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An Analytical Technique for Determining Efficient Portfolios

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Abstract

This work simplifies the Lagrangian constraint optimization approach in determining optimal portfolios. In asset allocation and forming optimal solutions for portfolios, this technique easily identifies efficient sets; and if risk-averse investors measure the value of a portfolio in terms of its mean and its standard deviation, they will select portfolios on the efficient frontier. Through the use of modern portfolio theory, statistical quantities for each asset in the portfolio are quantified in terms of their expected rate of return and their expected short-term volatility. These risk-reward characteristics are combined and analyzed to produce the minimum variance set.

This approach utilizes mathematics to explicitly determine the efficient portfolio which minimizes risk for a desired expected portfolio rate of return. The presented method is in contrast to previous techniques, which identify the optimal portfolio weights through an iterative procedure.

Background

The work of Markowitz, Sharpe, Fama, Treynor and Black defined current modern portfolio theory in finance literature. From a given collection of risky assets and linear constraints, the optimal portfolio weights can be found by solving a system of \( m+n \) linear equations with \( m+n \) unknowns. Mathematically, this is a problem with an objective function and \( n \) linear constraints. Through the use of statistical quantities, the market can be examined as a whole and portfolios can be determined for desired performance characteristics. Expected returns of assets in the portfolio are determined through the use of historical data and risk is measured by the standard deviation.

The model for analyzing risk relies on probability distributions of some
quantifiable outcome. Since an investment’s rate of return is the relevant outcome of an investment, financial risk analysis focuses on the probability distribution of rates of return. Modern portfolio theory uses the mean and variance of the returns as the basis of investment decisions in the risk-reward space. The logic of using only the rate of return may seem simplistic compared with more in-depth security analysis techniques that stress ratio analysis of financial statements, management interviews, industry forecasts, the economic outlook, and financial markets. In practice, however, there is no contradiction in these two approaches. After the fundamental security analysis is complete, one needs to convert the estimates into several possible rates of return and attach probability estimates to each. The security analyst’s consideration of the market demand for the firm’s products and the success of research and development, management depth and ability, and macroeconomic conditions are all duly reflected in the forecasted rates of return and their probabilities. Thus, the variability of the expected return is a measure of risk grounded in fundamental analysis of the firm, its industry, and the economic outlook.

Discussion

A central component to the calculation of efficient portfolios is the variance-covariance matrix. Let the variance-covariance matrix for an \( m \)-asset portfolio be denoted as:

\[
V = \begin{bmatrix}
    \text{Cov}(r_1, r_1) & \text{Cov}(r_1, r_2) & \text{Cov}(r_1, r_3) & \cdots & \text{Cov}(r_1, r_m) \\
    \text{Cov}(r_2, r_1) & \text{Cov}(r_2, r_2) & \text{Cov}(r_2, r_3) & \cdots & \text{Cov}(r_2, r_m) \\
    \text{Cov}(r_3, r_1) & \text{Cov}(r_3, r_2) & \text{Cov}(r_3, r_3) & \cdots & \text{Cov}(r_3, r_m) \\
    \cdots & \cdots & \cdots & \ddots & \cdots \\
    \text{Cov}(r_m, r_1) & \text{Cov}(r_m, r_2) & \cdots & \cdots & \text{Cov}(r_m, r_m)
\end{bmatrix}
\]

By recognizing that the covariance of one asset to itself is the variance and that the covariance between returns of two assets is constant irrespective of the order, the variance-covariance matrix is symmetric can be simplified to:
Also let \( x \) denote a vector of portfolio weights for the \( m \) assets.

\[
x = [x_1 \ x_2 \ x_3 \ \cdots \ x_m]
\]

The variance of the portfolio can be computed using the following equation:

\[
\sigma^2(r_p) = x V x^T
\]

The equations above hold true for a portfolio without any constraints. However, in practical applications, constraints are a necessity. In particular, the two constraints are of interest: the sum of portfolio weights must be equal to 1.0 and the computed portfolio will have a return equal to the required rate of return. A Lagrangian function can be defined to incorporate these two constraints.

\[
L = \sigma^2(r_p) - \lambda_1 (x_1 + x_2 + x_3 + \cdots + x_m - 1) - \lambda_2 (x_1 k_1 + x_2 k_2 + x_3 k_3 + \cdots + x_m k_m - R_p) \quad (1)
\]

where \( \lambda_1 \) and \( \lambda_2 \) are Lagrangian multipliers, \( k_i \) are the rates of return for the \( i^{th} \) asset, and \( R_p \) is the required rate of return.

The above Lagrangian function can be generalized and expanded to include more constraints, the Lagrangian can be written as shown below.

\[
L = \sigma^2(r_p) - \lambda_1 (f_1) - \lambda_2 (f_2) - \cdots - \lambda_n (f_n)
\]

where \( f_j \) are the constraint functions (for \( j = 1 \) through \( n \)).
Differentiating the Lagrangian function with respect to the portfolio weights and Lagrangian multipliers, and setting the result equal to zero will produce a system of equations whose solution gives the portfolio weights that minimizes the function. The resulting equation can be written in the form of the linear algebraic equation

\[ Hy = z \]  

(2)

For the example of \( m \) assets and two linear constraints, i.e. the sum of portfolio weights equal to 1.0 and the portfolio return equal to the required rate of return, the components of Equation (2) are defined below.

\[ H \] is a bordered Hessian matrix as denoted below

\[
H = \begin{bmatrix}
2\sigma^2(r_1) & 2\text{Cov}(r_1, r_2) & 2\text{Cov}(r_1, r_3) & \cdots & 2\text{Cov}(r_1, r_m) & 1 & k_1 \\
2\text{Cov}(r_2, r_1) & 2\sigma^2(r_2) & 2\text{Cov}(r_2, r_3) & \cdots & 2\text{Cov}(r_2, r_m) & 1 & k_2 \\
2\text{Cov}(r_3, r_1) & 2\text{Cov}(r_3, r_2) & 2\sigma^2(r_3) & \cdots & 1 & k_3 \\
\vdots & \vdots & \vdots & \ddots & \vdots & \vdots & \vdots \\
2\text{Cov}(r_m, r_1) & 2\text{Cov}(r_m, r_2) & \cdots & 2\sigma^2(r_m) & 1 & k_m \\
1 & 1 & 1 & \cdots & 1 & 0 & 0 \\
k_1 & k_2 & k_3 & \cdots & k_m & 0 & 0
\end{bmatrix}
\]

(3)

\( y \) is the vector of portfolio weights and Lagrangian multipliers (for the \( m \) risky assets and two linear constraints).

\[ y^T = [x_1 \quad x_2 \quad x_3 \quad \cdots \quad x_m \quad \lambda_1 \quad \lambda_2] \]

\( z \) is a vector defined as follows:

\[ z^T = [0 \quad 0 \quad 0 \quad \cdots \quad 0 \quad 1 \quad R_p] \]
Solving for the vector $y$ produces the portfolio weights necessary to achieve the desired portfolio rate of return, $R_p$.

\[ y = H^{-1}z \]

Previously, the determination of an efficient portfolio involved graphical techniques. For example, starting with the minimum variance set diagram, one would locate a position on the vertical axis equal to the risk-free rate, $r_f$. Using this point as a basis, the Capital Market Line (CML) is constructed as a tangent to the efficient frontier. The line itself has the property of the greatest possible slope.

The tangent point results in an efficient portfolio whose standard deviation is estimated from the slope of the CML and the portfolio rate of return. This method produces an estimated portfolio risk whose accuracy is dependent upon the density of the discrete sample points.

In the new approach presented below, the exact value of the risk, i.e. standard deviation, can be attained by utilizing subcomponents of the inverted bordered Hessian matrix, the Lagrangian multipliers, and the constraint values. In examining the bordered Hessian matrix, in equation (3), it is noted that the upper left terms are consistent with the variance covariance matrix, $V$. Additionally, because of the symmetric property, the upper right and lower left elements are equivalent. Thus, the bordered Hessian matrix can be sub-divided into four sub-matrices as shown:
\[
H = \begin{bmatrix}
2\sigma^2(r_1) & 2\text{Cov}(r_1, r_2) & 2\text{Cov}(r_1, r_3) & \cdots & 2\text{Cov}(r_1, r_m) & 1 & k_1 \\
2\text{Cov}(r_1, r_2) & 2\sigma^2(r_2) & 2\text{Cov}(r_2, r_3) & \cdots & 2\text{Cov}(r_2, r_m) & 1 & k_2 \\
2\text{Cov}(r_1, r_3) & 2\text{Cov}(r_3, r_2) & 2\sigma^2(r_3) & \cdots & \cdots & \cdots & \cdots \\
\vdots & \vdots & \vdots & \ddots & \vdots & \vdots & \vdots \\
2\text{Cov}(r_1, r_m) & 2\text{Cov}(r_m, r_2) & \cdots & \cdots & \cdots & \cdots & \cdots \\
1 & 1 & 1 & \cdots & 1 & 0 & 0 \\
k_1 & k_2 & k_3 & \cdots & k_m & 0 & 0
\end{bmatrix}
\]

\[
= \begin{bmatrix}
2\mathbf{V} & \mathbf{K} \\
\mathbf{K}^T & 0
\end{bmatrix}
\]

where \( \mathbf{V} \) is the \( m \times m \) variance-covariance matrix and \( \mathbf{K} \) is a \( m \times n \) matrix (\( m \) is the number of assets and \( n \) is the number of constraints). Shown below are the matrices for the example of two constraints.

\[
\mathbf{V} = \begin{bmatrix}
\sigma^2(r_1) & \text{Cov}(r_1, r_2) & \text{Cov}(r_1, r_3) & \cdots & \text{Cov}(r_1, r_m) \\
\text{Cov}(r_1, r_2) & \sigma^2(r_2) & \text{Cov}(r_2, r_3) & \cdots & \text{Cov}(r_2, r_m) \\
\text{Cov}(r_1, r_3) & \text{Cov}(r_2, r_3) & \sigma^2(r_3) & \cdots & \cdots \\
\vdots & \vdots & \vdots & \ddots & \vdots \\
\text{Cov}(r_1, r_m) & \text{Cov}(r_m, r_2) & \cdots & \cdots & \sigma^2(r_m)
\end{bmatrix}
\]

\[
\mathbf{K} = \begin{bmatrix}
1 & k_1 \\
1 & k_2 \\
1 & k_3 \\
\vdots & \vdots \\
1 & k_m
\end{bmatrix}
\]

Additionally, the vector \( \mathbf{y} \) can be divided into two sub-vectors: the portfolio weights, \( \mathbf{x} \), and the Lagrangian multipliers, \( \lambda \). This is shown below.
Finally, the vector $z$ can also be divided into two sub-vectors: a zero vector and the constraint values, $C$, as shown below.

$$z^T = \begin{bmatrix} 0 & 0 & 0 & 1 & R_p \end{bmatrix} = \begin{bmatrix} 0 & C \end{bmatrix}$$

With the above sub-matrices and sub-vectors defined, equation (2) can be rewritten as follows:

$$Hy = z$$

$$\begin{bmatrix} 2V & K \\ K^T & 0 \end{bmatrix} \begin{bmatrix} x \\ \lambda \end{bmatrix} = \begin{bmatrix} 0 \\ C \end{bmatrix}$$

The equation can now be separated into two distinct matrix operations. The result is

$$2V_{\bar{x}} + K\lambda = 0$$

$$K^T \bar{x} = C$$

By noting that the relationship $\bar{x}^TK = (K^T\bar{x})^T$ holds true, the first set of equations can be used to determine the portfolio standard deviation.
Thus the portfolio variance and standard deviation are given by the following equations:

\[ \sigma^2(r_p) = \mathbf{x}^T \mathbf{V} \mathbf{x} \]
\[ = -\frac{1}{2} \mathbf{C}^T \mathbf{\lambda} \]
\[ \sigma(r_p) = \sqrt{-\frac{1}{2} \mathbf{C}^T \mathbf{\lambda}} \]

This equation for the standard deviation eliminates the need to iteratively determine the CML and estimate the risk associated with the efficient portfolio.

**Data and Analysis**

We have collected 34 monthly observations for a portfolio comprised of nine risky assets and one risk free asset. The nine risky assets are: Millennium Pharmaceutical (MLNM), Wells Fargo (WFC), AT&T (T), IBM, Pfizer (PFE), Home Depot (HD), EMC, Wal-Mart (WMT), and Cisco Systems (CSCO). A T-bill having a risk-free rate is the final portfolio asset. The required portfolio return is 4% and in addition to the two normalization constraints we have added a third constraint: that the investment in Wells Fargo to be 10% of the overall portfolio. The last three columns of the inverted bordered Hessian matrix, also known as the Jacobean matrix, is:

\[
\begin{array}{ccc}
0.00 & 2.49 & -0.06 \\
0.00 & 0.00 & 1.00 \\
0.00 & -6.30 & 0.07 \\
0.00 & 1.53 & -0.49 \\
0.00 & 5.45 & -0.45 \\
0.00 & 0.79 & 0.04 \\
0.00 & 2.49 & 0.32 \\
0.00 & 6.42 & -0.38 \\
0.00 & 2.40 & -0.03 \\
1.00 & -15.26 & -0.02 \\
0.00 & 0.00 & 0.00 \\
0.00 & -1.00 & 0.00 \\
0.00 & 0.00 & -0.01
\end{array}
\]
Multiplying the above sub-matrix by the transpose of C vector below:
\[
C^T = \begin{bmatrix}
1 & 0.04 & 0.10
\end{bmatrix}
\]
will produce the portfolio weights, i.e. the proportions to be invested in the above companies, and the Lagrangian multipliers.

The result in this example is as follows:

<table>
<thead>
<tr>
<th>T-bill</th>
<th>MLNM</th>
<th>WFC</th>
<th>T</th>
<th>IBM</th>
<th>PFE</th>
<th>HD</th>
<th>EMC</th>
<th>WMT</th>
<th>CSCO</th>
<th>(\lambda_1)</th>
<th>(\lambda_2)</th>
<th>(\lambda_3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.39</td>
<td>0.09</td>
<td>0.10</td>
<td>0.24</td>
<td>0.01</td>
<td>0.17</td>
<td>0.04</td>
<td>0.13</td>
<td>0.22</td>
<td>0.093</td>
<td>0</td>
<td>-0.04</td>
<td>-0.00044</td>
</tr>
</tbody>
</table>

The variance of this portfolio can be easily computed by multiplying the vector \(C^T\) and the vector \([\lambda_1 \ \lambda_2 \ \lambda_3]\). From this, the standard deviation is calculated by \(\sigma(r_p) = \sqrt{-\frac{1}{2}C^T\lambda}\).

\(\sigma(r_p) = 0.028461\)

The associated minimum variance set and CML for this portfolio is plotted below.
Conclusions
This work offers a method to make the process of constraint optimization in asset allocation easier and more straightforward. For practitioners, as well as academics, the above method makes the formation of portfolios with different desired rates of return possible by using one simple calculation. In addition, the computation of risk (standard deviation) of such portfolios is simple and far more accurate than traditional techniques.

References
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A Comparative Study of Pricing of Audit Services in Emerging Economies

Abstract

This paper contributes to under researched issue of how auditors charge for their services by empirically examining audit fee determinants in three emerging economies within South Asia. Using data from 108 Bangladeshi firms, 213 Indian firms and 191 Pakistani firms for the year 1997-98, the results show that size of the reporting entity and size of the audit firms are the two most important determinants across the three countries. Among the three other variables, estimated risk index and auditee complexity variables are found to be significant only for the Indian firms. The results of this study provide useful insights into the role of contracting cost variables and auditors’ billing practices in comparative and emerging economies, in general and, South Asia, in particular.

Key words: Audit fee; Size; Risk; Complexity; Big versus small audit firms; South Asia; Bangladesh; India; Pakistan; and Emerging economies.
1. INTRODUCTION

The determination of audit fee is not an uncommon problem faced by auditors and their clients. Concern has been expressed about the escalating cost and time taken to complete the audit (Taylor & Baker, 1981). Auditors react that the fees charged are inadequate in relation to their audit services provided, while clients argue that audit fees are too high. Therefore, an audit fee determinants model can be of value to both the auditor and client. The model can also provide an objective benchmark for fee-setting by highlighting the determinants of audit fees (Gist, 1992).

There are various determinants that affect audit fees, for example, auditee size, loss, financial condition, auditee complexity/risk, and international linkage, etc. Johnson, Walker, & Westergaard (1995) provide a review of audit fee variables tested in prior audit fee model studies in various countries including Australia, Hong Kong, India, Malaysia, New Zealand, Singapore, United Kingdom, and the United States.

Several studies have examined the factors that affect the level of pricing of audit services (for example, (Simunic, 1980); (Francis, 1984); (Firth, 1985); (Simon, Ramanan, & Dugar, 1986); (Francis & Simon, 1987); (Low, Tan, & Koh, 1990); (Chan, Ezzamel, & Gwillium, 1993); and (Johnson, Walker, & Westergaard, 1995)). A majority of these studies use regression analysis (an ordinary least square model) on identified variables of corporate sector firms. These studies provide evidence on the association of audit fees with auditee size, auditee complexity, loss exposure, auditee risk and audit firm size.

To our knowledge, there has been limited published work on audit fee models in emerging countries (other than, (Karim & Moizer, 1996) and (Ahmed & Hossain, 2000) for Bangladesh and (Simon, Ramanan, & Dugar, 1986) for India). The main purpose of this study is to extend previous research by examining the determinants of external audit fees charged to publicly listed companies in Bangladesh, India and Pakistan.

This study is significant in that a specific market (emerging countries) is investigated in which cultural, socio-economic, political and economical fundamentals are different than those in western developed countries but share very similar socio-economic and cultural environments. Further, the accounting profession, company regulatory provisions and the market for audit services in Bangladesh, India and Pakistan are similar, it is expected that the determinants of audit
fees would be similar across the three countries. With globalization of trade, government policies emphasizing market-oriented economies and the recent growth of capital markets, a study of pricing of audit services in emerging nations has even become more relevant for international and domestic investors. This study examines this important issue by undertaking a comparative analysis on the determinants of audit fees by using a large sample of listed companies in three emerging countries in South Asia- Bangladesh, India and Pakistan.

Bangladesh, India and Pakistan, together formerly known as the Indian sub-continent, occupy an important position in the Asian region in terms of geographical location, population and economic potential. The stock markets in all three countries have been in existence for more than 80 years and have experienced rapid growth in recent times both in number of listed companies and volume of trading. Following liberalization of economic policies, overseas direct investment and participation in the securities markets in these countries have increased many folds, state ownership in the productive sector has reduced and private sector investments have been expanded. At the end of 1998, the total market capitalization of the stock exchanges in Bangladesh, India and Pakistan was about US$1,034 million, US$105,188 million and US$5,418 million, respectively ((IFC), 1999), with each achieving positive economic growth in the last decade. In 1998, there were 5,860 firms listed on the Mumbai (formerly Bombay) Stock Exchange in India, which is the second largest in the world based on the number of listed firms. The accounting professional bodies in these countries have established a regional body called the South Asian Federation of Accountants (SAFA) to harmonize accounting and reporting practices in the region within the framework of the South Asian Regional Cooperation (SARC).

The overall results of the study show that a significant association exists between audit fees and auditee size across all the three countries. Among the three other variables such as estimated risk index, loss, and auditee complexity, only estimated risk index and auditee complexity variables are found to be significantly related to audit fees for Indian firms. The Big-5 or affiliated to Big-5 audit firms were charging a premium fee in across all three countries.

This paper is organised as follows: Section 2 provides a brief regulatory accounting and auditing profession in Bangladesh, India and Pakistan followed by model and hypothesis development, including descriptions of variables selected in the study in Section 3. Section 4 describes the research design including the sample and selection procedures. Section 5 presents and discusses
the empirical results, followed by a summary of the paper, limitations and conclusions in Section 6.

2. THE LEGAL AND INSTITUTIONAL FRAMEWORK FOR CORPORATE FINANCIAL REPORTING IN SOUTH ASIA

Corporate financial accounting and reporting by public companies in Bangladesh, India and Pakistan is mainly governed by the Companies Act and professional accounting bodies, which are modelled on the British system introduced during the British colonial era. Further, financial reporting of Stock Exchange listed companies is influenced by the Securities and Exchanges Act within these countries. The professional accounting bodies are empowered to promulgate accounting standards, which are primarily based on International Financial Reporting Standards (IFRS) issued by the International Accounting Standards Board (IASB).

The Legal Framework

Bangladesh, India and Pakistan inherited the Companies Act 1913 as the main company legislation following their independence from the British until it was replaced by The Companies Act, 1956 in India, The Companies Ordinance, 1984 in Pakistan, and The Companies Act, 1994 in Bangladesh. These Acts, however, have gone through amendments since the promulgation, particularly in India. With respect to financial reporting, these Acts require companies, among others, to keep proper books of accounts and to prepare and send financial statements to their shareholders in order to reflect a true and fair view of the state of affairs of the company. Companies are required to verify their accounts by independent qualified auditors.

For listed companies, all three countries have separate Securities and Exchange Commission in pursuance of the Securities and Exchange Act to protect investors and to monitor issue of securities, directors’ rights and responsibilities, and financial reporting with a view to promote and broaden the capital market. The detailed financial reporting disclosure requirements are contained in separate schedules. The securities authorities in all three countries require all listed companies to comply with existing regulations, in addition to complying with rules regarding keeping of accounts and verifications thereof.
Professional Accounting in South Asia

Like the company legislations, the structure of professional accounting bodies is modelled on the UK. There are two important professional accounting bodies in each country responsible for financial accounting and verification of accounts. These are the Institute of Chartered Accountants and the Institute of Cost and Management Accountants (slightly different title in India ie Institute of Cost and Works Accountants of India). Members of the Chartered Accountants Institute are eligible to practice and verify accounts prepared by both private and public limited companies. Both Institutes of each country are members of the International Accounting Standards Board (IASB) and have been given power by the government to promulgate accounting standards in order to improve corporate financial reporting. Companies are required to comply with standards and external auditors are expected to verify whether reporting practices are consistent with existing company legislations and accounting standards. External independent auditors are appointed by the board of directors and are approved by shareholders at the Annual General Meeting of the company. Auditors are generally appointed for one year and are eligible for reappointment. Specific details regarding the appointment and termination of auditors are contained in the Companies Act. For listed companies, the Securities and Exchange Act stipulates further conditions regarding auditor’s appointment and termination and requires company directors to submit audited financial statements within a certain period, not exceeding six months to the Authority\(^2\).

3. MODEL AND HYPOTHESIS DEVELOPMENT

Simunic (1980) and Taylor & Baker (1981) provide the framework for the determinants of audit fees in which audit fee as dependent variable and several firm-specific independent variables such auditee size, complexity, risk, financial condition are used as the explanatory variables in a cross-sectional Ordinary Least Squares regression model. Subsequently, several researchers have extended and modified this model and employed it in different research settings. An extensive literature review can be found in (Yardley, Kauffman, Cairney, & Albrecht, 1992); (Anderson & Zeghal, 1994); and (Johnson, Walker, & Westergaard, 1995). Generally, proxy variables for auditee size, audit complexity, audit risk, and audit firm size are significantly associated with audit fees.
On the basis of previous studies on audit fee model, we develop the following model:

\[
\text{Log of audit fees} = \alpha + \beta_1 \text{LTASS} + \beta_2 \text{EATDUM} + \beta_3 \text{ZFCINDEX} + \beta_4 \text{INVRTTA} + \beta_5 \text{SAF} + \varepsilon
\]

Where

LTASS = size of the firm measured as the natural log of total assets;

EATDUM = firm’s operating condition measured as a dummy variable if earnings are negative 1, otherwise zero;

ZFCINDEX = estimated risk index also called Z-index of the financial condition of a company;

INVRTTA = firm’s complexity measured as the proportion of inventory and receivable to total assets;

SAF = size of audit firm, dummy variable if a big auditor 1, otherwise zero; and

\(\varepsilon\) = residual error term.

Explanations for the variables selected in this study are given below:

**Dependent variable:**

**Audit Fee (LFEE)**

Audit fee is calculated on the basis of amount spent on external audit. This fee is determined with the mutual agreement between the auditor and auditee and mostly on a yearly basis. Generally audit fee is logged. There are numerous factors that determine the fee levels. For example, (Low, Tan, & Koh, 1990) suggest that audit fees are primarily a function of audit hours, which in turn are dependent upon the extent of audit risks.

Firm specific information, including audit fees are obtained from the annual reports. Consistent with most previous audit fee research, we use the amount of expenditure on external audit as a proxy for monitoring provided by the auditors. This is denoted by AUDFEE in local currency of that particular country. A log transformation is undertaken to improve the normality of the data and to reduce any skewness. The variable is denoted by LFEE {Log Fee}.

**Independent variables:**

**Auditee Size (LTASS)**
Audit fee depends on the size of auditee firm. There are many indicators of an entity’s size and the most common are total assets, turnover and net profit before tax. Most researchers favour the value of total assets, as it is a good indicator in determining how much audit effort is involved. Researchers in last two decades have found a positive relationship between size and fees (eg. (Simunic, 1980); (Taylor & Baker, 1981); (Firth, 1985); (Simon, Ramanan, & Dugar, 1986); (Brinn, Peel, & Roberts, 1994). It is evident from previous research that client size is the most significant explanatory variable in determining audit fees. A firm with large assets or turnover will have to pay more in audit fees, as an auditor has to spend more time and resources to perform the audit of a large firm which therefore can expect higher charges. The large firms are more decentralised and therefore the problem of asymmetric information is probably more severe in large firms. The contracting constituents in large firms may demand greater monitoring and control from auditing and hence incur higher costs than small firms to resolve their agency problems. A large organisation is more complex and an auditor has to spend more time and resources to ensure that accounts are prepared in conformity with the Generally Accepted Accounting Principles (GAAP).

Auditee size is measured by the end of year book value of total assets. Simon, Ramanan, & Dugar, (1986) use log of total assets in their audit model for Indian companies. Logarithmic transformation was then undertaken to normalise the distribution of data set. This variable is labelled LTASS {Log of total assets for size}.

Operating Condition (EATDUM)

Operating condition is an accounting convention, which is based on the premise that a firm will continue to operate in the future. This will depend on an entity’s overall performance each year. If a company is profitable and performs better it is considered that the firm would continue to operate. Contrary to this, if a company incurs loss it may be regarded as risky. A priori, one would expect a higher audit risk to be associated with higher audit fees as a consequence of more audit testing or as an insurance premium (Chan et al., 1993). The riskiness of audit also increases when a firm incur losses, which in turn, increases the probability of a firm’s violation of debt covenants and eventual bankruptcy increases. The probability of bankruptcy affects an auditor’s going concern judgement. (Simunic, 1980), (Francis, 1984) and (Brinn, Peel, & Roberts, 1994).
A dummy variable for loss is used and we labelled it as EATDUM \{Binary = 1, if earnings are negative, otherwise zero\}. We estimate a negative association of this variable with audit fee. This is consistent with other research as whose loss making variable is positively (or negatively) associated with audit fee (Brinn, Peel, & Roberts, 1994).

**Financial Condition (ZFCINDEX)**

Financial condition of the firm is an important determinant of how an auditor would spend time during the audit process. If the financial condition is healthy, then the audit would perceive that the risk associated with audit is minimum. On the other hand, if the firm is in poor financial condition then the risk of financial distress and bankruptcy increases. In that situation, the perceived risk that auditors would fail to identify omission or mistakes within the accounting systems will increase which in turn increase the overall audit risk. Auditors in that situation tend to spend more time to minimise their own risk of being sued for negligence or lack of professionalism.

However, it is inappropriate to measure a firm’s financial condition based on one variable. In this study, a combined index is used to reflect a firm’s financial condition following (Zmijewski, 1984) bankruptcy model. Although several bankruptcy models have been developed in the US, no such model has been developed in the context of emerging nations. However, (Jaggi & Tsui, 1999) have argued that the (Zmijewski, 1984) model is relevant for other countries such as Hong Kong. In this study also, we use (Zmijewski, 1984) model shown below:

\[ ZFC= -4.336 - 4.513 \text{ (ROA)} + 5.679 \text{ (FINL)} + 0.004 \text{ (LIQ)} \]

Where \( ZFC \) represents an estimated risk index of the financial condition of the company. The higher the value of the index the higher the propensity to fail and the weaker the financial condition (Jaggi & Tsui, 1999). ROA is measured as the net income divided by total assets multiplied by 100, FINL as the ratio of total debt to total assets, and LIQ as the ratio of current assets to current liabilities. A positive association between the index and audit fee is expected.

**Complexity (INVARTTA)**
Like auditee size, auditee complexity has been incorporated in most audit fees studies (see, for example, (Walker and Johnson, 1996) for a review of the literature). Accounts receivables and inventory have been introduced to measure the auditee complexity (Simunic, 1980); (Francis & Simon, 1987); and (Brinn, Peel, & Roberts, 1994). The contention is that because it is hard to audit a given amount of these items than to audit other financial statement items, firms with large amount of inventory and receivable should require more efforts by auditors in verifying these accounts and this, therefore, results in higher audit fees.

Auditee complexity is calculated as a sum total of accounts receivable and inventory as a percentage of total assets. The variable is labelled INVARTTA (Portion of inventory and accounts receivable to total assets). A positive relationship between this variable and audit fee is expected. This is consistent with other research (Johnson, Walker, & Westergaard, 1995) and (Ahmed & Hossain, 2000).

*Size of Audit Firm (SAF)*

The Big 5 audit firms (Andersen, Deloitte & Touche, Ernst & Young, KPMG, and Pricewaterhouse Coopers) are likely to pay more attention to verify the accounts of their clients. These firms have their offices in most big cities in the world. Alternatively, these firms have affiliated or linkage with the local big audit firms, for example, in Bangladesh (Ahmed & Hossain, 2000). An extensive research literature has described the importance of audit by Big firms versus small firms.

Size of audit firm has been included because previous research has shown conflicting results. Large audit firms are more likely to have complex accounting systems and geographically dispersed operations. Large accounting firms are more likely to have specialised audit skills and also numerous offices which can perform the necessary participating engagements for companies with dispersed operations (Francis, 1984).

As in (Ahmed & Nicholls, 1994), audit firms have been classified as being small or big according to the following criteria: (1) international linkages; (2) number of firms audited in the sample. This information on audit firm size and local affiliates was obtained from Institute of Chartered Accountants of India (ICAI), Institute of Chartered Accountants of Pakistan (ICAP) and Karim and Moizer (1996) on India, Pakistan and Bangladesh. If a firm is linked with one of the Big Five accounting firms, it will be categorised as a big firm. Further, number of client companies an audit
firm had during the year 1998-99 was obtained by reading the audit firm’s name from the company’s annual report. Regarding deciding on the reputation of an audit firm advice from academics and accounting professionals from these countries were sought. Based on these three criteria, a dummy variable is constructed where a 1 is assigned when a firm is considered big, otherwise a 0. The variable is labelled SAF. A positive sign is predicted between this variable and audit fees.

4. RESEARCH DESIGN

Sample Selection

The sample consists of 108 Bangladeshi firms listed on the Dhaka Stock Exchange (DSE); 213 Indian firms listed on the Mumbai (formerly named, Bombay) Stock Exchange (MSE); and 191 Pakistani firms listed on the Karachi Stock Exchange (KSE) as at December 1999 for which annual reports were available for the year ended on either 31 December 1998 or 30 June 1999. Table 1 provides full details of the number of sample companies by country used in this study. Following previous research we excluded banks, insurance and mutual funds because each operates under different regulations. The annual reports were hand collected from the DSE; MSE; and KSE libraries and, in the case of missing reports, from the head office of the Securities and Exchange Commission (SEC) and companies’ head offices located in the major cities of the concerned country. Since the sample is not random, some cautions are warranted in generalising the findings. However, such a large sample represents fairly all industries.

5. RESULTS

Descriptive statistics of the variables are presented in Table 2. It shows Indian companies are larger in size, as measured by total assets, with an average of Indian Rs 4.76 million, followed by Pakistan Rs. 2.11 million and Bangladeshi Tk. 0.640 million. The standard deviation of this variable is large across all three countries, and skewness and kurtosis reveal size measures are not normally distributed. Therefore, following prior research, the log (base 10) of this variable is taken to handle non-normal data and used in the regression model. Net income figure (not reported in table) shows Indian companies, on average, made about seven times more profit than
Bangladeshi companies and about five times more profit than Pakistani companies during the period under study, which is consistent with company size. ZFCINDEX indicates that financial condition, measured on the basis of Zmijewski’s (1984) model, is similar in Bangladesh, India and Pakistan. However, the large standard deviation statistics suggest there are variations across the companies in these countries. There is not much variation in INVARTA across the three countries both in terms of average and standard deviation.

It shows that all explanatory variables are fairly normally distributed except, AUDFEE and TOTASS. Since these variables are highly skewed, logarithmic transformation was undertaken to reduce their skewness. The correlation matrix (not reported) indicates that the highest pairwise Pearson’s correlation coefficient is 0.344 between EATDUM and ZFCINDEX, followed by 0.240 between INVERTA and EATDUM. The third highest correlation coefficient is 0.216 between LTASS and EATDUM. All other possible combination of correlations is below 0.20 and not significant at the 0.10 confidence level. Therefore, it is considered that multicollinearity will not be a problem in the regression estimation.

**Multivariate Analysis**

Table 3 shows the results of the multivariate models under panel A: OLS and under panel B: Rank Regression. Panel A model shows that all independent variables (except EATDUM) are significant for the total sample. Auditee size and size of audit firm are significant in all three countries. Financial condition and complexity variables are significant for Indian companies only. Loss variable is significant only for Bangladeshi companies. This evidence is also consistent with (Karim & Moizer, 1996), who find no support for the relationship between LFEES and INVAR. As in all prior studies of audit fees, client size (LTASS) is significant at 1% and has the highest standardised beta (explanatory power of each variable) of 0.553, followed by INVARTTA (0.234) and SAF (0.118) for overall data. The overall $R^2$ is 47%. This provides additional empirical support for client size and audit fees relationship in a developing and emerging market, although, these results are not consistent among the three countries, the coefficient of each variable is LTASS (0.188), followed by SAF (0.145) and EATDUM (-0.143) for Bangladesh; LTASS (0.557), followed by INVARTTA (0.298) and SAF (0.232) for India; and LTASS (0.443), followed by SAF (0.172) for Pakistan. These results indicate that in Bangladesh firm size and audit firm size; in India firm size, firm’s financial condition, audit firm size and firm’s
complexity; and in Pakistan firm size, and audit firm size are significant determinants of audit fees. However, to our expectation, EATDUM is negative in all countries. The model’s $R^2$ is 24%; 51% and 42% for Bangladesh, India and Pakistan respectively.

We repeat the foregoing multivariate analyses using rank regression. Lang & Lundholm (1993) have suggested the use of ranked regression as a powerful alternative estimation model for coping with data sets with skewed distribution and when there is a potential for non-linear and monotonic relations between the dependent and explanatory variables. Ranked regression requires all continuous variables to be ranked either in ascending or descending order and regression of the ranked endogenous variable on the ranked (continuous) and unranked (dichotomous) exogenous variables.

When we run rank regression model, shown under panel B, the overall size coefficient increased to 0.638 followed by SAF (0.171) and INVARTTA (0.123). The overall adjusted $R^2$ increased to 50%. The rank regression model for Bangladesh improves the marginal explanatory power (coefficient) of firm size to 0.274 followed by SAF (0.176). The model also shows the coefficient of total assets (0.683), SAF (0.188) and INVARTTA (0.125) for India, and LTASS (0.535) and SAF (0.232) for Pakistan. Overall both parametric OLS and non-parametric (ranks regression) are consistent in terms of identifying significant determinants of audit fees.

The results reveal that for both models (F statistic) are highly significant, with adjusted $R^2$s are about 49%. These are, however, lower than reported in a previous study of Bangladesh (e.g., (Karim & Moizer, 1996) $R^2 = 56$ percent) and India (e.g., (Simon, Ramanan, & Dugar, 1986).

To test whether models are properly fitted, the residuals are examined by plotting against the fitted values, and diagnostic tests such as Wald tests for normality were undertaken for the two models. The results suggest little deviation from normality. On the whole, the empirical results suggest that auditee size and size of audit firm are the most significant determinants of audit fee variation.

6. SUMMARY, LIMITATIONS AND CONCLUSIONS

This paper examines empirically the determinants of audit fees in Bangladesh, India and Pakistan. The study complements earlier research by incorporating variables such as auditee size, auditee
complexity, financial condition and size of audit firm. This study also examines the determinants of audit fees comparatively where firms are required to prepare financial statements under the provisions of the Companies Act of each country and increased auditors’ role and duties derived from liberalisation of the economies in pursuit for external funds. The empirical results obtained from cross-sectional regressions indicate that the determinants of audit fees in South Asian countries are similar to those of other developed and industrial countries; that is, audit fees are strongly related to client size, audit risk, and complexity variables. Another important finding is the existence of a premium fee paid to Big Five or affiliated to Big Five auditors consistent with prior studies.

This study contributes to the extant literature audit fee studies by focusing on comparative studies using data from three emerging and important countries within Asia-Pacific region where the market for audit services is not highly regulated and demand mainly derives from legislative requirements such as the Companies Act.

The conclusions drawn from this study are constrained by several caveats. First, the statistical analyses carried out in this study may suffer from an omitted explanatory variables problem. For example, analytical and theoretical studies (e.g., (Feltham, Hughes, & Simunic, 1991) indicate that corporate governance decisions including the use of audit services are likely to be influenced by supply side factors such as perceived audit risk and the litigation risk. Therefore, it is possible that the empirical evidence documented in this study could be affected by cross-sectional differences in omitted supply side factors that influence audit fees. The second caveat pertains to measurement errors of variables included in empirical tests. If the proxies of loss and cost of audit services induce errors in the model, the measurement error could potentially reduce the power of the test conducted in this study.

There are several issues that can be addressed in future research. For instance, the inclusion of other supply-side factors as determinants of audit fees could provide a more powerful test of the theory. Future research could also benefit by considering the interdependencies using simultaneous equations model by incorporating both demand and supply side variables. Additionally, refinements of the proxy for loss are warranted to eliminate alternative explanations of empirical findings.
References:


ICAI (2002), The Institute of Chartered Accountants of India (http://www.icai.org/).

ICAP (2002), The Institute of Chartered Accountant of Pakistan (http://www.icap.org.pk/).


Table 1

<table>
<thead>
<tr>
<th></th>
<th>Bangladesh</th>
<th>India</th>
<th>Pakistan</th>
<th>Total</th>
</tr>
</thead>
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<tr>
<td>Annual Reports received</td>
<td>120</td>
<td>239</td>
<td>226</td>
<td>585</td>
</tr>
<tr>
<td>Missing information</td>
<td>12</td>
<td>26</td>
<td>35</td>
<td>73</td>
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<tr>
<td>Usable reports</td>
<td>108</td>
<td>213</td>
<td>191</td>
<td>512</td>
</tr>
</tbody>
</table>

Source: Annual reports from various companies operating in Bangladesh, India and Pakistan.
### Table 2
Descriptive Statistics on the Variables According to Country and Total Sample

<table>
<thead>
<tr>
<th>Variable</th>
<th>Bangladesh</th>
<th>India</th>
<th>Pakistan</th>
<th>Total sample</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N=108</td>
<td>n=213</td>
<td>n=191</td>
<td>n=512</td>
</tr>
<tr>
<td>Mean</td>
<td>Median</td>
<td>St. Dev</td>
<td>Range</td>
<td>Mean</td>
</tr>
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<td>AUDFEE</td>
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<td>75348</td>
<td>424420</td>
<td>1056507</td>
</tr>
<tr>
<td></td>
<td>30000</td>
<td>627000</td>
<td>160160</td>
<td>13097000</td>
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<tr>
<td>LAUDFEE</td>
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<td>0.58</td>
</tr>
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<td></td>
<td>4.47</td>
<td>2.10</td>
<td>5.20</td>
<td>3.64</td>
</tr>
<tr>
<td>TOTASS</td>
<td>6.40E+05</td>
<td>1.02E+05</td>
<td>4.76E+06</td>
<td>1.23E+7</td>
</tr>
<tr>
<td></td>
<td>2.65E+05</td>
<td>6.32E+06</td>
<td>1.17E+06</td>
<td>8.95E+7</td>
</tr>
<tr>
<td>LTASS</td>
<td>8.44</td>
<td>0.58</td>
<td>9.11</td>
<td>0.67</td>
</tr>
<tr>
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<td>8.42</td>
<td>2.89</td>
<td>9.06</td>
<td>3.52</td>
</tr>
<tr>
<td>EATDUM</td>
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<td>0.28</td>
<td>0.45</td>
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<td>0.00</td>
<td>1.00</td>
<td>0.00</td>
<td>1.00</td>
</tr>
<tr>
<td>ZCFINDEX</td>
<td>-0.48</td>
<td>6.31</td>
<td>-0.66</td>
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<td>-1.75</td>
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<td>0.31</td>
<td>0.97</td>
<td>0.35</td>
<td>0.87</td>
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<tr>
<td>SAF</td>
<td>0.39</td>
<td>0.49</td>
<td>0.30</td>
<td>0.45</td>
</tr>
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<td></td>
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</tr>
</tbody>
</table>

Tk. = Taka, local currency of Bangladesh, exchange rate is US $1.00 = 57.00 BDT (Bangladesh Taka) [www.xe.com/ucc/convert.cgi](http://www.xe.com/ucc/convert.cgi), accessed 20 May 2002

Rs. = Rupees, local currency of India, exchange rate is US $1.00 = 48.99 INR (India Rupees). [www.xe.com/ucc/convert.cgi](http://www.xe.com/ucc/convert.cgi), accessed 20 May 2002

Rs. = Rupees, local currency of Pakistan, exchange rate is US $1.00 = 59.97 PKR (Pakistan Rupees) [www.xe.com/ucc/convert.cgi](http://www.xe.com/ucc/convert.cgi), accessed 20 May 2002

Variable description:
AUDFEE: audit fees
LAUDFEE: natural log of audit fee
TOTASS: total assets
LTASS: natural log of total assets
EATDUM: dummy variable; if earnings are negative 1, otherwise zero. This variable is a proxy for operating condition
ZCFINDEX: Z index indicating financial condition
INVARTTA: proportion of inventory and receivables to total assets
SAF: size of audit firm
Table 3
Multiple Regression Results on Reporting Lag According to Country and Overall Sample

**Panel A (OLS):** \( \text{LFEEs} = \alpha + \beta_1 \text{LTASS} + \beta_2 \text{EATDUM} + \beta_3 \text{ZCFINDEX} + \beta_4 \text{INVARTTA} + \beta_5 \text{SAF} + \epsilon \)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Bangladesh</th>
<th>India</th>
<th>Pakistan</th>
<th>Total sample</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sign</td>
<td>Coeff.</td>
<td>T-value</td>
<td>Coeff.</td>
</tr>
<tr>
<td>LTASS</td>
<td>+</td>
<td>0.188</td>
<td>3.334**</td>
<td>0.557</td>
</tr>
<tr>
<td>EATDUM</td>
<td>+</td>
<td>-0.143</td>
<td>-1.671*</td>
<td>-0.093</td>
</tr>
<tr>
<td>ZCFINDEX</td>
<td>+</td>
<td>-0.265</td>
<td>-0.490</td>
<td>0.023</td>
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<tr>
<td>INVARTTA</td>
<td>+</td>
<td>0.027</td>
<td>0.183</td>
<td>0.298</td>
</tr>
<tr>
<td>SAF</td>
<td>+</td>
<td>0.145</td>
<td>2.242*</td>
<td>0.232</td>
</tr>
<tr>
<td>Intercept</td>
<td></td>
<td>2.290**</td>
<td>0.021</td>
<td>0.823*</td>
</tr>
<tr>
<td>R(^2)</td>
<td></td>
<td>23.6%</td>
<td>50.8%</td>
<td>41.7%</td>
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<tr>
<td>Adjusted R(^2)</td>
<td></td>
<td>19.9%</td>
<td>49.6%</td>
<td>40.2%</td>
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<tr>
<td>Model’s F-value</td>
<td></td>
<td>6.370</td>
<td>43.00**</td>
<td>26.639**</td>
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<td>Model’s sig level</td>
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<td>0.000</td>
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</table>

**Panel B (Rank Regression):** \( \text{LFEEs} = \alpha + \beta_1 \text{LTASS} + \beta_2 \text{EATDUM} + \beta_3 \text{ZCFINDEX} + \beta_4 \text{INVARTTA} + \beta_5 \text{SAF} + \epsilon \)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Bangladesh</th>
<th>India</th>
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<td>Sign</td>
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<td>T-value</td>
<td>Coeff.</td>
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<tr>
<td>LTASS</td>
<td>+</td>
<td>0.274</td>
<td>2.919**</td>
<td>0.683</td>
</tr>
<tr>
<td>EATDUM</td>
<td>+</td>
<td>-0.181</td>
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<tr>
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<td>-0.118</td>
<td>-1.162</td>
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<td>INVARTTA</td>
<td>+</td>
<td>0.032</td>
<td>0.334</td>
<td>0.125</td>
</tr>
<tr>
<td>SAF</td>
<td>+</td>
<td>0.176</td>
<td>1.933*</td>
<td>0.188</td>
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<tr>
<td>Intercept</td>
<td></td>
<td>43.680**</td>
<td>17.253*</td>
<td>26.890*</td>
</tr>
<tr>
<td>R(^2)</td>
<td></td>
<td>23.2%</td>
<td>54.6%</td>
<td>39.3%</td>
</tr>
<tr>
<td>Adjusted R(^2)</td>
<td></td>
<td>19.5%</td>
<td>53.5%</td>
<td>37.7%</td>
</tr>
<tr>
<td>Model’s F-value</td>
<td></td>
<td>6.230</td>
<td>49.975</td>
<td>24.113</td>
</tr>
<tr>
<td>Model’s sig level</td>
<td></td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
</tbody>
</table>

** and * indicates the t-value of coefficients are significant at the 1% and 5% levels respectively (two tailed test).

Variable description:
AUDFEE: audit fees
LAUDFEE: natural log of audit fee
TOTASS: total assets
LTASS: natural log of total assets
EATDUM: dummy variable; if earnings are negative 1, otherwise zero. This variable is a proxy for operating condition.
ZCFINDEX: Z index indicating financial condition
INVARTTA: proportion of inventory and receivables to total assets
SAF: size of audit firm

1 Other member countries are Sri Lanka, Nepal, Bhutan and Maldiv.
2 Authority means the regulatory body established by the Securities and Exchange Act within each country.
3 The statistic is calculated as follows: $W = n \frac{b_1^2}{6} + \frac{(b_2 - 3)^2}{24}$, where $b_1$ is skewness, $b_2$ is kurtosis and $n$ is the number of observation. $W$ is asymptotically distributed as chi-square with two degrees of freedom (Greene, 1991, p 329).
SPECIALIZED INTERNATIONAL EQUITY INVESTMENT WITH SELECTIVE HEDGING/SPECULATIVE STRATEGIES: A U.S. VIEWPOINT

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ABSTRACT

In this study we examine the construction and performance of specialized international stock portfolios. Assuming risk-neutrality and the random walk model we derive a rule-of-thumb that periodically selects the appropriate foreign stock index and is either long or short foreign currency contracts. The empirical results of testing the rule-of-thumb with an investment universe of six major foreign equity markets show that our rule-of-thumb provides superior performance in comparison with the unhedged strategy. As a side benefit of this study we test and reject the Unbiased Forward Rate Hypothesis (UFRH) in favor of the Random Walk Hypothesis (RWH).

INTRODUCTION

The benefits of international diversification have long been recognized. A recent ex ante international portfolio selection study by Eun and Resnick (1994) shows that when portfolios of stocks, bonds, and stocks and bonds are considered and the exchange rate risk is hedged with forward contracts, the risk/return configuration is much better over unhedged international portfolio investment for bond portfolios and stock and bond portfolios, but only minimal improvement is obtained for stock portfolios. A more recent study by Eun and Resnick (1997) explores passive and active strategies for handling exchange rate risk. Using the random walk model they also consider three conditional hedging strategies. One conditional hedging strategy of particular interest to us involves selling currency forward when it is trading at a premium but buying currency forward when it is trading at a discount. Their empirical results indicate that the random walk strategies exhibit superior performance in comparison to the unhedged and passive hedging strategies under all parameter estimation techniques. Eun and Resnick (1997, p.40) state: "These results imply that the random walk model provides a good estimate of next period's spot rate of exchange."

It should be noted that international diversification of securities portfolios does not imply reduction or elimination of foreign exchange risk. As Eaker and Grant (1990) and Eun and Resnick (1997) point out, portfolio managers may enhance the risk/return performance of their portfolios by taking advantage of foreign currency returns. This paper examines the benefits of concentrating on foreign currency returns. Based on quarterly data over the period 1974-1996, we consider two strategies: a) selectively "hedging" exchange risk with forward contracts when the forward rate is at a premium and selectively "speculating" on exchange risk with forward contracts when the forward rate is at a discount, and b) leaving foreign exchange exposure unhedged. Since our investor is risk-neutral, we dispense with the use of efficient frontiers and concentrate on individual foreign equity markets that maximize expected utility which is equivalent to maximizing expected portfolio return.

We find that risk neutrality, along with random walk, produces a rule-of-thumb whose
The sequential application obtains performance results that are much better than those of the unhedged strategy.

The rest of the paper is organized as follows. Section II develops the formulas for unhedged return, forward-based hedged return, and forward-based speculative return. Section III discusses the data used and provides the analytical framework. Section IV discusses and contracts the results of strategies based on the Unbiased Forward Rate Hypothesis (UFRH) and on the Random Walk Hypothesis (RWH). Finally, Section V ends the paper with some concluding comments.

FORMULAS FOR FOREIGN EQUITY RETURNS, WITH AND WITHOUT FORWARD CONTRACTS

General Formulas
Let \( N \) be the foreign currency principal to be invested in the same currency stock index. For the sake of illustration, consider investing in the German stock market. Then the dollar value of this investment is

\[
W_0 = N \times S_0
\]

(1)

where \( S_0 \) (\( S_1 \)) = current (future) spot rate of DM1, in \$/DM. At the end of the period the dollar value of the investment in the German stock market will be

\[
W_1^{Sk} = N \times (1 + R_S^{DM}) S_1
\]

(2)

where \( R_S^{DM} \) = the rate of return in DMs on the German stock index. If the investor considers a long (short) forward DM contract whose notional principal is \( kN \) (\( -kN \)), at maturity that coincides with that of the equity investment, the value of the forward contract will be

\[
W_1^{Fwd} = \pm kN (S_1 - F_0)
\]

(3)

where

\( F_0 \) = the current forward exchange rate in \$/DM
\( k \) = a multiplier that represents the number of times the notional value of the forward contract is higher than the principal of the FX amount invested in the foreign stock index, and \( +(-) \) denotes a long (short) forward DM contract.

At maturity, the value of the foreign equity investment cum the forward contract

\[
W_1^S = W_1^{Sk} + W_1^{Fwd} = N (1 + R_S^{DM}) S_1 \pm kN (S_1 - F_0)
\]

(4)

and the dollar return from the above investment will be

\[
\frac{W_1^S}{W_0} = 1 + R_p^S = \frac{N (1 + R_S^{DM}) S_1 \pm kN (S_1 - F_0)}{N S_0}
\]

\[
= (1 + R_S^{DM}) \frac{S_1}{S_0} \pm k \left( \frac{S_1 - F_0}{S_0} \right)
\]

(5)

where \( R_p^S \) = portfolio rate of return from the U.S. investor’s viewpoint.

Expected Return Formulas under the Unbiased Forward Rate Hypothesis (UFRH) and the Random Walk Hypothesis (RWH)

For an international investor, exchange risk may substantially contribute to the overall portfolio risk; it may also provide an opportunity to earn abnormal returns.

Assume that the U.S. investor believes in the UFRH. This assumption implies that

\[
F_0 = S_1^*
\]

(6)

where * denotes expected value.

From equation (5), the expected portfolio return is given by

\[
(1 + R_p^S)^* = \left( (1 + R_S^{DM}) \frac{S_1}{S_0} \right)^* \pm k \left( \frac{S_1^* - F_0}{S_0} \right)
\]

(7)

Under the UFRH, equation (7) simplifies to

\[
(1 + R_p^S)^* = \left( (1 + R_S^{DM}) \frac{S_1}{S_0} \right)^* \pm k \left( \frac{F_0 - F_0}{S_0} \right)
\]

or

\[
(1 + R_p^S)^* = \left( (1 + R_S^{DM}) \frac{S_1}{S_0} \right)^*
\]

(8)

The above expression suggests that under the UFRH, the expected performance of the unhedged investment in a foreign equity market will be statistically similar to that of the
same foreign equity market cum forward contracts.

On the other hand, if the U.S. investor believes in the RWH, then

\[ S_0 = S_1 \]  \hspace{1cm} (9)

Under the RWH, equation (7) is expressed as follows

\[
(1 + R^S_p)^* = \left[ (1 + R^DM) \frac{S_1}{S_0} \right] \pm k \left( \frac{S_0 - F_0}{S_0} \right)
\]

\[
= \left[ (1 + R^DM) \frac{S_1}{S_0} \right] \pm k \left( 1 - \frac{F_0}{S_0} \right)
\]  \hspace{1cm} (10)

The traditional belief about investing in international equities has been that of higher expected returns and lower risk relative to U.S. equities. Recent empirical evidence by Sinquefield (1996), however, suggests that for integrated foreign stock markets such as the French, German, UK, Canadian, Japanese, and the Swiss stock market, the expected (excess) return of each country stock index should be the same.

This claim translates into equal long-term stock index return performance regardless of national origin, when the return is expressed in dollars. If the above claim is defensible, then under the UFRH, the specialized investor/speculator will be indifferent as to what foreign or domestic stock index to invest in, whether with forward foreign exchange contracts or without. Under the RWH, the risk-neutral investor/speculator will concentrate on the forward foreign exchange component in the expected portfolio return \((1 + R^S_p)^*\). Since the investor wants to maximize \((1 + R^S_p)^*\) (s)he will decide on the foreign stock index that maximizes \(\pm k \left( 1 - \frac{F_0}{S_0} \right)\) or \(\max k \left| \frac{F_0}{S_0} \right| \). If the expression within the absolute value brackets is negative (positive), then the risk-neutral investor/speculator will sell (buy) the currency of the forward contract at the current exchange rate. Since it is almost impossible to have \(\frac{F_0}{S_0} = 1\) for all foreign countries in the investor’s universe, we expect the temporal composition of the specialized portfolios to be strictly international.

Thus the maximization of \((1 + R^S_p)^*\) under the RWH translates into the following rule-of-thumb:

1. At the beginning of every period the risk-neutral investor/speculator computes \(\left| \frac{F_0}{S_0} \right|\) for each foreign exchange forward contract under consideration and selects the contract, and associated foreign stock index, with the maximum \(\left| \frac{F_0}{S_0} \right| \).

2. If the expression in the absolute value brackets is negative (positive) buy the associated foreign stock index and sell (buy) the same currency forward.

The size of the notional value of the forward contract relative to the equity investment size, \(k\), depends on the volatility of the foreign exchange changes, the return frequency, institutional constraints, and the temperament of the investor. We choose \(k = 1\) and \(2\) only since we had to work with quarterly data.

If the RWH holds, we expect the strategy of selecting a contract with \(\max \left| \frac{F_0}{S_0} \right|\) and buying the associated foreign equity index will outperform the same foreign stock index sans forward contracts, on average. Next we discuss the data source and present the analytical framework for testing the (in)efficiency of the forward exchange market with the time series of actual quarterly portfolio returns generated under the UFRH and the RWH.

**THE DATA AND THE ANALYTICAL FRAMEWORK**

**The Data**

To analyze the efficiency of specialized international stock indices cum forward contracts relative to same stock indices sans contracts, we developed one period ahead expected spot rates in the 1974.II to 1996.IV period for the following countries (currencies): Canada (C$), France (FF), Germany (DM), Japan (¥), Switzerland (SF), and the United States (US$). We then estimated one period ahead expected spot rates using a regression model that included the lagged exchange rate, lagged return, and the lagged natural logarithm of the return. The coefficients of the regression model were used to calculate the one period ahead expected spot rate for each country.

The RWH and the UFRH state that the expected return of each country stock index should be the same. If the RWH is invalid, then the expected return of each country stock index will differ from the expected return of the U.S. stock index. The expected return of each country stock index is calculated as the sum of the expected return of the U.S. stock index and the expected return of the foreign exchange contract.

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Kingdom (BP). The choice of quarterly data was made because of availability. However, quarterly data, besides being non-overlapping, mitigate timing problems associated with higher frequency data.

Since we adopted the U.S. viewpoint, we used the following quarterly time series for our analysis: U.S. money market interest rates, Industrial Share Price Index (ISPI) data for the U.S. and the above six (6) foreign countries, spot exchange rates, and three-month forward rates. The above data were compiled from the International Financial Statistics, a publication of the International Monetary Fund, and are available in the databank that is part of Madura’s (2000) textbook.

Since our original data on spot and forward exchange rates were expressed in U.S. dollars per foreign exchange unit or $/FX and since our analysis is performed from a U.S. viewpoint, no conversion of the raw data is needed.

Test of the UFRH

Obtaining data on expected exchange rates is difficult. Further, to obtain expected foreign stock index returns expressed in dollar terms is doubly difficult since no expected exchange rates or expected foreign stock index returns are observed in the marketplace. However, if we assume that the U.S. risk-neutral investor/speculator forecasts based on the UFRH, the average realized specialized portfolio return cum forward contracts will not be statistically different from the average specialized portfolio return sans forward contracts.

To assess the UFRH, we measure the deviation \( d_t \) (t=1, ..., n=91) between the U.S. investor’s return on a portfolio cum forwards and the same single market portfolio return sans forwards. That is,

\[
d_t = \left[ (1 + R_{FX}^{S_1}) \frac{S_t}{S_{t-1}} \pm k \left( \frac{S_t - F_{t-1}}{S_{t-1}} \right) \right] - \left[ (1 + R_{FX}^{S_1}) \frac{S_t}{S_{t-1}} \right]
\]

Since returns on portfolios with and without forwards are likely correlated, we employ the paired t-test for dependent observations to the quarterly variable \( d_t \) to test whether the UFRH is acceptable. Thus we calculate the statistic

\[
t = \frac{\bar{d} - 0}{\frac{\sigma_d}{\sqrt{n}}} = \frac{\bar{d}}{\frac{\sigma_d}{\sqrt{n}}} = \frac{\sigma_d}{\sigma_d}
\]

where, \( \sigma_d(\bar{d}) \) is the standard deviation of \( d_t \) \( \bar{d} \) is the arithmetic mean of \( d_t \)'s or

\[
\bar{d} = \frac{\sum_{t=1}^{n} d_t}{n}, \text{ and } n = \text{the number of quarterly observations in the sample. Here } n = 91
\]

For each foreign stock index (and currency), the null hypothesis is \( H_0: d^* = 0 \) and the alternative hypothesis is

\[
H_1: d^* \neq 0
\]

If the null hypothesis cannot be rejected, the believer in the UFRH will be justified in being indifferent between investing in a foreign stock market and investing in same foreign stock market cum long or short forwards.

Test of Equality in Expected Returns for Foreign and Domestic Stock Indices

To test the equality among stock indices as shown by Sinquefield (1996), we have to take into account the evidence of positive correlation among country index returns.

Indeed, Balvers, Wu, and Gilliland (2000, p. 752), using annual return data from Morgan Stanley Capital International over the period 1970 to 1996, computed the following betas with the world index for the countries in our universe — Canada: \( \beta = 0.759 \), France: \( \beta = 1.115 \), Germany: \( \beta = 0.755 \), Japan: \( \beta = 1.321 \), Switzerland: \( \beta = 0.874 \), United Kingdom: \( \beta = 1.312 \), and United States: \( \beta = 0.806 \).

The above statistics show that international stock index returns are positively correlated and thus the use of paired t-tests is recommended. Thus to assess the posited equality of foreign and domestic stock index expected returns, we calculate the deviation \( d_t \) (t = 1, ..., 91 quarters) between the investor’s U.S. stock market index return and the
contemporaneous foreign stock market index return based on U.S. dollars:

\[ d_t = \left(1 + R_{S,t}^{FX}\right) \frac{S_t}{S_{t-1}} - \left(1 + R_{S,t}^{US}\right) \]  

(14)

In employing the paired t-test for dependent observations to the quarterly variable \(d_t\) we calculate the t-statistic from equation (12) and test the same set of hypotheses. If the null hypothesis cannot be rejected, then there are no differential expected returns for country-specific stock market indices.

Test of the RWH
If the assumption of equal expected country-specific stock returns is defensible then at every decision time the RWH believer will concentrate on the choice of one forward foreign exchange contract from the set of six different currencies, based on the maximum \(\left|1 - \frac{F_0}{S_0}\right|\) criterion. If the information provided by the criterion has predictive value, then selecting sequentially the forward contract with the maximum \(\left|1 - \frac{F_0}{S_0}\right|\) should provide superior performance on average. Since we expect the above criterion to select different currencies over time, the multi-currency approach associated with the RWH will test the following hypotheses:

If the time-series of realized portfolio returns is based on the maximum \(\left|1 - \frac{F_0}{S_0}\right|\) criterion, then

\[ H_0 : d^* = 0 \quad \text{and} \quad H_1 : d^* > 0 \]  

(15)

Here the \(d_t\) value (t = 1, . . . , n=91) is defined by equation (11). If the alternative hypothesis is accepted, then the RWH will be preferred to the UFRH, in a direct comparison.

Of course, the significance of the RWH will be tested by the same statistic given in equation (12). The only difference is that the null hypothesis under the UFRH will be tested using a two-tailed test, whereas the null hypothesis under the RWH will be tested using a one-tailed test.

Measuring Risk and Return in the CAPM Framework
The case of the time-series of portfolio returns generated under the RWH is unusual because it contains data from different foreign stock indices. Since all realized portfolio returns, both under the UFRH and the RWH, are expressed in dollars, we assume that they have been generated by artificial U.S. assets and analyze their risk/return characteristics in two ways. In the first case we assume that the capital markets are segmented and adopt the U.S. stock market index as the market portfolio. In the second case we assume capital market integration, with the U.S. stock market index as only an important component of the world market portfolio. We assume that the “world” market portfolio return is proxied by the arithmetic average of the contemporaneous returns of the Canadian, German, British, French, Swiss, Japanese, and U.S. stock indices.

To determine the systematic risk, or beta, \(\beta_P\), of the portfolios under consideration and their degree of superior, or inferior, performance, \(\alpha_P\), in the CAPM context, we use the following characteristic line regression model:

\[ R_{P_t} - r_t = \alpha_P + \beta_P R_{m_t} - r_t + \varepsilon_{P_t} \]  

(16)

where:

- \(\alpha_P\) = a return component that quantifies the magnitude of the forward exchange rate pricing error à la CAPM,
- \(\beta_P\) = the slope coefficient that measures the sensitivity of portfolio returns to movements in the US or “world” market portfolio, \(R_{m_t}\),
- \(\varepsilon_{P_t}\) = a random disturbance,
- \(r_t\) = 90-day US money market rate, a proxy for the risk-free asset return.

As we already mentioned, empirical evidence by Balvers, Wu, and Gilliland (2000, p. 752) and others shows that the systematic risk, or beta, of the first return component in equation (5) is positive and gravitates around one. Similarly, empirical evidence by Mark (1988) and others suggests that the beta of the second “return” component in equation (5) should be near zero and, generally,
statistically insignificant. Given $\beta_p$, if $\alpha_p > 0$ ($\alpha_p < 0$) the performance of the associated portfolio is deemed superior (inferior). Under the UFRH the priors are that $\alpha_p = 0$ and $\beta_p > 0$. Under the RWH, the associated expectations for portfolios selected by maximizing $\left|1 - \frac{F_t}{S_0}\right|$ over time are that, $\alpha_p > 0$ and $\beta_p > 0$.

**EMPIRICAL RESULTS**

First we employ quarterly portfolio returns that are generated under the UFRH. The first observation is obtained when the investor buys a foreign stock market index and is long, or short, the corresponding foreign exchange forward contract at the end of 1974.I. The last observation is generated when the investor selects the portfolio at the end of 1996.III. Panel A. of Table 1 reports the results of the paired t-tests for the UFRH when $k = +1.0$ and when the same currency forward contracts are used throughout the 91-quarter sample period. We observe that with the exception of the Canadian stock index, the average deviation, $\bar{d}$, is generally positive but insignificantly different from zero. The test then fails to reject the null hypothesis of the long-term (i.e., over a 23-year period) unbiasedness of the forward rate. But how strong is this evidence? We note that our alternative hypothesis $H_1: d^* \neq 0$, does not specify a competing model and thus has little power. In this situation, failure to reject the null hypothesis does not tell us much. Panel B of Table 1 offers strong evidence that when the alternative is the RWH, it convincingly rejects the null UFRH. Indeed when the multi-currency/country strategy applies the max $\left|1 - \frac{F_t}{S_0}\right|$ rule-of-thumb, the average difference $\bar{d}$ is 3.25% per quarter and highly significant. Since the null hypothesis in expression (15) identifies the UFRH as the model to be contrasted to the alternative hypothesis of the RWH, the highly significant outperformance of the RWH-based rule-of-thumb strongly suggests that the forward rate is an inferior estimator of the future spot rate and that the information the max $\left|1 - \frac{F_t}{S_0}\right|$ rule conveys is incompletely exploited by the market.

It is interesting to compare the statistical findings of Table 1 with actual performance results from the same strategies in question by utilizing a multi-period index of performance under sequential reinvestment.

<table>
<thead>
<tr>
<th>TABLE 1</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Paired t-Tests for the UFRH: U.S. Viewpoint</strong></td>
</tr>
<tr>
<td>(Based on 91 quarterly observations; $k=1$)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Comparison with Same Country Stock Index</th>
<th>$\bar{d}$</th>
<th>$\sigma(d)$</th>
<th>t-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Panel A. Single-Currency/Country Strategy</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BP Portfolio</td>
<td>0.00224</td>
<td>0.057933</td>
<td>0.36888</td>
</tr>
<tr>
<td>FF Portfolio</td>
<td>0.006751</td>
<td>0.060535</td>
<td>1.06385</td>
</tr>
<tr>
<td>SF Portfolio</td>
<td>0.005833</td>
<td>0.075466</td>
<td>0.73739</td>
</tr>
<tr>
<td>DM Portfolio</td>
<td>0.002445</td>
<td>0.064649</td>
<td>0.36072</td>
</tr>
<tr>
<td>J¥ Portfolio</td>
<td>0.005435</td>
<td>0.067606</td>
<td>0.76267</td>
</tr>
<tr>
<td>C$ Portfolio</td>
<td>-0.000823</td>
<td>0.02328</td>
<td>-0.3373</td>
</tr>
<tr>
<td><strong>Panel B. Multi-currency/country Strategy</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\max \left</td>
<td>1 - \frac{F_t}{S_0}\right</td>
<td>$</td>
<td>0.0325</td>
</tr>
</tbody>
</table>

Note: For the t-statistic see equation (12) 
(*** ) denotes significance at the .001 level, for one-sided tests.

Let us define terminal wealth

$$W_T = W_0 (1 + R_{p_1})(1 + R_{p_2})\ldots(1 + R_{p_T}) = \prod_{t=1}^{T} (1 + R_{p_t})$$

where $W_0 =$ initial wealth, here assumed to be equal to $1,$ and $T = 1, \ldots, n=91$ quarters.
Figure 1 shows the terminal wealth (or Index Value) over the period end 1974.I-end 1996.IV of investing sequentially either in the UK stock market index, or the UK stock index plus a long (i.e. $k=1,2$) or a short ($k=-1,-2$) position in a BP forward contract. The index values are measured on the vertical axis and time is in quarter-year intervals on the horizontal axis. In figure 1, we observe both positive and negative deviations in individual periods or clusters of several periods. However, the general secular trend is unmistakably upward.

The same general result is found by using other single currencies. Therefore, it can be argued that even though the UFRH performs poorly in any individual period or cluster of periods, over extended periods of time it appears that the UFRH generally holds so that both the foreign stock index and the portfolio of same stock index with forward contracts exhibit the same long-run, secular tendencies by producing similar terminal wealth.

Figure 7 also plots the Index value of the max \( 1 - \frac{F_0}{S_0} \) multi-currency/country strategy as a function of time. To account for the sizeable disparities in final wealth, we express the vertical axis numbers in logarithmic terms. It is clear that as time progresses the spread between terminal wealth \( W_T \) of the max \( 1 - \frac{F_0}{S_0} \) multi-country portfolio and that of same multi-country portfolio sans forwards becomes wider and wider in favor of the max \( 1 - \frac{F_0}{S_0} \) multi-
country portfolio. In figure 7, the contrast between the unhedged multi-country portfolio and same portfolio with forwards is more dramatic when \( k = 2 \).

It is also interesting to compare the performance of the various investment strategies under the UFRH and the RWH-based max \( 1 - \frac{F_0}{S_0} \) by use of the annualized geometric mean return (or compound annual return) metric. The formula for the annualized geometric return over the entire sample period of 91 quarters (or 22.75 years) is given below:

\[
GM_p = \left[ \left( 1 + R_{p1} \right) \left( 1 + R_{p2} \right) \ldots \left( 1 + R_{p91} \right) \right]^{\frac{1}{91}} - 1
\]  

(18)

In Table 2, we report the geometric mean returns for the U.S. stock index, the single-currency/country stock indices, same indices with forward contracts when \( k = \pm 1 \) and \( \pm 2 \), the multi-currency/country index sans forwards and the multi-currency/country index with \( k = 1 \) and \( k = 2 \). As expected, the single country/currency portfolios perform like the same portfolios with forward contracts, in general. Further, comparing unhedged single-country and multi-country geometric mean returns to the U.S. stock index shows that they are not dissimilar. Finally, the compound annual return of the max \( 1 - \frac{F_0}{S_0} \) strategy with \( k = 1 \) is a very impressive 27% whereas the compound annual return of the strategy with \( k = 2 \) is a stratospheric 40%.
Table 2
Terminal Wealth, TW, and Geometric Mean Returns, GM, for Time Series Generated Under the UFRH and the RWH: U.S. Viewpoint
(Based on 91 Quarters or 22.75 Years)

Panel A. Single Currency/country Strategies

<table>
<thead>
<tr>
<th>Time Series</th>
<th>TW</th>
<th>GM</th>
<th>TW</th>
<th>GM</th>
<th>TW</th>
<th>GM</th>
<th>TW</th>
<th>GM</th>
</tr>
</thead>
<tbody>
<tr>
<td>$ Stock Index</td>
<td>$7.995</td>
<td>9.57%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C$ Unhedged</td>
<td>$3.065</td>
<td>5.05%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C$ +Forwards</td>
<td>$2.601</td>
<td>4.29%</td>
<td>$3.353</td>
<td>5.46%</td>
<td>$2.126</td>
<td>3.37%</td>
<td>$3.529</td>
<td>5.70%</td>
</tr>
<tr>
<td>FF Unhedged</td>
<td>$6.257</td>
<td>8.39%</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>FF + Forwards</td>
<td>$7.242</td>
<td>9.09%</td>
<td>$3.796</td>
<td>6.04%</td>
<td>$5.764</td>
<td>8.00%</td>
<td>$1.604</td>
<td>2.10%</td>
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<tr>
<td>SF Unhedged</td>
<td>$10.58</td>
<td>10.93%</td>
<td></td>
<td></td>
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<tr>
<td>SF + Forwards</td>
<td>$10.02</td>
<td>10.66%</td>
<td>$6.735</td>
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<td>$5.675</td>
<td>7.93%</td>
<td>$2.474</td>
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<tr>
<td>DM + Forwards</td>
<td>$5.049</td>
<td>7.38%</td>
<td>$5.594</td>
<td>7.86%</td>
<td>$2.590</td>
<td>4.27%</td>
<td>$3.268</td>
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<tr>
<td>J¥ Unhedged</td>
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<td>12.08%</td>
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<tr>
<td>J¥ + Forwards</td>
<td>$12.47</td>
<td>11.87%</td>
<td>$9.255</td>
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<td>9.72%</td>
<td>$4.427</td>
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<tr>
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<td>9.29%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BP + Forwards</td>
<td>$8.821</td>
<td>10.04%</td>
<td>$9.111</td>
<td>10.20%</td>
<td>$5.443</td>
<td>7.73%</td>
<td>$5.872</td>
<td>8.09%</td>
</tr>
</tbody>
</table>

Panel B. Multi-currency/country Strategy

| max [\( \frac{F_i}{S_0} \)] | $233.5 | 27.09% | $2074. | 39.89% |

Note: Beginning wealth at end 1974.I is \( W_0 = $1.0 \). Terminal Wealth, TW, is at end 1996.IV.

In Table 3, we report the results of testing the hypothesis of equal country-specific stock returns. Using the \( d_i \) values from equation (14) we calculate the t-statistic from equation (12) for each foreign index - U.S. index combination. As Panel A shows, we cannot reject the null hypothesis of long-term absence of differential expected returns for country-specific stock market indices. This conclusion corroborates the observation of the similarity of geometric means and terminal values from Table 2, when single-currency/country stock indices are compared to the U.S. stock index.

Panel B in Table 3 also tests the hypothesis of equality between expected multi-currency/country stock index returns and U.S. stock index returns. Again, the resulting t-value cannot reject the null hypothesis.

Table 3
Paired t-tests for the Expected Stock Index Return Equalities: U.S. Viewpoint
(Based on 91 quarterly observations)

<table>
<thead>
<tr>
<th>Comparison with U.S. Stock Index Returns</th>
<th>( \bar{d} )</th>
<th>( \sigma(d) )</th>
<th>t-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Panel A. Single-Currency Strategy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Canadian Stock Index</td>
<td>-0.00998</td>
<td>0.065252</td>
<td>-1.45829</td>
</tr>
<tr>
<td>French Stock Index</td>
<td>0.000631</td>
<td>0.110392</td>
<td>0.054525</td>
</tr>
<tr>
<td>German Stock Index</td>
<td>-0.00115</td>
<td>0.100925</td>
<td>-0.10868</td>
</tr>
<tr>
<td>Japanese Stock Index</td>
<td>-0.00355</td>
<td>0.156746</td>
<td>-0.21585</td>
</tr>
<tr>
<td>Swiss Stock Index</td>
<td>0.004003</td>
<td>0.099923</td>
<td>0.382166</td>
</tr>
<tr>
<td>British Stock Index</td>
<td>0.005671</td>
<td>0.100227</td>
<td>0.539764</td>
</tr>
<tr>
<td>Panel B. Multi-currency Strategy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multi-currency/country Index Alone</td>
<td>0.014749</td>
<td>0.099894</td>
<td>1.4085</td>
</tr>
</tbody>
</table>

Figure 8 also plots the Index Values of all single-currency stock indices as a function of time. The performance of all foreign and domestic stock indices are similar and thus corroborate the observation of Geometric Mean Return, GM, and Terminal Wealth, TW, similarity among the equity indices under consideration from Table 2.
Finally, it is also interesting to quantify the systematic riskiness, $\beta_P$, and abnormal returns, $\alpha_P$, if any, of each of the strategies in question, within the CAPM framework. We use the conventional characteristic line model (see equation (16)) and Table 4 records the results. With the exception of the C$ stock market, the international CAPM explains the observed time-series of stock index cum forwards returns much better than the domestic CAPM. The same applies to the multi-currency/country stock index cum forwards time-series. Again, as expected the intercept $\alpha_P$ is statistically insignificant for all single-currency/country indices, regardless of "market" portfolio used. As for the beta coefficient, the domestic CAPM produces betas that are defensive (i.e. have value lower than one) and some are statistically insignificant. When the international CAPM is used, however, all betas are highly statistically significant and, with the exception of the C$ stock index, have values greater than one.

As for the multi-currency/country strategies, their betas increase when the international CAPM is used and, with the exception of the domestic beta when $k=1$, are highly statistically significant. As for the alphas, $\alpha_P$, they are all significantly positive, with values higher (lower) within the domestic (international) CAPM framework, as expected. When $k=1$, the max

$$1 - \frac{F_0}{S_0}$$

strategy produces $\{\alpha_P = 0.047, \beta_P = 0.262\}$ statistics with the domestic CAPM and $\{\alpha_P = 0.041, \beta_P = 0.893\}$ statistics with the international CAPM. When the portfolios are levered, i.e. for $k = 2$, the associated $\{\alpha_P, \beta_P\}$ statistics are more impressive yet. Specifically, the alpha coefficient from the domestic (international) CAPM is 0.0766 (0.0685) per quarter or more than $4 \times 0.076 = 30.6\%$ ($4 \times 0.0685 = 27.4\%$) when annualized!

**CONCLUDING COMMENTS**

In this paper we consider an investment universe of six major foreign equity markets and their associated forward currency markets. Our analysis allows us to make several statistically justified statements.

Under the UFRH we cannot reject the hypothesis that long-term, the average country-specific stock index return is no different from same with long or short foreign exchange forward positions in the absence of a specific competing hypothesis.

We cannot reject the hypothesis that the long-term performance in dollar terms of foreign stock indices is no different from that of the U.S. stock index.

Under the assumptions of risk-neutrality and the random walk, we devise a rule-of-thumb, that, in direct competition with the UFRH, empirically produces statistical and economic superior performance.

A contribution of our paper is to link the forward rate bias

$$\frac{S_1^* - F_0}{S_0}$$

opportunities by identifying the direction of the bias in advance. Our model is a direct test of forward market informational efficiency since it examines whether unusual opportunities exist in this market.

A second contribution of our paper is to suggest a method of international portfolio selection that first selects the foreign currency based on our rule-of-thumb and then invests in the same-currency foreign equity index.

We interpret our results as an indication that investors do not efficiently use all freely available information to predict future spot rates.
### Table 4

**REGRESSION-BASED TESTS FOR SYSTEMATIC RISK: US VIEWPOINT**

(Number of observations = 91, k=1 and k=2)

<table>
<thead>
<tr>
<th>Currency</th>
<th>K=1</th>
<th>K=2</th>
<th>K=1</th>
<th>K=2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>α</td>
<td>β</td>
<td>Adj. R²</td>
<td>α</td>
</tr>
<tr>
<td>BP</td>
<td>0.0115</td>
<td>0.5939</td>
<td>0.07</td>
<td>0.0144</td>
</tr>
<tr>
<td></td>
<td>(0.0145)</td>
<td>(0.1985)</td>
<td></td>
<td>(0.020)</td>
</tr>
<tr>
<td></td>
<td>(0.7943)</td>
<td>(2.7161)</td>
<td></td>
<td>(0.732)</td>
</tr>
<tr>
<td>FF</td>
<td>0.0116</td>
<td>0.4559</td>
<td>0.04</td>
<td>0.0192</td>
</tr>
<tr>
<td></td>
<td>(0.0157)</td>
<td>(0.2160)</td>
<td></td>
<td>(0.0901)</td>
</tr>
<tr>
<td></td>
<td>(0.7378)</td>
<td>(2.1190)</td>
<td></td>
<td>(1.2315)</td>
</tr>
<tr>
<td>US</td>
<td>-0.0093</td>
<td>0.7834</td>
<td>0.38</td>
<td>-0.0100</td>
</tr>
<tr>
<td></td>
<td>(0.0077)</td>
<td>(0.1052)</td>
<td></td>
<td>(0.0099)</td>
</tr>
<tr>
<td></td>
<td>(0.7465)</td>
<td>(7.4465)</td>
<td></td>
<td>(6.5148)</td>
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<tr>
<td>JV</td>
<td>0.0187</td>
<td>0.3325</td>
<td>0.03</td>
<td>0.0244</td>
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<tr>
<td></td>
<td>(0.0159)</td>
<td>(0.2186)</td>
<td></td>
<td>(0.022)</td>
</tr>
<tr>
<td></td>
<td>(1.7167)</td>
<td>(1.5213)</td>
<td></td>
<td>(0.9522)</td>
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<tr>
<td>SF</td>
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<td>-0.01</td>
<td>-0.0206</td>
</tr>
<tr>
<td></td>
<td>(0.0153)</td>
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<td>(0.022)</td>
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<tr>
<td></td>
<td>(1.6745)</td>
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<td>(-1.106)</td>
</tr>
<tr>
<td>DM</td>
<td>-0.0071</td>
<td>0.0004</td>
<td>-0.01</td>
<td>-0.0100</td>
</tr>
<tr>
<td></td>
<td>(-0.0285)</td>
<td>(0.0005)</td>
<td></td>
<td>(0.040)</td>
</tr>
<tr>
<td></td>
<td>(-0.2498)</td>
<td>(0.6588)</td>
<td></td>
<td>(-0.27)</td>
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**Panel B. Multi-currency/country**

<table>
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<tr>
<th>Max</th>
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<th>S</th>
<th>K=1</th>
<th>K=2</th>
<th>K=1</th>
<th>K=2</th>
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<tbody>
<tr>
<td>0.0469</td>
<td>0.0111</td>
<td>(4.2405)**</td>
<td>0.02</td>
<td>0.0766</td>
<td>0.02</td>
<td>0.36</td>
</tr>
<tr>
<td>(0.1516)</td>
<td>(7.1274)</td>
<td></td>
<td>(0.1017)</td>
<td>(4.450)</td>
<td></td>
<td>(0.3137)</td>
</tr>
</tbody>
</table>

Note: (*, **) denotes significance at the (.01, .0001) levels respectively.

### REFERENCES


OPERATIONALIZING A CFM CURRICULUM

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Maggie Houston
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ABSTRACT

This paper describes a joint effort between the Finance and Accountancy Departments of Wright State University to operationalize a Certified in Financial Management (CFM) curriculum. We begin by describing the CFM designation and our interest in the CFM. We continue with a description of the steps necessary to implement the program along with strategies for stimulating student interest and participation. We conclude with a brief summary of our results to date and our goals for improvement. This paper should function as a reference to assist others interested in establishing a CFM focus within their curriculum.

THE CFM DESIGNATION

In May 1996, the Institute of Management Accountants (IMA) introduced its CFM program. The new designation is an extension of the well-established CMA (Certified Managerial Accountant) designation, which the IMA introduced in 1972. The designation is awarded upon successful completion of a four-part examination coupled with two continuous years of professional experience in financial management and/or management accounting. As with most certification programs the CFM/CMA also require 30 hours of continuing professional education (the equivalent of approximately 4 days) to maintain the certification once awarded.

These designations are unique in that three out of the four parts of the examination are identical for both the CMA and the CFM (Parts 1, 3, and 4). The exams differ only in which Part 2 the examinee chooses to take. For the CFM designation the Part 2 CFM exam is "Corporate Financial Management" whereas for the CMA designation the Part 2 CMA exam is "Financial Accounting and Reporting." This notion of parallel exams also allows the candidate to qualify for both designations by sitting for only one extra part of the exam.

Both examinations are administered by the Institute of Certified Management Accountants (ICMA) which is the testing arm of the IMA. According to the ICMA, the primary purpose of the CMA/CFM examination programs is "to establish an objective measure of an individual's knowledge and competence in the fields of management accounting and financial management." The ICMA also sets forth three additional objectives for establishing these exams:
1. Establish management accounting and financial management as recognized professions by identifying the role of the professional, the underlying body of knowledge, and a course of study by which such knowledge is acquired.

2. Encourage higher education standards in the management accounting and financial management fields.

3. Encourage continued professional development.

Exhibit 1 outlines the topics covered on each part of the CMA/CFM examination. This topics list is recommended by the Gleim/Flesher Outline and Study Guide for CMA/CFM preparation or alternatively on the IMA website at [www.imanet.org](http://www.imanet.org). Each exam part consists of computer-based multiple-choice questions and is administered at local Sylvan Learning Centers. This allows candidates to register for the exam at their convenience, complete the exam via computer, and receive tabulated results immediately upon completion. It should also be noted that exams are modular and can therefore be taken in any sequence.

**OUR INTEREST IN THE EXAM**

The Accountancy and Finance Departments of Wright State University became interested in developing a CFM based curriculum for four reasons. First, it was clear to both departments that the gap between the accounting and finance disciplines has been narrowing. Noteworthy evidence of this trend has been the inclusion of traditional finance topics (such as time value of money and capital budgeting) into the accounting curricula, the change in the name of the IMA’s flagship publication from Management Accounting to Strategic Finance, and the admission of finance majors into Beta Alpha Psi, the national accounting honorary. Moreover, surveys have indicated that as a result of pressures from technological advances and globalization, as well as the financial markets, accountants spend less time in traditional number crunching functions and an increasing amount of time in the role of analyst and strategist.

Second, Ohio’s new 150-hour requirement to sit for the CPA examination would require a 5-year program of study. The CFM program on the other hand, could be completed in four years and would be appealing to students who liked both accounting and finance and looked forward to a career in a corporate setting.

Third, the faculty felt that being “certified” would increase the marketability of our students as they entered the work force and advanced their careers. We were particularly impressed with the Financial Management Association’s (FMA) strong endorsement of the CFM as “the premier designation in the field of Financial Management.”

And finally, the Wright State University Finance Department, like most in the field, has long held the belief that students interested in pursuing a career in Corporate Finance must embrace the related field of accounting. As a result, we have long recommended that all finance electives for students interested in corporate finance be taken in the accounting field. This has led to a relatively strong dual major program which is becoming increasingly more difficult to accomplish in four years as the Accountancy Department gears up for the 150-hour CPA requirement.
### EXHIBIT 1: CMA/CFM TOPICS

<table>
<thead>
<tr>
<th>CFM/CMA Part 1</th>
<th>Economics, Finance, and Management</th>
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<td>Microeconomics</td>
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<td>Macroeconomics</td>
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<td>International Business Environment</td>
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<td>Domestic Institutional Environment of Business</td>
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<td>Capital Structure Finance</td>
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<td>Organizational Theory</td>
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<td>Motivation and the Directing Process</td>
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<td>Communication</td>
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<td>Financial Statements</td>
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<td>Equity</td>
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<td>Other Income Items</td>
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<td>Other Reporting Issues</td>
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<td>External Auditing</td>
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<td>Financial Statements: Special Topics</td>
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<td>Long-Term Capital Financing</td>
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<th>Management Reporting, Analysis, and Behavioral Issues</th>
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<td>Product Costing and Related Topics</td>
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<table>
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<td>Decision Making under Uncertainty</td>
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<td>Quantitative Methods I</td>
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<td>Quantitative Methods II</td>
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<td>Information Systems II</td>
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<td>Internal Auditing</td>
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</table>
OUR APPROACH

Our approach to implementing a CFM based curriculum involved six steps. First, we analyzed the knowledge requirements for each part of the exam. We compared knowledge requirements with our entire business curriculum. Some topics were covered in management classes, others in economics classes, still others in accounting and finance. Our basic quest was to discover where within our existing curriculum were the topics covered on the CFM examination covered? This process was not unlike the one discussed in Rude and Blue (2000) who provide an excellent resource. Some exam parts seemed like a natural fit for the accounting curriculum and others quite apparently were finance topics. Each part of the CFM is very broad based and cannot be covered in a single course. We therefore examined sequences of courses that might offer the best general preparation and sought to place the actual exam preparation in the last of the sequence. We determined that two parts of the CFM would be covered in the accounting curriculum and two parts in the finance curriculum.

The second step involved assessing how well specific exam topics were covered in our existing curriculum. Each of the four courses we would potentially designate as CFM prep courses were pre-existing courses with pre-existing learning objectives. It was necessary for us to assess how closely these learning objectives coincided with the topics included on each exam. In most cases we found that the courses selected had a high degree of commonality with the CFM topics, but for each there were also deficiencies. These deficiencies really fell into two categories. In some cases the topics were only treated on a cursory level on the exam and could easily be left to the individual student preparation. Others, however, were of more significant proportion and were assimilated into the curriculum and its learning objectives. For Part 2 CFM, for example, there is a rather extensive segment on raising capital and the investment banking functions. These topics were added to the learning objectives of Finance 420, and reading, writing, and case assignments were added to correct the deficiency.

The third step was to designate four courses as appropriate preparation for the CFM examination. We decided that Part 1 was best taken after Finance 421, a senior seminar in working capital management; Part 2 fit with Finance 420, a senior seminar in corporate finance; Part 3 was consistent with Accounting 498, a senior seminar in managerial accounting; and finally Part 4 would be taken after Accounting 412, a second accounting systems course.

The fourth step was to examine how this new proposal would fit with course requirements for a major in accounting or finance. If the introduction of this program were going to create undue stress for either candidate, it would surely be doomed from its initiation. Here, in essence, is what we discovered.

From the Accounting Major’s Perspective
The Accountancy Department at Wright State University has a strong CPA focus which results in an extensive list of required courses for all accounting majors. This has advantages and disadvantages for the student interested in preparing for the CFM examination. The advantage is that the prerequisites for the all CFM parts and the course designated for Part 3 are already required for these students. There are only three additional courses needed for the accounting student to complete the CFM preparation:

- ACC 412 Accounting Systems II (Part 4)
- FIN 420 Seminar in Financial Management (Part 2)
- FIN 421 Seminar in Working Capital Management (Part 1).

The disadvantage is that the requirements for the accounting degree are so extensive that an accounting student would need 195 credit hours to complete both the accounting major and the CFM preparation courses.

From the Finance Major’s Perspective
The quest is simpler, yet very structured, for the traditional finance major. This student
may lack the managerial accounting and systems expertise needed for parts 3 and 4 of the examination. However, the finance major calls for 12 credit hours of finance electives and, due to our long-standing belief that accounting electives are important to finance students interested in corporate finance, all of the necessary prerequisite accounting courses were already acceptable electives. This has made the cooperative effort necessary for a timely completion of the CFM examination a natural extension of the pre-existing requirements for finance majors. The only difference is that students with an interest in the CFM will have very little flexibility in their choice of electives. They must incorporate the additional managerial accounting and systems courses. The Finance major with the CFM focus is listed in Exhibit 2. Note that these are quarter hours at Wright State University and not semester hours.

Exhibit 2
Finance Major with CFM Focus

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Course Name</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education Courses</td>
<td></td>
<td>51</td>
</tr>
<tr>
<td>Business Core</td>
<td></td>
<td>79</td>
</tr>
<tr>
<td>Finance Requirements</td>
<td></td>
<td>27</td>
</tr>
<tr>
<td>ACC 203</td>
<td>Introduction to Accounting Systems</td>
<td></td>
</tr>
<tr>
<td>ACC 304</td>
<td>Financial Accounting I</td>
<td></td>
</tr>
<tr>
<td>ACC 305</td>
<td>Financial Accounting II</td>
<td></td>
</tr>
<tr>
<td>ACC 306</td>
<td>Financial Accounting III</td>
<td></td>
</tr>
<tr>
<td>FIN 303</td>
<td>Case Problems in Financial Management</td>
<td></td>
</tr>
<tr>
<td>FIN 401</td>
<td>Investing in Securities</td>
<td></td>
</tr>
<tr>
<td>FIN 420</td>
<td>Seminar in Financial Management (CFM Part 2)</td>
<td></td>
</tr>
<tr>
<td>FIN 421</td>
<td>Working Capital Management (CFM Part 1)</td>
<td></td>
</tr>
<tr>
<td>FIN 490</td>
<td>International Financial Management</td>
<td></td>
</tr>
<tr>
<td>Finance Electives:</td>
<td></td>
<td>15</td>
</tr>
<tr>
<td>ACC 321</td>
<td>Management Accounting I</td>
<td></td>
</tr>
<tr>
<td>ACC 322</td>
<td>Management Accounting II</td>
<td></td>
</tr>
<tr>
<td>ACC 328</td>
<td>Accounting Systems I</td>
<td></td>
</tr>
<tr>
<td>ACC 412</td>
<td>Accounting Systems II (CFM Part 4)</td>
<td></td>
</tr>
<tr>
<td>ACC 498</td>
<td>Seminar in Managerial Accounting (CFM Part 3)</td>
<td></td>
</tr>
<tr>
<td>Business Elective</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Non-business Electives</td>
<td></td>
<td>14</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>189</td>
</tr>
</tbody>
</table>

The fifth order of business was to select materials and assimilate them into course requirements. We selected the Gleim/Flesher exam preparation guides as required purchases for each CFM designated course. Gleim was chosen primarily because the Accountancy Department had experience using Gleim as prep guides in other courses and were satisfied with them. We then decided to integrate each study unit into the course as homework assignments. In addition, two of the three professors (Parts 2,3) use Gleim type multiple choice questions as part of the midterm exam for each of these courses. We feel that this encourages continuous preparation throughout the quarter. It should also be noted that the study units are assigned to parallel class coverage as opposed to allowing the guide to dictate course content. For example, in the Managerial Accounting Seminar, the units in the Gleim manual, Part 3, are assigned in the following sequence - 1, 2, 4, 6, 5, 8, 7, 3, 9, 10 and in the Corporate Finance Seminar, the units from the Gleim manual Part 2 are somewhat scrambled as well and are assigned in the following sequence - 1, 3, 4, 5, 6, 8, 7, 9, 10, 2. The Gleim units are not always a perfect fit for the course content, but
in most instances they provide a succinct review for the topics in the learning objectives.

A final implementation issue was how to encourage participation? Registering for the exam requires the student to join either the IMA or the FMA where student memberships are $29 and $20 respectively. In addition, the student must pay $47.50 for each part of the examination (retakes cost the full $95). These costs are substantial for many of our students; therefore, neither the Accountancy Department nor the Finance Department felt comfortable mandating that each student take the CFM exams. We opted instead to strongly recommend that students sit for the exams in place of their final exams for the quarter enrolled in each of the four CFM courses. If our students choose not to take the applicable part of the CFM, then they take the regularly scheduled final examination. In order to encourage participation, we provide that there will be no "downside" risk if the student takes the CFM and fails. The student simply receives the grade achieved going into the final. We do however provide and "upside" incentive. Depending on the instructor, we have been employing about one half of a letter grade for having passed the part attempted. Exhibit 3 is a common explanation of the grading policy with the CFM option in place.

**Exhibit 3**  
**Grading Policy**  
**Finance 420 (CFM Part 2)**

<table>
<thead>
<tr>
<th>Item</th>
<th>POINTS Without CFM Exam</th>
<th>POINTS With CFM Exam</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cases</td>
<td>150 Points</td>
<td>150 Points</td>
</tr>
<tr>
<td>Presentation</td>
<td>50 Points</td>
<td>50 Points</td>
</tr>
<tr>
<td>Midterm Exam</td>
<td>100 Points</td>
<td>100 Points</td>
</tr>
<tr>
<td>Opinion Journals</td>
<td>50 Points</td>
<td>50 Points</td>
</tr>
<tr>
<td>Final Exam</td>
<td>150 Points</td>
<td>0 Points</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>500 Points</td>
<td>350 Points</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>GRADE</th>
<th>POINTS Without CFM Exam</th>
<th>POINTS With CFM Exam*</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>450 Points and above</td>
<td>315 Points and above</td>
</tr>
<tr>
<td>B</td>
<td>400 to 449 Points</td>
<td>280 to 314 Points</td>
</tr>
<tr>
<td>C</td>
<td>350 to 399 Points</td>
<td>245 to 279 Points</td>
</tr>
<tr>
<td>D</td>
<td>300 to 349 Points</td>
<td>210 to 244 Points</td>
</tr>
</tbody>
</table>

*Note: Five points will be added to the overall average of any student passing the CFM Part 2. (This is the equivalent of approximately 18 extra points on a 350-point scale.)

**PROBLEMS ENCOUNTERED**

As we began to offer the CFM prep in conjunction with our regular accounting and finance curricula we encountered what might be thought of as "growing pains." We noted that a good number of the students registered in each designated course (especially for Parts 2 and 3) were indeed agreeing to sit for the test. As a result we received quite a bit of feedback. From this feedback we discovered a need for additional exposure to preparatory materials and more specifically computer-based materials. For example, some students did not realize the computer-based test includes prompts to use various tools provided during the examination. One student, who in our estimation was a strong candidate to pass the exam, did not realize that for all time value of money related problems a small icon appears in the upper corner of the computer screen that allows access to interest factors. He completed the exam with a four-function calculator and no interest factor.
tables. Clearly his probability of success was grossly diminished by his lack of familiarity with the process. The exam is also a timed test that allows examinees to mark questions they are unsure of and return to them as time permits. Students unfamiliar with this process are less able to manage their test taking time.

In an effort to promote further preparation, the Department of Accountancy and the Department of Finance jointly invested in a set of software provided by Gleim that allows students to take an online quiz that is timed and provides immediate feedback about performance. This software is provided in the computer labs of both departments and heightens students’ awareness of the test-taking situation. It is our hope that we will see improved pass rates as students avail themselves of this resource. It is noteworthy that respondents to our graduate survey most often mention computer-based exercises as key to their success.

A second area of difficulty was with the registration process. It is of utmost importance that students register to become an IMA student member prior to attempting to register for the exam itself. The IMA has recently developed an excellent website for registration purposes which does not allow students to register for the ICMA and the exam parts without first obtaining their IMA membership number. In the past, however, the forms could easily have been completed simultaneously which caused them to reach a bottleneck in the process that seemed interminable. The two organizations (IMA and ICMA) have distinctly separate processes and the ICMA forms would often get held up waiting for the IMA registration to appear. Some of us opted to assist students with this registration process so as to encourage participation. This is a problem that we should not expect to experience with the new IMA safeguards in place, but it is essential that instructors be willing to familiarize themselves with the registration process.

**RESULTS**

The following chart presents the results of our efforts from Fall of 1999 to Fall of 2001. Note that not every course is offered every quarter and that some of the four courses within the CFM sequence are required courses for other interests as well.

<table>
<thead>
<tr>
<th>Course</th>
<th>CFM Part</th>
<th>Number Enrolled</th>
<th>Number Taking the CFM Exam</th>
<th>Number Who Passed the CFM</th>
</tr>
</thead>
<tbody>
<tr>
<td>FIN 421</td>
<td>Part 1</td>
<td>72</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>FIN 420</td>
<td>Part 2</td>
<td>74</td>
<td>51</td>
<td>8</td>
</tr>
<tr>
<td>ACC 498</td>
<td>Part 3</td>
<td>171</td>
<td>87</td>
<td>22</td>
</tr>
<tr>
<td>ACC 412</td>
<td>Part 4</td>
<td>29</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>346</td>
<td>142</td>
<td>37</td>
</tr>
</tbody>
</table>

Our performance so far for our program will not yet earn us bragging rights, but we are not disheartened by results. We take confidence from the respondents to our graduate survey who indicate unanimously that they perceive value added by certification in their chosen careers. It is interesting to note that not a single respondent to our graduate survey had anything negative to say about the value of certification to them personally. Virtually every respondent felt that certification is important to their career path and valued by their employers. One might conclude that we are at least on the right track.

**CONTINUOUS IMPROVEMENT**

As a fledgling program we hope for continued improvement. There are essentially three areas of concern: 1) to encourage the right students to pursue the CFM focus, 2) to encourage the right students to sit for the exam parts, and 3) to increase our pass rates and ultimately our number of majors.
The right students in the CFM Focus
As Exhibit 4 indicates a total of 142 students have taken one or more parts of the CFM exam, but to date only two have passed all four parts. We believe that this is due to the fact that we had students who were declared majors prior to our initiation of this program — in the pipeline so to speak. As a result, they were qualified to take the CFM designated courses, but may have lacked both the prerequisites and a strong interest in the CFM designation that would have encouraged success. As we continue with our efforts our goal would be to provide clearer guidance for students entering the business school, so that students taking these courses are clear about their objectives. This will require informing advisors of the benefits of this particular focus as compared to other existing opportunities in the school of business.

The right students taking the exams
We would like to gradually move to providing fewer incentives and attract students who are self-motivated to take the CFM examination. What we have observed so far is that our "no downside risk" policy may indeed encourage some of the wrong students to register for and take the test. In other words, currently two kinds of people take the test in lieu of their final examination — those who are very interested in the designation and as a result stand a good chance of passing, and those who see the exam as a moderately inexpensive way out of an additional 150-point final exam. We would hope to see fewer of the second group take the test in the future.

An increase in pass rates
We would like to see a higher pass rate than we have seen so far. Our current low pass rate can be attributed to many factors: 1) the introduction of a new program, 2) students being unaware of the exam prior to registering for the course, 3) our own incentives to take the exam in lieu of the final at no risk to the student's grade, and 4) the fact that very few students have taken any computer preparation for the exam. We believe that with improved instruction, increased awareness through better advising, and stronger encouragement to use the computer software for additional preparation, our pass rates should improve over time. We have even considered adding a one-hour lab to accomplish this last task.

CONCLUSION
With the field of accounting leaning toward more traditional finance functions as a means of providing new services and with the move of many schools toward a 150-hour preparation for CPA exams, this is clearly a time when the integration of accounting and finance curricula appears warranted. The CFM exam, in our opinion, is a vehicle to facilitate this. We at Wright State University intend to strongly endorse the program with the methodology described in this article and encourage other institutions to join us so that we may learn from each other.

REFERENCES


www.imanet.org
One common customer service policy in almost all US retail establishments allows customers to return merchandise within a given period of time after the merchandise has been purchased. Whether or not customers are allowed to return goods may discourage or encourage them to continue to patronize the business. Thus, companies generally adopt return policies to remain competitive by increasing customer satisfaction. Indeed, such policies may improve customer satisfaction, which in turn is expected to result in increased sales revenue. However, we posit that customer returns may adversely effect companies’ profits because of the tax structure of the state in which the retailer operates. This phenomenon is particularly peculiar to national retailers operating in border-states. The variability in state taxes provides the opportunity for customers to capitalize (intentionally or unintentionally) from the return of merchandise purchased between states at the expense of the state government and/or the local retail establishment. This study examines the effect of variability in state tax structures of border-states on company profits in the retail industry.
Abstract
Benjamin Bloom proposed six hierarchical and cumulative levels of testing to measure different levels of student subject knowledge. A review of these levels would assist the finance teacher in developing tests to measure the desired level of student mastery of the subject. It might also prove to be a tool for the teacher to assist in instructional evaluation. The lowest of these levels is knowledge, the ability to remember material previously learned. This level is a prerequisite for all other levels as is each level to all higher levels. Comprehension is the next level, where one must go beyond knowledge by understanding what one knows. Application is the next highest level. At this level one must be able to apply what he/she has comprehended. Then comes analysis, in which the individual must be able to break down or separate into parts the knowledge comprehended and applied. At the higher level is synthesis, which requires the creative combination of knowledge analyzed from several topics to create something which previously did not exist. Finally, evaluation, the highest level, requires critical appraisal of the knowledge one has analyzed and synthesized.
An Examination of the Assumed Volatility Rates in the Computation of the Fair Value of Incentive Stock Options

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Statement of Financial Accounting Standards No. 123 (SFAS #123) changed the reporting and disclosure requirements for firms issuing stock options to their officers and directors. For reporting purposes, firms may continue to use the “intrinsic value” methodology under APB 25 or they may use an estimate of the fair value of the options granted. However, if the firm elects to apply APB 25 and report the cost of options using the intrinsic value method, the firm must provide footnote disclosure of the estimated fair value of the options granted. Additionally, whether the firm elects to use the intrinsic value or the fair value method, firms must disclose the methodology and assumptions which led to the estimated fair value of the options.

Many assumptions must be made when calculating the estimated fair value of stock options. However, the assumptions with the greatest impact on the reported option value are time to expiration and the estimated volatility of the underlying security. Although the time to expiration (or the time until exercise) can, in the extreme, have a greater impact on the option’s computed value, this value is more difficult to manipulate both because of its easily comprehensible nature (e.g., 3 years versus 6 months), and also because a shorter time to exercise would require the option’s cost to be amortized over a shorter time period.

The estimated volatility is a less well-understood concept. This is because readers of financial statements would not readily know whether an “estimated volatility equal to 0.35” is reasonable or not. Auditors and other users of financial information might therefore be less likely to ascertain distortions or mis-estimations of this figure.

The purpose of this paper is to examine the assumed rate of stock volatility and compare it to some independent measurements of stock price volatility. Additionally, an analysis will be made of the sensitivity of the reported option value to changes in the level of the volatility measure. An examination of the 2001 annual reports of the firms in the Dow Jones 30 Industrials was made, and the pertinent data extracted. This data included the stated method of computing the fair value of the options (i.e., Black-Scholes or binomial method), the value of the options as estimated by the firms, and the necessary assumptions used in the computation of these fair values. The assumed volatility as reported by the firms is then compared to the volatility as estimated based on daily,
weekly, and monthly stock returns over various historic time horizons extending back as much as five years.

Although one would not expect the estimated volatility reported by the firm to exactly match any estimates of volatility made by the authors, one would expect that (a) the volatility measures would be reasonably close, and (b) the relative self-reported volatilities of the firms within the Dow 30 would have roughly the same rank ordering as the volatilities computed by the authors. Neither of these expectations is fully met, suggesting the expected volatility of stock prices may be systematically over or underestimated. Furthermore, recomputing the option values using the volatility measures constructed by the authors often leads to material changes in the estimated value of the option grants. This possible misstatement of the value of incentive stock options is clearly a source of concern for the auditors and consumers of published financial statements.
The Impact of SFAS No. 109 Information, At the Margin, On Merger Returns

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ABSTRACT

In February 1992, the Financial Accounting Standards Board (FASB) modified the reporting of deferred taxes to separate deferred tax assets and liabilities. The result is new information to financial statement users. This paper explores, using a unique data set, the proposition that the new deferred tax information will have relevance in an acquisition situation for stock market investors. While mergers are influenced by many factors including management and product synergies, horizontal and vertical integration, and critical mass, we hypothesize that, at the margin, the knowledge of deferred tax assets and liabilities will contribute to the final decision, and investors will exploit the opportunity.

Our results for the acquiring firms are consistent with prior research that reports no significant abnormal returns during the event; however, the target firms exhibit positive and significant abnormal returns. Further, the “deferred tax” variable for the sample of target firms is positive and significant suggesting that, at the margin, deferred tax information is important.

Introduction

The Financial Accounting Standards Board (FASB), in February 1992, mandated new reporting disclosures for deferred taxes. SFAS 109 superceded both SFAS 96 and APB 11 requiring a separate footnote disclosure of deferred tax assets (DTA) and liabilities (DTL) for fiscal years ending after December 15, 1992. In addition, the DTA book value is reduced by a valuation allowance (VA) when it is “more likely than not” that such assets will expire before they can be realized. By segregating DTA and DTL, financial statement users can better evaluate a firm’s future tax status, thus stock market investors have new and potentially important information.

Several studies have examined the information content of this revised reporting requirement. Philips, ET. Al. (2003) finds that management uses the VA account to manage earnings upwards. And, Kumar and Visvanathan (2003) use an event study to examine the information content of the VA. They present evidence suggesting that investors use the VA to assess management’s expectations of the realizability of the DTA.

There has been considerable debate concerning the motives for a mergers and acquisitions (M&A). Studies have examined the economic efficiency (Jensen, 1993),
managerial self-interest (Marris, 1964; Mueller, 1989), and a vehicle for corporate control (Jensen and Ruback, 1983). Empirically, it is apparent that all of these studies offer, at the least, a partial explanation for why managers engage in M&As. Further, Fuller, Netter and Stegemoller (2002) examine the market returns for investors of both acquiring and target at the announcement date for mergers with mixed results. They found that investors of acquiring firms experience negative returns when buying public firms and positive returns when acquiring private targets, while target firm investors experience positive abnormal returns. The present study draws from both market return and merger literature to investigate the possibility that DTA and VA are useful information for the investors of firms involved in a merger situation.

During the 1990s, there was an explosion of merger activity, and while many factors contribute to the merger decision, industry sources indicate that tax implications are a significant factor in merger decisions. For example, if an acquiring firm has a large deferred tax liability, then, ceteris paribus, a target with a relatively large deferred tax asset may be an attractive candidate. The findings concur with significance for target tax data, at the margin, in regressions of the ratio of tax assets/ tax liabilities on the abnormal returns. Thus, it appears that investors believe that DTAs relative to DTLs will be better utilized as a result of the merger.

**Research question**

As previously described, there is evidence in the literature that deferred tax assets and the valuation allowance have financial statement relevance for stock market investors. The niche in the research frontier that the current paper addresses is whether deferred tax assets, the valuation allowance and deferred tax liabilities are relevant with respect to an acquisition situation for investors. Or is the tax data singularly important to only individual firm valuations in the market?

No explicit market model exists that explains stock investor returns of acquirer/target securities. The literature does give a variety of motivations for acquisitions and explanations for market behavior. Thus, we can focus directly on the marginal effect of tax data in acquirer/target securities; which is done in our empirical analysis. This suggests the following research hypotheses.

**H1a:** The hypothesis of this study is: On the announcement date, the parties to the merger will experience positive abnormal returns.

**H2a:** At the margin, the ratio of deferred tax assets to deferred tax liabilities is significant for investors in the valuation of firms pursuant to a planned merger.

**Research Methodology and Results**

The initial sample consisted of all mergers reported in the MergerStat database from January 1, 1994 to December 31, 2001. This selection process yields hundreds of mergers, which we used as the starting point. Firms were then removed from the sample if either firm in the sample was privately held (no financial statement information), a foreign corporation (reporting requirement differences), or had incomplete data (unable to locate financial statement or stock market return information). The final sample consists of 56 merger transactions. Using the SEC Edgar database, we compiled the DTA, VA, and DTL for each company. The CRSP tapes are utilized for stock market return information. Abnormal returns (AR) are calculated according to the following equation:

$$t = \frac{\sum (\text{FirmReturn}_t - \text{MarketRet}_t)}{2}$$

For the full sample, we find that abnormal returns for the acquiring companies are not statistically significant (p = .5139); however for the target companies, the abnormal returns are significant (p = .0001). This finding is consistent with prior research (Fuller, Netter and Stegemoller 2002), which concludes that acquiring firms are not necessarily going to directly benefit at the time of the merger, but pursue the merger for other reasons (i.e. various synergies, etc.). On the other hand,
the only way the target firms can be obtained is to bid up the price, which then creates a positive abnormal return.

Table 1
Abnormal returns of Target and Acquired Firms

<table>
<thead>
<tr>
<th>Panel A – Full Sample</th>
<th>Mean</th>
<th>t-value</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquiring (n=56)</td>
<td>-0.0088</td>
<td>-0.6570</td>
<td>0.5139</td>
</tr>
<tr>
<td>Target (n=56)</td>
<td>0.1544</td>
<td>4.8401</td>
<td>0.0001</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Panel B – firms with deferred tax liability</th>
<th>Mean</th>
<th>t-value</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquiring (n=50)</td>
<td>-0.0079</td>
<td>-0.6171</td>
<td>0.5400</td>
</tr>
<tr>
<td>Target (n=50)</td>
<td>0.1433</td>
<td>5.2094</td>
<td>0.0001</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Panel C – firms without deferred tax liability</th>
<th>Mean</th>
<th>Sign Rank Test</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquiring (n=6)</td>
<td>-0.0167</td>
<td>-1.5</td>
<td>0.8438</td>
</tr>
<tr>
<td>Target (n=6)</td>
<td>0.2470</td>
<td>6.5</td>
<td>0.2188</td>
</tr>
</tbody>
</table>

To examine the relevance of the DTA, VA and DTL at the margin, we employ the following empirical model:

\[ \text{Abnormal returns} = b_0 \text{intercept} + b_1 \text{ISIC1} + b_2 \text{Trat} + b_3 \text{Arat} + \text{error term} \]

Where:

- **ISIC1** = the one digit SIC code, where target and acquired have the same one digit SIC code,
- **Trat** = ratio for target firms of the deferred tax asset over the deferred tax liability, and
- **Arat** = ratio for acquiring firms of the deferred tax asset over the deferred tax liability.

The ISIC1 code is a control variable used for control for industry. Trat and Arat is the ratio of deferred tax assets over deferred tax liabilities. T and A signify target and acquiring firms, respectively. The coefficient on the ratio variable is our statistic of interest, and significance suggests that, at the margin, tax benefits/detriments are used in the merger decision-making process. Both the acquirer and target ratios are included in the equation because the analysis of a merger question requires a systematic investigation of both.
parties to the merger. Thus, if either the acquirer or target firm has zero deferred tax liability then both the acquirer and target observations are dropped.

while the tax variable for acquiring companies is not ($p = .2353$). Thus, it appears that investors think that acquiring firms will be able to take advantage of the target’s tax assets relative to the target’s tax liabilities.

The findings are significant for target’s tax variable (see Panel A, Table 2; $p = .0009$),

---

**Table 2**
Regression of firms with tax liabilities, Target and Acquiring with deferred tax liability

*(n = 88)*

**Panel A – without the allowance account**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Parameter estimate</th>
<th>t-value</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-.0247</td>
<td>-.4800</td>
<td>.6304</td>
</tr>
<tr>
<td>ISIC1</td>
<td>.0781</td>
<td>1.4900</td>
<td>.1400</td>
</tr>
<tr>
<td>Trat</td>
<td>.0048</td>
<td>3.4400</td>
<td>.0009</td>
</tr>
<tr>
<td>Arat</td>
<td>-.0040</td>
<td>-1.2000</td>
<td>.2353</td>
</tr>
</tbody>
</table>

r-squared = .0956
F-value = 4.07
($p = .0095$)

**Panel B – with the allowance account**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Parameter estimate</th>
<th>t-value</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>.0293</td>
<td>.5900</td>
<td>.5568</td>
</tr>
<tr>
<td>ISIC1</td>
<td>.0140</td>
<td>.2600</td>
<td>.7943</td>
</tr>
<tr>
<td>Trat – A</td>
<td>-.0003</td>
<td>-.0600</td>
<td>.9500</td>
</tr>
<tr>
<td>Arat – A</td>
<td>.0125</td>
<td>.9800</td>
<td>.3278</td>
</tr>
</tbody>
</table>

r-squared = -.0093
F-value = .73
($p = .5352$)

Where,

- **ISIC1** = the one digit SIC code, where target and acquired have the same one digit SIC code,
- **Trat** = ratio for target firms of the deferred tax asset over the deferred tax liability,
- **Trat - A** = ratio for target firms of the (deferred tax asset – valuation allowance) over the deferred tax liability,
- **Arat** = ratio for acquiring firms of the deferred tax asset over the deferred tax liability, and
- **Arat - A** = ratio for acquiring of the (deferred tax asset – valuation allowance) over the deferred tax liability.
However, when the VA reduces the DTA, neither target nor acquiring is significant (See Panel B, Table 2; p = .95 and .3278 respectively). Why would the significance drop when the net of the DTA and VA is measured? The most obvious reason is that investors believe that the acquirer will be able to take full advantage of the tax assets in the merger and that target’s VA is irrelevant after the combination occurs. For example, a target has an NOL which is generating a tax asset but is unlikely to achieve profitability soon enough in the future for the target firm to make use of it (the reason for the target’s valuation allowance in the first place). But, when the acquirer takes over, the investors believe that target profitability will occur sooner because of synergistic (or other motivations described in the literature review) effects of the merger.

**Summary and Conclusion**

The purpose of this paper is to investigate the impact of balance sheet tax account effects at the margin on merger announcement returns. First, this paper finds significant results for the target company in a merger, but insignificant results for acquiring in a preliminary analysis, which is consistent with prior research. Given that the preliminary merger information is representative of typical merger findings, the paper then examines the marginal impact of tax data on returns of the acquirer and target. The results do find a marginal tax impact, which supports anecdotal industry expert opinions that taxes are relevant to merger decisions. In particular, a ratio of target tax assets to tax liabilities is significant, but acquirer ratios did not influence the return results.

**Bibliography**


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THE EFFECT OF THE NONUNIFORMITY OF THE UNIFORM CPA EXAMINATION IN THE PRESENCE OF THE 150-HOUR REQUIREMENT

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ABSTRACT

Previous research shows that the CPA certification is the primary reason accounting majors choose to major in accounting in the presence of the 150-hour requirement. Because of the 150-hour requirement, four year accounting graduates may have to forego or delay this goal. On the other hand, the differential state requirements for satisfying the 150-hour requirement may provide the opportunity for 4-year accounting graduates to adopt a strategy to “sit” for the exam in state that has adopted the requirement.

Indeed, anecdotal evidence suggests that accounting graduates seeking certification may shop around for the most friendly, least demanding state requirement. For example, until bordering states implemented the requirement, CPA candidates crossed state lines to sit for the exam. As this loophole has essentially closed, CPA exam candidates may seek to exploit the differential state requirements for satisfying the 150-hour requirement. This study investigates if potential CPA candidates are using states’ requirements for taking the CPA exam to develop strategies to sit for the CPA exam in the presence of the 150-hour requirement?
Utilizing a Game to Teach Pull Manufacturing and the Theory of Constraints

by

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Abstract

This paper presents a description of a simple experiential learning game which can be completed in one seventy-five minute class that instructors can use to cover push manufacturing systems and pull manufacturing systems with *kanban* systems. In addition, through different analysis of the results, instructors can cover costing under generally accepted accounting principles or costing under the Theory of Constraints.

With extra iterations, the game can also be used to cover the continuous improvement process advocated by the Theory of Constraints. Students can contemplate ways to get the most production through the constraint in the short run, while contemplating ways to eliminate the current constraint in the longer term.
THE ROLE OF GROWTH IN LONG TERM INVESTMENT RETURNS

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ABSTRACT

Stocks with a high valuation compared to fundamental values imply a high growth rate, yet these stocks have typically under-performed in subsequent years supporting Lakonishok, Shleifer and Vishney's (1994) contrarian investment strategies. The precise definition of growth and subtle differences of measuring growth are explored in assessing the role of growth in long-term investment decisions and stock valuation. Results from a later period and with additional tests than employed by LSV indicate that growth is a primary valuation factor, and
valuation measures such as E/P and B/M, are imperfect proxies for expected growth. Growth appears mean reverting, but investors do not seem able to discern changes in growth rates and this miss-specification of expected growth may help explain the superiority of value versus growth strategies. In addition, investors' naïve extrapolations of past growth provide explanatory power in future holding period returns.

INTRODUCTION

Value investing and growth investing are styles that favor firms with opposite growth profiles. Stocks with low earnings relative to prices (E/P) and lower book value relative to market value (B/M) are classified as growth (or glamour) stocks since much of the current price is from perceived growth prospects and not current earnings. High E/P and B/M stocks are classified as value stocks and these stocks have low growth prospects since their price reflects current earnings with little premium for growth. This implied growth valuation by investors suggests that investors anticipate continuing improvements in operating performance. Typically, operating performance can be measured by variables such as earnings, assets or sales.

The high market valuation accorded to growth stocks is puzzling at times, since high prices in excess of fundamental values indicate investors believe high growth rates are sustainable. High growth rates should entice competitive market forces and increase risk, thereby reducing future growth of these companies. While some studies provide support for growth investing, such as Peters (1991), many others (Basu (1977), Jaffe, Keim, and Westerfield (1989), Chan, Hamao, and Lakonishok (1991), Fama and French (1992), Capaul, Rowley and Sharpe (1993), Lakonishok, Shleifer and Vishny (1994) [LSV hereafter], Haugen (1995) and Bauman, Conover and Miller (1998)) reveal that value stocks earn higher returns. Value stocks, defined by high B/M and E/P, and presumably slower growth (although not tested in these studies), consistently outperform growth stocks over the long term.

The superiority of value strategies can be explained either by a hidden specification of risk, or by a mis-specification of growth manifest by investors' behavior. An alternative explanation relates to the time horizon of investors (see Lakonishok, Shleifer and Vishny (1994) or Haugen (1995). Fama and French (1992) suggest that the greater returns of value stocks are due to higher risk. Simply stated, high B/M is a proxy for high risk. This result contradicts the constant growth valuation model, leading to the conclusion that low B/M firms (associated with high growth) have higher expected and required returns, hence higher risk. Alternatively, behavioral explanations relate investors' overreactions to past operating results in a similar manner to their overreaction to past price behavior (see DeBondt and Thaler (1985, 1987)). Growth stock investors believe that high past growth in operating performance will continue unabated, even when the high growth rates are unlikely to be sustained beyond one to two post-formation years (LSV).

Much of the focus of growth has been concentrated on earnings. Chan, Karceski and Lakonishok (2002) find "no persistence in long-term earnings growth beyond chance." LaPorta, Lakonishok, Shleifer and Vishny (1997) find that earnings announcements that differ from expectations account for 25-30% of the premium earned by value stocks. Dechow and Sloan (1997) study analysts and find that the earnings estimates for growth firms are somewhat optimistic, and that those for value firms are on average pessimistic. These papers indicate that there may be an extrapolation bias built into investor expectations of growth, and this phenomenon may help explain why value firms outperform growth firms.

In examining the value versus growth investing phenomenon, this paper concentrates on the explicit link between growth and long-term investment performance and contributes to the literature in three ways. First, different actual measures of growth are examined without a predisposition to only consider earnings growth. Second, data used in this analysis is from the pre-internet period and extends the data used by LSV. The time period is important since the internet boom is often characterized as a period with many day traders, an explosion in the
number of listed companies and a very short-term investment focus on earnings that culminated in a bubble that inflated and burst. By using earlier data, this paper does not put an undue influence on this time period. Third, in measurements of growth, mean reversion is identified that may partially explain the value versus growth phenomenon. Fourth, naïve extrapolations of past growth are revealed produce counterintuitive results in future holding period returns.

VALUE VERSUS GROWTH

Value strategies favor the purchase of stocks with low prices relative to fundamental values. Graham and Dodd (1934) may be the earliest reference, but it wasn’t until the early 1990s that academic interest increased following the studies by Basu (1977), Fama and French (1992) and LSV. Basu (1977) finds the risk-adjusted returns for low P/E stocks (associated with low growth) exceed those for high P/E stocks (associated with high growth). With the explanatory power of beta questioned, Fama and French reveal the book to market ratio as a measure of price relative to fundamental value that provides explanatory power in the cross-sectional distributions of security returns.

Some early studies (Little (1962), Lintner and Glauber (1967) and Little and Rayner (1966)) connected growth and valuation. These studies find that future earnings, and hence, earnings growth rates, cannot be forecast due to the "random walk of earnings". Insignificant benefits accrue to those connecting growth forecasts to valuation. However, in a follow-up study, Fuller, Huberts, and Levinson (1992) find that high E/P (value) stocks have lower earnings growth rates. There is no consensus on the explanation of value stocks’ superior performance, with at least three different explanations in the literature. Fama and French (1992) suggest that performance is related to risk. But there are conflicting risk relationships at least with beta. Capaul, Rowley and Sharpe (1993) find a negative relationship between B/M and beta, while Harris and Marston (1994) control for growth and find a positive relationship between B/M and beta. This contradictory evidence does little to illuminate the connection between risk, return, and growth illustrated by the constant growth valuation model.

Second, LSV conclude that the behavior of individual and institutional investors causes the value/growth investment phenomenon. Growth investing lures individual investors. Institutional investors are also lured, but their motivations may not be only a desire for a high return, but also a desire for appearing prudent. Managers are less likely to be criticized if they have invested in stocks currently favored in the market. LSV imply that the herd's inherently transitory opinions ebb and flow with changes in the marketplace, causing growth holdings to move in and out of favor.

Third, the superior performance of high E/P and B/M strategies could also be a behavioral manifestation of overreaction as documented by Jegadeesh and Titman (1993). They find that positive feedback returns dissipate within two years such that employing strategies that work against the consensus of the market may be more effective in the long run. This finding is similar to DeBondt and Thaler's (1985,1987) contrarian strategy.

The key to understanding the value versus growth puzzle may be to examine growth in more detail. Haugen and Baker (1993) demonstrate that growth is mean reverting and mis-pricing may occur since high (low) growth prospects are subsequently revised, resulting in price declines (increases). This explanation of mis-pricing is not universally supported. Harris and Marston (1994) find that mis-pricing is not a valid explanation for the value/growth investment puzzle since portfolios based on differences in analysts' growth expectations have no return advantages. In contrast, Dechow and Sloan (1997) find evidence of mean reversion and the incorporation of analysts' growth expectation biases.

The missing link may be to examine growth and fundamental valuation variables along with long term holding periods. This paper looks at growth as a primary factor that may drive the E/P and B/M results found in the literature. Relating growth to valuation measures is addressed in the next section of the paper.

GROWTH HYPOTHESES

Existing literature reveals that a variety of variables (beta, E/P, B/M, cash flow, sales growth and size) contribute some explanatory power to
understanding stock returns. But the relationship between definitions of growth in operating performance and long-term holding period returns is not well identified in the literature. LSV examine sales and cash flow growth and the relationships with long-term returns, but they do not test asset or EPS growth and the relationship to long-term returns. This paper augments the LSV analysis of sales growth by examining the persistence of sales earnings and asset growth. In addition, the paper also re-examines LSV’s naïve extrapolation hypothesis using past and future growth.

This paper addresses three main questions. First, are various definitions of growth related to stock returns? Second, do high growth rates indicate superior firm investment opportunities through extrapolation of growth or, alternatively, does high growth attract investors who then bid up prices and lower returns? Third, can growth be used to help explain the superiority of value investment strategies?

For the first question, in order to determine the relationship between growth and stock returns, the a priori relationship can be expected to be positive or negative. If growth indicates increased opportunities for the firm, then a positive relationship between growth and returns should exist assuming the growth potential is not already included in prices. Alternatively, growth may indicate opportunities for competitors, and therefore there future growth will come at the expense of holding period returns. If publicly traded companies operate in competitive markets, then high growth may signify profitable opportunities. If firms are profitable, additional firms enter until economic profits are driven to zero. An exception would be for companies with monopoly power due to the industry or patents. Several different growth definitions (earnings, assets and sales) within this economic framework are used to determine the impact on holding period returns for long-term investment horizons. Asset growth is examined because it is an indicator of the long-term trend in the success of a firm. Sales growth is examined since sales are the basis of future (growth in) profits and earnings and may be the easiest variable for a firm to influence. Growth in these fundamental variables impacts shareholder valuation, at least in the long run.

To answer the second question about high growth rates attracting investors for superior or inferior returns, investor behavior and naïve extrapolations of growth rates and stock valuation over long horizon holding period returns are examined. According to LSV, investors over-extrapolate future growth rates. Firms with high past growth rates are expected to have high future growth rates, and this continuation is reflected in variables such as E/P and B/M.

For the third question of the use of growth to explain the superiority of value investment strategies, past and future growth is considered. Because extrapolation errors can occur, the relationship between naïve extrapolations of past growth and long horizon holding period returns is examined.

In sum, the questions are answered by examining investors’ responses to growth by testing for errors in growth rate expectations and how the errors relate to long horizon holding period returns.

**METHODOLOGY**

The Compustat 1995 annual tapes are used to obtain earnings, book value, sales, and total asset values for all firms with valid data on the Industrial and Research Tapes. Since the focus is on long horizon (5-year) growth rates and holding period returns, the analysis contains portfolios formed only during the years 1981 to 1990 and analyzing growth from 1981 to 1995. Portfolios are formed three months after company fiscal year ends and are held for five years without annual rebalancing. Firms are deleted from the sample if they do not contain valid pre- and post-portfolio formation data for five years, or if they do not have valid data on the 1995 CRSP data tape. 9,197 firm-years of data are used in the analysis. Firms are allocated to quintiles ranked by E/P, B/M, growth, and other variables.

Compound annual growth rate calculations are corrected for negative values and high volatility by employing the growth rate calculation procedure used by Dechow and Sloan (1997). The approach to calculating growth rates is illustrated in Brigham and Houston (1999). Five-year growth rates are calculated for earnings, assets and sales using a least-squares approach that fits a line among the six annual data points of interest.
For example, to calculate a historical annualized compound growth rate for the time period of interest, all data points from 5 years prior to the current year are used. A least squares fit of those data against time is then estimated and the slope of the regression line indicates the growth rate. If data for the beginning observation and the current observation are missing or negative, then that firm-year is dropped from the sample. Future growth rates are also calculated in a similar manner except that the six data points originate with the current observation and look forward 5 years.

LSV, who analyze the earlier period 1968 to 1989, suggest that investors make naïve growth extrapolation errors when pricing securities. They state that growth stocks’ earnings (sales and cash flow) grows faster for one to two years than for value stocks. Investors extrapolate the growth to continue, but for years 35 growth in earnings is similar for both growth and value companies. LSV do not extend their test of this naïve extrapolation hypothesis to examine return effects or to examine interactions between variables. If stock holding period returns are a function of fundamental valuation variables and growth rate values, then a cross sectional regression analysis may indicate the significance of growth and/or valuation measures. Long-horizon holding period returns may also be a function of other variables such as size factors and growth rate effects. The growth rate effects are modeled using past growth rate values as a proxy for future growth rate expectations, and errors from a naïve growth rate extrapolation model. The naïve growth errors are generated by a simple OLS regression of future growth rates onto historical growth rates. Using the previously realized growth rate calculation along with naïve extrapolation errors gives unique insight into the relationship between long horizon holding period returns and the role played by various measures of growth.

RESULTS

Overall correlation relationship between the holding period returns, growth rates, E/P, B/M, market values and stock prices for firms having valid past and future growth rates are examined. Across all firms and across all time periods (all firm-years), there exists a statistically significant positive correlation between holding period returns and future growth rates. Returns are negatively associated with past growth of earnings and assets, but positively associated with past sales growth.

One of the most interesting correlation relationships exists between the past and future growth rate variables. Past earnings growth is negatively correlated with future earnings growth, but positively correlated with future assets and sales growth. Past asset and sales growth rates are positively correlated with future asset and sales growth rates. This result may indicate that earnings figures contain more of a temporary component (random, non-predictive) and are more responsive to short-term changes, rather than the permanent growth component found in assets or sales figures. Earnings that are very low or negative during some years may skew results based on large percentage swings in earnings. Historical sales and asset growth seem to be better predictors not only of future sales and assets growth, but also of earnings growth. Future returns are highly correlated with future growth in sales, earnings and assets, and future growth in assets and sales are correlated with past growth, especially of sales, so past growth may be a guide to stock valuation. E/P and B/M do not appear to be good growth correlates.

Next, the effects of E/P and B/M on future holding period returns and past growth rates are analyzed. The E/P and B/M grouped results are consistent with the extant literature. Stocks are categorized in quintiles ranked by E/P or B/M and the results reveal that high E/P and B/M stock portfolios (value stocks) outperform the low E/P and B/M stock portfolios (growth stocks). A measure of risk for each quintile, the coefficient of variation (CV), is calculated as the quintile cross sectional standard deviation divided by the quintile mean. Not only do the value stock portfolios outperform growth stock portfolios in units of raw return; they also outperform in terms of risk per unit of return. For example, the high E/P (quintile 5) portfolio delivers more return (154% vs. 112%) than the low E/P (quintile 1) portfolio, but at a lower risk as measured by the coefficients of variation (135% vs. 162%). A similar result is manifest when the data are grouped according to the B/M ratio. The high B/M value portfolio delivers a return of approximately 166% whereas the low B/M portfolio only delivers a 108% return on investment. The cost of that higher performance is 139% standard deviation per unit
of return vs. a cost of 155% standard deviation per unit of return for the low B/M portfolio.

According to LSV's naïve extrapolation hypothesis, high return performance portfolios (as determined by E/P and B/M) should exhibit low past growth rates and relatively higher future growth rates. Conversely, growth portfolios should exhibit high past growth rates and relatively lower future growth rates. As shown in Table 2, high past earnings growth ranks (REPSGP) and low future growth ranks (REPSGF) are associated with high E/P (value) portfolios, whereas rankings of low past earnings growth rates and high future growth rates are associated with growth portfolios. For asset growth and sales growth, low past and future growth is associated with the E/P value portfolios. The persistence of these growth rates for the E/P value and growth reinforces the earlier results from LSV's (1994) naïve extrapolation hypotheses. Slow growth appears associated with higher returns in the sense that E/P portfolios growth patterns persist from past to the future.

Results across the B/M quintiles are similar to the E/P results and suggest that growth patterns are also persistent across B/M quintiles. This result confirms compatibility with the naïve extrapolation hypothesis; however, this panel sorts by B/M and is only an indirect test of the growth hypothesis. Although low (high) performers are associated with high (low) past growth in earnings, future earnings growth shows a U-shaped pattern, suggesting firms may move to either extreme. The past and future growth rates in assets and sales rankings are similar across B/M quintiles to the E/P ranking across quintiles.

Since firm size and low price effects are known to affect results of similar studies, rankings of market value and stock prices are also included. There appears to be no size or low-price effects confounding the E/P results. There are, however, small firm and low price effects in the B/M groupings. Size and price rankings are therefore included in the remaining analyses to examine any systematic impact on the results. In sum, these results indicate that the relationship between B/M and E/P with returns and growth is similar to earlier studies. Next, past growth and its impact on holding period returns are examined as the LSV hypothesis is extended.

We also calculate the future holding period return after dividing the data into quintiles according to historical growth. The slowest growing 20% (quintile 5 value firms) of earnings per share and assets have the highest future holding period return with the holding period return declining monotonically as the past growth increases. The relationship between growth in sales and holding period return is similar, with low growth firms exhibiting higher holding period returns. The coefficients of variation (CV) indicate that in each of the past growth panels (A-C) the extreme quintiles (1 and 5) have the largest return variance. In addition, the firms with the slowest past growth (quintile 5) have risk levels, as shown by the CV measure, that are lower than the risk of firms with the highest past growth. This observation will become important once the future growth ranks are examined.

Table 1 reports the future growth ranks for each of the past growth quintiles. The data are divided into past growth quintiles. The slowest past growth quintile (the value firms) has an assigned rank of 1.0. The future growth ranks for the lowest growth quintiles are 2.56 for earnings, 1.60 for assets, and 1.80 for sales. This increase in ranking indicates that slow past growth firms increased their growth ranks in the future. The firms with the fastest past growth (growth firms) have future growth ranks of 1.83, 2.52, and 2.63, for earnings, assets, and sales, respectively, indicating that growth ranks have fallen (from a rank of 5) for the fastest growers. Mean reversion of growth rates appears to occur. If investors extrapolate past growth trends as the future growth estimates, then they err. Fast growers tend to remain relatively fast growers, but their relative growth rates decline, and slow growers tend to grow relatively slowly in the future, but their relative growth rates increase. Mean reversion of growth rates in sales, assets, and earnings supports the hypothesis that competition reduces future growth of fast growers, and lack of competition enhances the growth of slow growers.

If investors expect past growth to continue in the future, investors are practicing naïve extrapolation. Since past growth ranks do not properly predict future growth, naïve extrapolation should produce returns that are inversely related to those based on perfect extrapolations of future growth. Results indicate that returns are higher for the
lowest past growth firms. This growth shift suggests that prices of firms with fast past growth are bid up too high by investors naïvely extrapolating past to future growth. Not only are returns higher for firms that grew slowly in the past but also risk, as measured by the coefficient of variation (CV), is lower compared to the firms that grew the fastest. This result indicates that although a higher level of risk is associated with high growth firms, higher returns are not necessarily so related. This contradiction of the risk/return tradeoff is one explanation of why value investment strategies appear to be superior to growth investment strategies.

The inverse relationship between past growth and holding period returns also adds support to the competitive market explanation. High past growth, no matter whether defined as growth in earnings, assets or sales appears to induce others to enter the marketplace, dampening prospects, and likewise, holding period returns. Although, high growth rates in assets and sales tend to persist into the future, they revert to a mean rate that does not translate into higher investment returns.

TABLE 1 MEAN DATA FOR LONG HORIZON HOLDING PERIOD RETURNS AND RANKINGS

This table provides mean data for the long horizon holding period returns and quintile rankings for the fundamental Earnings-to-Price (EP) and Book-to-Market (BM) variables. Each Panel is segregated into quintiles according to EP or BM rankings. Panel A shows the results for the EP rankings while Panel B shows the results for the BM rankings. Variable acronyms are as follows. HPR represents the 5year holding period returns for firms in each quintile portfolio. REPSGP (REPSGF) is the ranking of the past (future) 5-year earnings per share growth rate calculation. RASSTGP (RASSTGF) is the ranking of the past (future) 5-year total asset growth rate calculation. RSALEG (RSALEG) is the ranking of the past (future) 5-year total sales growth rate calculation. RMKT and RPRICE represent the rankings of the market value and stock price of each firm in each portfolio formation year respectively. C.V. is the coefficient of variation of the cross-sectional 5-year holding period returns in each quintile.

Growth rates were calculated using OLS regressions to fit a line between the logarithm of the most recent reported value of earnings, assets or sales with the previous or future 5 years reported values. Earnings per share and book value data were obtained from COMPUSTAT for each firm at its fiscal year end. Price data were obtained from CRSP and adjusted for stock splits or dividends when firms were added to the portfolio 3 months after fiscal year end. Holding period returns are buy-and-hold returns and include all dividends and distributions.

Panel A: Earnings-to-price (EP) quintile rankings

<table>
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<th>Growth Firms</th>
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<th>3</th>
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<td>112</td>
<td>121</td>
<td>131</td>
<td>141</td>
<td>154</td>
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<tr>
<td>C.V.</td>
<td>162</td>
<td>145</td>
<td>142</td>
<td>121</td>
<td>135</td>
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<tr>
<td>REPSGP</td>
<td>1.58</td>
<td>2.15</td>
<td>2.01</td>
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<td>2.23</td>
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Value Firms
Panel B : Book-to-market (BM) quintile rankings

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<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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<tbody>
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<td>REPSGF</td>
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<tr>
<td>RASSTGF</td>
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<td>RSALEGGP</td>
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<td>RMKT</td>
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<tr>
<td>RPRICE</td>
<td>1.86</td>
<td>2.22</td>
<td>2.11</td>
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To investigate the extrapolation issue in further detail, naïve extrapolation errors and the impact on future holding period returns are examined. LSV indicate that naïve extrapolation may help explain the E/P and B/M investment puzzles. This naïve extrapolation approach is fertile research territory since no readily available consensus expectation of estimates on sales and assets growth rates exist, and this sample includes many smaller firms that have no analyst estimates. Although no test of any particular asset pricing model is proposed, regressing long horizon holding period returns on growth rate extrapolation errors, along with other variables, may provide useful information on the role of growth. The particular relationship investigated is between holding period returns, fundamental variables, naïve growth rate indicators, errors associated with naïve extrapolations, and size related variables. The regression setting is specified by Equation (1).

\[
\text{HPR}_i = \alpha + \beta_1 \text{B/M}_i + \beta_2 \text{E/P}_i + \sum \beta_j \text{NGR}_j + \sum \beta_k \text{NGRE}_j + \sum \beta_m \text{Size}_k + \epsilon_i
\]  

\(1\)

B/M, and E/P are the valuation variables, NGR\(_j\) represents the naïve growth rate factors, which use past growth rates as the proxy, and NGRE\(_j\) represents the naïve growth rate errors. The subscript \(j\) represents earnings, sales and assets factors. Size\(_k\) represents market value or price level. The subscripts \(i\) and \(t\) correspond to firm \(i\) at time \(t\).

Two regressions are examined to test the impact of including the naïve extrapolation error. In the constrained regression the naïve extrapolation error parameters are restricted to zero, while in the unconstrained regression the naïve extrapolation error parameters are not restricted. These regressions also contain fundamental valuation variables, size variables, and growth variables. We next perform a cross-sectional regression analysis and the constrained regression is statistically significant, but the adjusted \(R^2\) is quite low (0.012). A test for restricting the naïve error parameters rejects the null that they are equal to zero (F-value = 796). The explanatory power of the unconstrained model is substantially larger than the constrained.
one (adjusted $R^2$ of 0.215 vs. 0.012), and more importantly, there is an indication that naïve growth rate extrapolations help explain long horizon returns.

The naïve growth rate errors (from the unconstrained regression) for earnings, sales, and assets are all positive and significant contributors to explaining the holding period return (HPR). Naïve growth expectations in earnings, assets and sales are also significant in explaining holding period returns. The B/M and E/P fundamental valuation variables are statistically significant, but the size variable is not significant. It is interesting to note the differences in the constrained and unconstrained results for E/P and size. The size variable loses and the E/P variable gains significance, because the naïve growth errors in conjunction with the other variables better explain the return generating process. The interrelationships between the error variables, growth, and the fundamental variables seem to have some common variability. Growth, especially growth rate extrapolation errors, and B/M (and E/P to a lesser extent) are important factors explaining long-term returns.

In sum, past growth, B/M and especially the difference between past and future growth (as reflected in the naïve growth errors), are important in explaining holding period returns. The role played by growth may be particularly important because of the errors made when investors develop future estimates. The statistical significance of the naïve growth rate errors (NGRE’s) indicates that market participants consider deviations from naïve growth rate extrapolations in making investment decisions. The positive coefficients indicate that holding period returns fall for firms failing to reach growth expectations. Firms exceeding naïve extrapolation growth forecasts have superior returns. It is likely that investment participants incorporate changes in expectations before the end of a 5-year holding period horizon. Incorporating errors of naïve extrapolations represents rational behavior in an efficient market context and provides support for the LSV contention that naïve extrapolation errors affect long horizon holding period returns. This result applies to all the growth definitions and demonstrates a possible benefit from explicitly incorporating growth as a factor in investment decision making.

**CONCLUSION**

Historical growth rates in earnings, sales, and assets are important factors explaining future growth and future long-term returns. Future growth is higher for fast growing firms, but there is a relative decline in rank for firms that grow faster, and a relative increase for firms that grow slowly. Growth appears to be mean reverting. Consistent with a competitive market explanation, the results indicate an inverse relationship between past growth rates and future growth rates and holding period returns. Slow growth firms produce higher returns than fast growth firms because their growth is relatively faster than in the past and because their share prices have been marked down to reflect a belief of future slow growth. Firms that exhibit high levels of past growth potentially entice competition that lowers stock market performance in the future.

Naïve growth rate extrapolation errors are positively related to holding period returns. This conclusion extends and is consistent with LSV’s suggestion that value firms will outperform growth firms because investors naïvely extrapolate both slow and fast historical growth rates. Through time, once errors in naïve extrapolations are realized, investors adjust, causing value firms to outperform growth firms. Thus, investors’ growth errors are important factors explaining why value strategies outperform growth strategies. Extrapolation errors, and not necessarily risk differences, cause value strategies to consistently have higher returns than growth strategies. These results support both a competitive market explanation and a behavioral explanation of investment returns.
REFERENCES


Email is currently one of the most prevalent and widely used forms of business (and casual) communication. However, email use in the workplace exposes enterprises to many types of risk, financial and otherwise. Many companies rely on software solutions to reduce email risk. A much more effective tool for reducing email risk is the development and enforcement of a comprehensive email policy. However, many companies lack information on successful email policy enforcement procedures; specifically information on certain enforcement techniques and their legality. The purpose of this paper is to outline certain workplace email policy enforcement techniques and to discuss the legality of those techniques.
ABSTRACT

This paper examines stock market reaction to FDA announcements of new drug approvals. The paper examines 167 announced approvals by the FDA during the period 1980 through 1999. Using event study methodology, the study finds that there are significant positive abnormal returns on the day of the announcement of new drug approvals and on the two day period including the day of the announcement and the day after. However, the paper also finds that there is no evidence of significant positive returns prior to the announcements. Accordingly, the paper concludes that any pre-announcement buying pressure arising from insider trading does not affect the price of the stock. Stock adjustments do not occur until after the announcement.
INTRODUCTION

An ongoing concern by the Federal Drug Administration and by the Securities and Exchange Commission is that nonpublic information regarding the progress of drug trials may be used for personal profit by insiders in the company or in the FDA. Using such information in making stock decisions is considered insider trading and is prohibited.

No one knows the extent of insider trading regarding FDA trials. One way to determine if insider trading is affecting stock prices is to examine stock price behavior around the time of important announcements regarding the progress of the FDA trials. This technique has been used in the finance literature to detect unusual trading prior to a variety of different types of events. It is widely used to detect the impact of trading prior to and surrounding merger announcements—another type of announcement that has been linked to insider trading.

This paper examines stock market reaction to FDA announcements of new drug approvals. The paper examines 167 announced approvals by the FDA during the period 1980 through 1999. Using event study methodology, the study finds that there are significant positive abnormal returns on the day of the announcement of new drug approvals and on the two day period including the day of the announcement and the day after. The paper also finds that there is no evidence of significant positive returns prior to the announcements. The paper concludes that any pre-announcement buying pressure arising from insider trading does not affect the price of the stock. Stock adjustments do not occur until after the announcement.

EVENT STUDIES AND INSIDER TRADING

Investors who have non public information that is material to the value of a stock can profit from that information by buying or selling the stock prior to the public release of the information. Consider for example an unexpected positive decision regarding drug approval. Investors who have are aware of a future announcement of a drug approval could buy the stock. When the announcement is made, the stock will typically increase to reflect the value of the drug approval.

Trading in anticipation of a public announcement is sometime referred to as leakage (i.e. the information is “leaking” out into the public domain). Such trading may be illegal. Typically, trading on material non-public information is illegal if it is performed by investors who have a fiduciary duty to the shareholders of the involved firms, or if the information is misappropriated and the investor knows (or should know) that it was misappropriated, or if the information involves a tender offer for stock. Otherwise, the anticipatory trading may be legal. An example of anticipatory trading that is legal is trading by an analyst who has possession of nonpublic information that has been assembled from a mosaic of public information and non-material nonpublic information.

Some events are more likely than others to be accompanied by leakage (anticipatory trading). For example material events that cannot be predicted by insiders are unlikely to exhibit leakage. Such events include plane wrecks, earthquakes, fires, and other sudden unpredictable events. Events likely to exhibit leakage are events that have substantial value implications and which are known by some informed investors prior to the public release of the information. An example of such an event would be an offer by a company to buy another company. The offer has substantial value implications for both the acquiring company and the target company. Such offers require preliminary work by hundreds of employees of the involved firms as well as investment bankers and key investors. Often preparation of the offers may involve several weeks and even months of preparation. Accordingly, there are many opportunities for leakage with regard to these announcements.

Event study methodology can identify anticipatory trading. Numerous studies have employed event studies to identify leakage in a variety of different types of announcements. For example in a sample of 1,814 takeover bids over the period 1975 through 1991 Schwert (1996) finds a 25% runup in price over the 42 day period prior to the announcement. Cornell and Serri (1992) examine the impact of insider trading in the Anheuser-Bush tender offer to buy Campbell – Taggert. They find a runup in price of Campbell – Taggert that corresponds to
documented insider trading (the insider trading was documented by civil and criminal litigation subsequent to the incident). Raad and Wu (1995) examine the returns associated with 204 stock repurchase announcements and find significant average excess returns associated with insider trading in the days prior to the announcement. Meulbroek (1992) examines a variety of different types of events in which the SEC determined insider trading occurred prior to the public announcement. She found statistically significant excess returns associated with 145 takeover related announcements, 12 negative earnings announcements, 10 bankruptcy announcements, and 11 misc. good news announcements. These are all events for which it was later determined that insider trading occurred prior to the announcement. She finds that excess price movement on insider trading days is 40 to 50% of the subsequent price reaction to the public announcement. She further concludes that “...stock price run-ups before takeover announcement reflect widespread insider trading.”

This study uses an event study to explore anticipatory trading prior to announcements of drug approvals by the Food and Drug Administration (FDA). Significantly positive abnormal returns prior to the announcement would be evidence of anticipatory trading. Anticipatory trading would indicate that insider trading may be occurring. Failure to find significant abnormal returns prior to the announcement combined with abnormal returns on the date of the announcement and thereafter would indicate the absence of anticipatory trading. This would indicate that there is no evidence of insider trading.

**METHODOLOGY**

FDA drug approval dates for the period 1980 through 1999 were identified from several different sources including Kaitin, Decerbo and Lasagna (1991), Kaitin and Manocchia (1997), Kaitin Richard and Lasagna (1987), Kaitin Mannocchia, Seibring and Lasagna (1994) and a search of the Federal Register: FDC Reports. Stock returns are drawn from the daily returns file of the Center for Research in Security Prices (CRSP). The event day t=0 is the approval date. The estimation window was designated from day t = -230 through t=-30. The event window was designated as extending from t=-30 through t=+30. Market model parameters for each stock were estimated using equation (1):

\[ R_{jt} = a_j + b_j R_{mt} + e_{jt} \]  

(1)

Where \( R_{jt} \) is the CRSP daily return of security \( j \) on day \( t \); \( R_{mt} \) is the return of the CRSP equally-weighted market return on day \( t \); and \( a_j \) and \( b_j \) are the coefficients of the regression. The coefficients are then used to estimate stock’s performance during the event period. The excess return for security \( j \) on day \( t \) is the difference between the actual return and the predicted return as presented in Equation 2:

\[ ER_{jt} = R_{jt} - (a_j + b_j R_{mt}) \]  

(2)

The average excess return (AER) for each day \( t \) during the event period is calculated as shown using equation (3):

\[ AER_t = \frac{\sum_{j=1}^{n} ER_{jt}}{n} \]  

(3)

The test statistic was generated using standardized excess returns (SER) for each stock \( j \) as shown in Equation 4:

\[ SER_{jt} = \frac{ER_{jt}}{S_{jt}} \]  

(4)

Where:

\[ S_{jt} = \sigma_j \sqrt{\frac{1}{200} + \frac{(R_{mt} - \bar{R}_m)^2}{\sum_{i=0}^{31} (R_{mt} - \bar{R}_m)^2}} \]  

(4.1)

The term \( \sigma \) is the estimated standard deviation of the residual from the market model regression, 200 is the number of days in the estimation period, \( R_m \) is the average return on the CRSP market index during the estimation period, and \( R_{mt} \) is the return on the market index at time \( t \). The test statistic for the AER at time \( t \) is given in Equation 5:

\[ Z_t = \frac{1}{\sqrt{n}} \sum_{t=1}^{n} SER_{jt} \]  

(5)

The calculation of the cumulative average excess return (CAER) from \( t_1 \) through \( t_2 \) is given in Equation 6:

\[ CAER_{t_1,t_2} = \sum_{t=t_1}^{t_2} AER_t \]  

(6)
Finally, the test for significance for the CAER is as follows:

\[ Z = \left( \frac{1}{\sqrt{m}} \right) \sum_{t=1}^{t_1} Z_t \]  

(7)

Where \( m = t_2 - t_1 + 1 \).

If there was information leakage prior to the approval decision, the AAR’s and especially the CAER’s prior to \( t=0 \) will be positive. Additionally, failure to find significant positive returns on day \( t=0 \) and/or \( t+1 \) would indicate that the event was anticipated and therefore be evidence of leakage. The failure to find significant positive returns prior to \( t=0 \) and strongly significant abnormal returns on and subsequent to \( t=0 \) would indicate an absence of substantial information leakage.

**TEST RESULTS**

Table (1) presents the AER’s during the 60 day event window. There are no significantly positive AER’s during the 30 days prior to the decision date. On the other hand, day \( t=0 \) shows a significant positive AER with a \( Z \) statistic of 3.458.

Table (2) show a selection of CAER’s for the event window. None of the CAER’s prior to \( t=0 \) are significantly positive. All of the CAER’s are negative but insignificantly different from zero. However, the CAER’s subsequent to \( t=0 \) are all significantly positive. These results indicate that there was no leakage prior to \( t=0 \) and that on day \( t=0 \) the announcement surprised the market and the stock reaction was positive.

**CONCLUSION**

This paper found that there were no significantly positive abnormal returns prior to the announcement of FDA drug approvals. On the other hand, on the day of the announcement there were significantly positive abnormal returns with a \( t \)-statistic indicating a level of significance beyond the .001 level. The significantly positive abnormal returns on day

<table>
<thead>
<tr>
<th>Time Relative To Event</th>
<th>Average Excess Return</th>
<th>Z Statistic</th>
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<tr>
<td>-20</td>
<td>-0.001859</td>
<td>-1.6524</td>
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<tr>
<td>-19</td>
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<tr>
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</tr>
<tr>
<td>20</td>
<td>-0.000141</td>
<td>0.3151</td>
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* Significant at 5% (two sided test)  
** Significant at 1% (two sided test)
Table 2: CAER’s for selected sub periods.

<table>
<thead>
<tr>
<th></th>
<th>CAAR</th>
<th>Z-Stat</th>
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<td>CAAR(0,1)</td>
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<td>3.1628 **</td>
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<tr>
<td>CAAR(0,5)</td>
<td>0.008295</td>
<td>2.5792 **</td>
</tr>
<tr>
<td>CAAR(0,10)</td>
<td>0.011514</td>
<td>2.8856 **</td>
</tr>
<tr>
<td>CAAR(0,20)</td>
<td>0.013203</td>
<td>2.7477 **</td>
</tr>
<tr>
<td>CAAR(0,30)</td>
<td>0.015830</td>
<td>2.5776 **</td>
</tr>
<tr>
<td>CAAR(-5,-1)</td>
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<tr>
<td>CAAR(-10,-1)</td>
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<tr>
<td>CAAR(-20,-1)</td>
<td>-0.008225</td>
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</tr>
<tr>
<td>CAAR(-30,-1)</td>
<td>-0.011963</td>
<td>-1.5281</td>
</tr>
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</table>

* Significant at 5% (two sided test)
** Significant at 1% (two sided test)

zero and the significantly positive CAER’s subsequent to the announcement indicate that the announcement was (at least partially) unanticipated.

The absence of abnormal returns prior to the announcement indicates that anticipatory trading on information regarding drug approvals by the FDA is not sufficient to have a positive impact on the price of the associated securities. These results indicate that information leakage is not affecting the value of these securities. The results are consistent with the absence of anticipatory trading by insiders.

REFERENCES


LEASE OR SALE

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Abstract

In a true leveraged leasing transaction, the lessor reports rental income and deducts related business expenses. The lessee deducts the rental payments. Nevertheless, the Commissioner has, on numerous occasions, challenged purported lease agreements, arguing that a “sales” transaction, rather than a “leasing” transaction, has actually occurred. Where a lease is recharacterized as a sale, the lessee will be considered the owner of the leased equipment and, thus, lose the expense deduction for the rental payments, but have depreciation and other related expense deductions. The lessor will be treated as if he sold the leased equipment in a taxable transaction and recognizes gain as payments are received. And since he is no longer the owner of the leased equipment, no deduction or depreciation or other related expenses will be allowed. This paper examines in greater detail the factors affecting the “lease or sale” decision.

Introduction

Leveraged leasing is a distinct, tax-oriented method of financing the long-term use of machinery and equipment. A preponderance of leveraged leases are found in capital-intensive industries such as the transportation (airplanes, railroad rolling stock and ships) and energy industries. Many leveraged leases are also found in the computer industry. For reasons discussed later in this article, many leveraged lease lessees are either low-taxpaying or non-taxpaying business corporations or non-profit entities such as hospitals and government agencies.

In a true leveraged leasing transaction, the lessor will report rental income and deduct related business expenses, including interest and depreciation. The lessee will deduct the rental payments as a business expense. Nevertheless, the Commissioner has, on numerous occasions, challenged apparent lease agreements, arguing that a “sales” or “financing” transaction, rather than a “leasing” transaction, has actually occurred. This dramatically changes the tax consequences to the purported lessor and lessee. For when a lease is recharacterized as a sale, the lessee will now be the owner of the leased equipment and, thus, lose the expense deduction for the rental payments, but gain deductions for depreciation and other expenses related to the leased equipment. The lessor, on the other hand, will be treated as if he sold the leased equipment in a taxable transaction and, thus, recognizes gain and imputed interest income as lease payments are received. Lastly, since he is no longer the owner of the leased equipment, no deductions for depreciation or other leased equipment-related expenses will be allowed.

The above discussion identifies who the lessees in leveraged lease transactions are likely to be, but who are the lessors? Originally, wealthy individuals seeking to “shelter” their “other income” were a major force in the leveraged lease field, but restrictive tax legislation in the mid-1970s effectively...
precluded their continued participation.1 Noncorporate, pass-through entities comprised of such individuals (i.e., limited partnerships) were similarly precluded. Thus, the lessor market has come to be dominated by commercial banks and independent leasing companies. Investment banking firms, which usually concentrate on the “leveraged” portion (senior debt), are also become actively involved in the “equity” (i.e., lessee) area.

Equipment leasing transactions are structured so as to separate ownership from use of the equipment. The owner of the equipment for federal tax purposes is the lessor, who may be an individual, a trust, a partnership, a joint venture, or a corporation. As indicated above, the lessor’s status—corporate vs. noncorporate—is extremely important because tax consequences vary according to ownership status. For example, a noncorporate lessor is subject to the “at risk” provisions of IRC § 465,2 whereas a corporate lessor, with some exceptions, is not.3

Often the user (lessee) of the equipment does not earn sufficient income (or has large net operating loss carryovers) to directly utilize the tax benefits flowing from the purchase of equipment (i.e., accelerated depreciation and the interest deduction when the purchase is financed). A lease arrangement allows the lessee to pass these benefits on to an owner (lessor) who can fully utilize them. In so doing, the lessee expects to indirectly enjoy these tax benefits in the form of lower rental payments which, in turn, result in a lower acquisition cost when compared to the cost of acquiring the equipment through conventional financing methods (i.e. bonds, stock, or conditional sale). In economic terms, the effective cost of leasing will hopefully be lower than the effective cost of purchasing. This comparison is known among financial analysts as the “Lease or Purchase Decision.”4

For definitional purposes, a leveraged lease is a financial lease in which the lessor borrows, on a nonrecourse basis, a substantial portion of the purchase price of the leased equipment. Thus, a leveraged lease transaction is a three party transaction: a lessee (user), a lessor (owner-equity participant), and a lender (debt participant). Normally, the lessee selects the equipment which is then purchased by the lessor and then rented to the lessee on a net basis. “Net basis” means that the lessee is responsible for maintenance, taxes, and insurance.

The manner in which the lessor obtains his funds for the purchase of the equipment is what gives rise to the term “leveraged leasing.” An equity contribution, generally ranging from 20 to 35 percent of the equipment invoice price, is made directly by the lessor. The remaining amount (i.e. the “leveraged” portion) is borrowed from institutional lending sources on a nonrecourse basis. By nonrecourse is meant that the lender looks solely to the lessee’s rental payments (i.e. the lease) and to the underlying collateral (equipment) for loan repayment. Ordinarily, the lessor is not personally liable on the loan.5

Rental payments by the lessee are generally set at a level so as to be sufficient to cover the annual loan payments, with any excess over the debt service being retained by the owner-lessee. (Remember, this is a net lease situation. If the lessor must bear maintenance, taxes, or insurance in addition to debt service, rental payments must be adjusted upwards to cover these costs.) The aforementioned excess together with the tax benefits and the residual value of the equipment, which accrues to the lessor upon the termination of the lease, are the sources of investment return and recapture for the lessor.

The distinguishing elements of leveraged leasing as opposed to other forms of leasing, such as sales leasing or direct leasing (i.e. non-leveraged leasing), may be summarized as follows:

(1) Utilization of Leverage. In a non-leveraged lease, the equipment is either purchased totally with the funds of the lessor, or manufactured by the lessor, whereas in a leveraged lease situation, the lessor borrows a substantial portion of the purchase price of the equipment from an institutional lender;

(2) Non-Full Payout. In a non-leveraged lease, usually the rental payments are set to fully amortize the price of the equipment over the life of the lease, whereas in a leveraged lease, the rental payments are set to cover debt service and produce some profit apart from the tax benefits. (This stems primarily from the IRS’s advanced ruling requirements that there be a “profit” and that the residual value be at least 20 percent of the original
equipment cost and at least 20 percent of its useful life must remain after the expiration of the lease);\(^5\)

(3) Lessor’s Expected Return. In a leveraged lease, the expected rate of return to the lessor as a function of actual dollars invested, is substantially greater than in a non-leveraged lease (leverage effect);\(^7\)

(4) Expected Returns Can Be Altered. In leveraged leasing, expected returns can be altered by changing certain alternatives and assumptions re: the depreciation method, the “sinking fund” rate, or the residual value;\(^8\)

(5) Empirical Differences. Non-leveraged lease transactions involve smaller dollar amounts, shorter durations, and less structure than leveraged lease transactions.

From the lessee’s point of view, the advantages of leveraged leasing are the same as those in other leasing transactions: 100 percent financing, the ability to trade non-utilized tax benefits for lower effective acquisition costs, and certain accounting advantages on both the balance sheet and the income statement. Leasing also provides a means of acquiring capital equipment when the traditional methods (bonds, stock, or conditional sales) are unavailable to the firm by reason of indenture restrictions, loan covenants, or otherwise. The accounting advantages to the firm’s debt ratio due to “off-balance sheet” financing have been limited by FASB 13, which sets forth the conditions under which a lease must be capitalized and the procedures for doing so.

The advantages of leveraged leasing for the lessor are clear-cut. It provides a vehicle for investing money at an attractive rate of return as well as a possible hedge against inflation through receipt of residuals.

Leveraged leasing, however, is not always a “win/win” proposition for the parties. There are risks as well as rewards. The major risk from the lessee’s standpoint is an underestimate of the residual value which has the effect of raising the equipment’s anticipated effective acquisition cost.

The risks to the lessor are more numerous. Since most lessors anticipate a residual value in determining their expected returns, an overestimate will lower their returns. An inability to earn an anticipated reinvestment rate on the “sinking fund” (tax reserve fund) will also lower expected returns.\(^9\) Another problem is the possible non-availability of taxable income from other sources in the earlier years of the lease to take advantage of the tax benefits inherent in the lease. The lessor also bears the risk of tax law changes (often the lease agreement will have indemnifications seeking to protect the lessor against this risk). Finally, a change in the lessor’s marginal tax rate could affect the expected return. An increase in the earlier periods of the lease (when taxes are negative) would increase the expected return while an increase in the latter periods (when taxes are positive) would lower the expected return. The worst possible case would be a marginal tax rate decrease in the earlier periods coupled with an increase in the later periods.

As the foregoing suggests, leveraged leasing, in comparison to other forms of leasing, affects the lessor to a greater extent than the lessee. In fact, once the rental payments have been negotiated, the lessee has no real interest in how the lessor finances the purchase of the equipment (i.e. whether or not the lease is leveraged).\(^10\) The lessee has made the “Lease or Purchase Decision” and that decision is generally unaffected by the lessor’s financing plans. The advantages that a lessee obtains through leasing are the same whether or not the lease is leveraged. Thus, the pertinent analysis of a leveraged lease transaction is from the lessor’s perspective. In short: How does a potential lessor determine whether or not a proposed leveraged lease transaction will generate an acceptable after-tax rate of return on invested capital?

**Tax Aspects Of Leveraged Leasing**

**A. Lease Or Sale**

Since leveraged leasing is a tax-based investment, in that a significant source of the lessor’s return is derived from the tax benefits implicit in the lease, its profitability depends on current application of relevant tax laws. Therefore, in this section of the article, various tax benefits and assumptions germane to leveraged leasing are examined.
The initial tax hurdle facing the parties to a leveraged lease transaction is whether the Internal Revenue Service (IRS) will treat the transaction as a “true lease” or as a “conditional sale” or some other “financing arrangement.” This threshold question is extremely important to the lessor since the primary source of his expected return is derived from the tax benefits, which are predicated upon the transaction being characterized as a lease for federal tax purposes.

In the typical leveraged lease situation, the lessor realizes ordinary income in the form of rental payments. However, as owner of the equipment, he will be entitled to deduct accelerated MACRS depreciation\(^\text{11}\) and elect the IRC § 179 expensing option. He will also deduct interest payments on the loan.\(^\text{12}\)

If the transaction is recharacterized as a conditional sale or financing arrangement, the lessor will be treated as a vendor and the rental payments will be considered as part of the selling price of the equipment. The tax effects of this recharacterization are as follows:

1. Any gain on the sale will be treated as capital gain, assuming the equipment is not held by the lessor primarily for sale to customers in the ordinary course of his trade or business.\(^\text{13}\)

2. Depreciation deductions will be lost and recapture may be triggered;

3. A portion of the rental payments will be treated as interest income.\(^\text{14}\)

From the standpoint of the lessee, if the transaction is characterized as a lease, he will be able to deduct the rental payments made to the lessor.\(^\text{15}\) If the transaction is recharacterized as a conditional sale or financing arrangement, the aforesaid deduction will be unavailable, but the lessee would then be considered the owner of the equipment and therefore entitled to the (1) depreciation deductions;\(^\text{16}\) (2) ordinary and necessary expense deductions re: the equipment;\(^\text{17}\) (3) deduction for a portion of rental payments which represent imputed interest payments.\(^\text{18}\)

The availability of tax benefits in the context of leveraged leasing fundamentally depends on satisfaction of the “business purpose” or “economic substance” tests.\(^\text{19}\) The Supreme Court, in acknowledging that tax consequences are almost always considered in business decisions, held that the existence of a valid business purpose independent of tax considerations is sufficient to cause a transaction to be recognized for tax purposes:

The fact that favorable tax consequences were taken into account by Lyon on entering into the transaction is no reason for disallowing those consequences. We cannot ignore the reality that the tax laws affect the shape of nearly every business transaction.\(^\text{20}\)

In the Lyon case, Worthen Bank and Trust Company began to construct a corporate headquarters and principal banking facility valued at $9.0 million, including land and parking garage. Due to various state and federal regulations, Worthen discovered that it was not feasible to self-finance the project. As an alternative, it entered into a sale-and-leaseback agreement with the Lyon Company. Lyon leased the ground from Worthen, took title to the building, and then leased it back to Worthen for 25 years on a net basis. Lyon obtained $7.14 million in permanent financing from New York Life. Worthen obligated itself to make rental payments equal to the principal and interest payments of the New York Life mortgage, which also had a 25-year term. Worthen had the option to repurchase the building at various times at prices equal to the then unpaid balance of the New York Life mortgage and Lyon’s original equity investment of $500,000 plus 6 percent interest compounded annually. Worthen also had the option to extend the lease for eight additional 5-year terms at $300,000 per year. Interestingly, if all the renewal options were in fact exercised, it seems Lyon would likewise net $500,000 plus 6 percent interest compounded annually. On its federal income tax return for 1969 Lyon accrued rent from Worthen and deducted depreciation on the building, interest on its mortgage loan, and legal and other expenses incurred in the transaction. The Commissioner disallowed these deductions on the ground that Lyon was not the true owner of the building for tax purposes arguing that the sale-and-leaseback arrangement was merely a financing transaction in which Lyon loaned Worthen $500,000 at 6 percent interest compounded annually.
and acted as a conduit for the transmission of principal and interest to New York Life. In short, the Commissioner argued that Lyon acquired, risk free, all the tax benefits attributable to the $7.6 million building for nothing more than making a $500,000 loan to Worthen at 6 percent.

In reaching its conclusion that transaction was a bona fide sale-and-leaseback the Supreme Court stated:

Although the rent agreed to be paid by the bank equaled the amounts due from the petitioner to its mortgagee, the sale-and-leaseback transaction is not a simple sham by which petitioner was but a conduit used to forward the mortgage payments made under the guise of rent paid by the bank to petitioner, on to the mortgagee, but the construction loan and mortgage note obligations on which petitioner paid interest are its obligations alone, and, accordingly, it is entitled to claim deductions therefore under §163(a) of the Internal Revenue Code of 1954.

While it is clear that none of the parties to the sale-and-leaseback agreements is the owner of the building in any simple sense, it is equally clear that petitioner is the one whose capital was invested in the building and is therefore the party entitled to claim depreciation for the consumption of that capital under §167 of the Code.

In short, we hold that where, as here, there is a genuine multiple-party transaction with economic substance which is compelled or encouraged by business or regulatory realities, is imbued with tax-independent considerations, and is not shaped solely by tax-avoidance features that have meaningless labels attached, the Government should honor the allocation of rights and duties effectuated by the parties. Expressed another way, so long as the lessor retains significant and genuine attributes of the traditional lessor status, the form of the transaction adopted by the parties governs for tax purposes. What those attributes are in any particular case will necessarily depend upon its facts. It suffices to say that, as here, a sale-and-leaseback, in and of itself, does not necessarily operate to deny a taxpayer’s claim for deductions. (Italics added)

The Tax Court has indicated that where the taxpayer is motivated primarily in obtaining tax benefits and where the transaction has no independent business purpose and no economic substance because there is no reasonable expectation of profit, a purported lease will be set aside. In the case of Belz Investment Co. v. Commissioner, which also involved a sale-and-leaseback transaction, the Court set forth the following:

Whether such payments are “rent” or “purchase price” depends upon the substance of the transaction, not upon the form of the transaction or the labels used...The focus is the practical effect of the transaction, not its technical effect...

Although it is agreed that the substance of the transaction is controlling, courts have focused on different factors to determine the substance of a particular transaction. One factor emphasized is the parties' intent, as gleaned from the facts and circumstances existing at the time of the transaction, including the economic realities...Other decisions have analyzed transactions in terms of whether the economic realities indicate that traditional business relationships of lessor lessee were created...

In short, in order for the lessor to avail himself to the implicit tax benefits of a lease, the transaction must meet the above tests (i.e. “business purpose” or “economic substance”).

B. IRS Guidance

In an attempt to clarify its position on the Lease-Sale question, the IRS issued Rev. Rul. 55-540 which set forth guidelines to aid in the determination of whether it will view a transaction as a lease or sale. In general, the Service looks to the “intent of the parties as evidenced by the provisions of the agreement read in the light of the facts and circumstances existing at the time the agreement
was executed rather than to the actual form of the agreement. An intent evidencing a “sale” will generally be found to exist if one or more of the six presumptions set forth in Section 4.01 of Rev. Rul. 55-540 are present.

Rev. Rul. 55-540 creates a two-fold problem in the context of leveraged leasing: first, it defines a “conditional sale” rather than a “lease”; and second, it is specifically directed at two party transactions (non-leveraged leases).

Because of the complexity of most leveraged lease transactions and the importance of certainty as to the tax consequences, the Service, in the mid-1970s, promulgated several revenue procedures instructing taxpayers as to how to obtain “advanced rulings” on the “lease or sale” question. Revenue Procedures 2001-28 and 2001-29 have subsequently modified these earlier revenue procedures. Although these revenue procedures do not define, as a matter of law, whether a leveraged lease transaction is or is not a lease for federal income tax purposes, they certainly clarify the Service’s position in the event there is a dispute.

The guidelines require that the following conditions be satisfied in order to obtain an Advanced Ruling that the transaction is a leveraged lease for tax purposes:

1. **Minimum unconditional “at risk” investment.** On or before the date the equipment is first placed in service or used by the lessee, the lessor must make (or be personally and unconditionally committed to make) a minimum equity investment of at least 20 percent of the acquisition cost of the equipment and such minimum equity investment must be maintained at all times throughout the lease term. The net worth of the lessor must be sufficient to satisfy any such personal liability. In addition, the lessor must show that as of the end of the lease term:

   (A) the residual fair market value will be at least 20 percent of its original cost;

   (B) the remaining useful life of the equipment will be at least the greater of one year or 20 percent of its useful life.

The requirement that the minimum equity investment be maintained throughout the life of the lease is generally met where rental payments and debt service are level and the 20% minimum investment and residual value requirements are met. However, the requirement would not appear to be met where pretax cash flow is greater in the early years of the lease term (e.g. through the utilization of uneven rental or debt service payments, or “interest only” debt in early years) unless the equity investment is increased. This is because the guidelines require that lessee’s cumulative obligation (i.e. rental payments) minus lessor’s cumulative disbursements (ordinarily debt service) may not exceed the sum of the excess, if any, of the lessor’s initial equity investment over the 20 percent minimum investment plus the cumulative pro rata portion of the projected profit exclusive of tax benefits. Projected profit is defined as the excess of the lessee’s cumulative obligation plus the residual value over the lessor’s cumulative disbursements plus the initial equity investment.

The following example should help clarify the above. Assume $100,000 equipment cost; $20,000 equity investment; $80,000 debt; $20,000 residual value; 10 year lease term; cumulative pretax cash flow $10,000; annual pro rata portion of projected profit $1,000 per year ($10,000 / 10 Years). Assuming even rentals and debt service the requirement would be met since in all years the cumulative before tax cash flows exclusive of tax benefits do not exceed (a) the sum of the equity investment in excess of 20% of the equipment cost ($0 here) plus (b) the cumulative pro rata portion of the projected profit from the transaction exclusive of tax benefits. For example, in Year 3 the cumulative pro rata portion of the projected profit exclusive of tax benefits is $3,000 (3 x $1,000 per year) and the actual cumulative pre-tax cash flow exclusive of tax benefits for Year 3 is also $3,000. (see Table 1)
If, however, the rent payment or debt service structure were altered so as to render a cumulative before tax cash flow of $6,000 for the first 5 years and $4,000 for remaining 5 years. The requirement would not be met. For example, in Year 3 the cumulative pro rata portion of the projected profit exclusive of tax benefits is $3,000 (3 x $1,000 per year) while the actual cumulative pre-tax cash flow exclusive of tax benefits for Year 3 is $3,600 (see Table 2). The concern here is to prevent the building-up of an “equity” interest, which would make it difficult for a lessee to forego exercising a purchase or lease extension option.

(2) Lease Term and Renewal Options. For purposes of applying the various tests under the guidelines, the lease term includes all renewal or extension periods except those exercisable at the lessee’s option at fair rental value at the time of the renewal or extension.

(3) Purchase and Sale Rights. Neither the lessee nor a member of the lessee group may have a right to purchase the equipment at a price less than the fair market value at the time the right is exercised. Furthermore, at the time the equipment is first placed in service by the lessor, the lessor may not have the right to cause any party to purchase the equipment (thus, “puts” at any price even fair market value, appear to be prohibited). It may be possible, however, for the lessee or a third party to insure or guarantee the residual value, so long as the guarantor is not committed to buy the property but merely to pay the lessor the difference between the residual value actually realized and the amount insured.

(4) No Investment by the Lessee. Other than limited exceptions for severable improvements and certain non-severable improvements, no part of the

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* (Lease Payment - Debt Service) / Lease Term

TABLE 2

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* (Lease Payment - Debt Service) / Lease Term
cost of the equipment or any improvements or addition thereto may be furnished by the lessee or by any member of the lessee group. The lessee is permitted to repair and maintain the equipment and certain additions may possibly be permitted.

(5) No Lessee Loans or Guarantees. No member of the lessee group may lend funds to the lessor to be used in acquiring the equipment, nor may lessee guarantee any acquisition indebtedness of the lessor; however, a member of the lessee group may guarantee the lessee’s net lease obligations. Third-party guarantees also appear to be acceptable.

(6) Profit Requirement. The lessor must demonstrate that he expects to earn a profit from the transaction apart from the tax benefits resulting from the transaction. Two tests must be satisfied in order to meet this requirement: (A) Overall Profit Test (explained in point (1)); and (B) Positive Before Tax Cash Flow Test (basically requires rental payments to exceed debt service by a reasonable amount).

(7) Uneven Rentals. The IRS will not question the timing of the lessee’s rental deduction or the lessor’s income realization if the annual rent for any year is not more than 10 percent above or below the average annual rent over the lease term; or the annual rent term for any year during at least the first two-thirds of the lease term is not more than 10 percent above or below the average annual rent during that fractional term, and the annual rent for any year during the remaining lease term is no greater than the highest annual rent for any year during the initial fractional term, and no less than one-half of the average annual rent during such initial fractional term.

(8) Limited Use Property. The IRS will not issue advance rulings where the equipment is considered “limited use property” (i.e. “property expected not to be useful or usable by the lessee at the end of the lease term except for purpose of continued leasing or transfer to any member of the lessee group”). Rev. Proc. 76-30 (as modified by Rev. Proc. 2001-28) sets out general guidelines to help determine whether equipment will be considered “limited use property.”

Quantitative Analysis

From the lessor’s standpoint, whenever the discounted after-tax cash flows of a lease result in a positive net present value (NPV), the lease is “profitable.” Where the NPV of a lease equals zero, the projected discounted after-tax cash flows will equal the lessor’s initial equity investment and he will “breakeven” on the lease. In fact, in this “breakeven” scenario, the lease’s after-tax rate of return is the discount rate. In financial terms, this unique rate is the lease’s internal rate of return (IRR). Accordingly, the “breakeven rental payment” is that unique, before-tax cash inflow that causes the lease’s discounted projected after-tax cash flows to equal the lessor’s initial equity investment.

This is demonstrated below in Equations 1, 2, 3, and 4. These equations lay out a leveraged lease’s cash flows which consist of six elements: (1) rental payments \( L \), (2) loan amortization \( P+I \), (3) the tax shelter from interest and depreciation deductions \([I+CR]MTR\), (4) the tax shelter from the IRC § 179 expensing election \([EE(MTR)]\), and (5) the residual value of the equipment \((RV)\). Element (6) is the lessor’s initial equity investment \((EI)\).

\[
\text{Equation 1:} \quad NPV = \sum_{t=1}^{n} \frac{L_t (1-MTR)}{(1+k)^t} + \frac{P_t}{(1+k)^{t-1}} - \frac{MTR[(1+CR)_t]}{(1+k)^{t-1}} - \frac{EE(MTR)}{(1+k)^{t-1}} - RV - EI
\]

\[
\text{Equation 2:} \quad 0 = \sum_{t=1}^{n} \frac{L_t (1-MTR)}{(1+k)^t} - \sum_{t=1}^{n} \frac{P_t}{(1+k)^{t-1}} - \frac{MTR[(1+CR)_t]}{(1+k)^{t-1}} - \frac{EE(MTR)}{(1+k)^{t-1}} - RV - EI
\]

\[
\text{Equation 3:} \quad EI = \sum_{t=1}^{n} \frac{L_t (1-MTR)}{(1+k)^t} - \sum_{t=1}^{n} \frac{P_t}{(1+k)^{t-1}} - \frac{MTR[(1+CR)_t]}{(1+k)^{t-1}} - \frac{EE(MTR)}{(1+k)^{t-1}} - RV - EI
\]

An analysis of Equation 1 indicates that rental payments are really a function of the other five cash flows, which, in turn, are determined externally by such factors as the acquisition cost, the useful life of the equipment, the amount borrowed \((P)\) and the interest rate \((I)\) thereon, tax deduction rules, the lessor’s marginal tax rate \((MTR)\) and expected after-tax rate of return \((k)\), and finally, the length of the lease term \((n)\). In other words, once these five cash flows are established, the before-tax rental payments can be computed by setting \(NPV\) equal to 0 (Equation 2) and solving for the rental payment (Equation 4). The computed value represents the lowest annual rental payment a lessor can charge.
an and still recover his initial equity investment. A higher rental payment leads to profit, while a lower rental payment results in loss.

Equation 4:

\[
\sum_{k=1}^{n} R_{k} \left( 1 - \frac{MTR}{1+k} \right) = \sum_{k=1}^{n} P_{k} + L_{k} \cdot \left( 1 + \frac{CR}{1+k} \right) - \sum_{k=1}^{n} \left( \frac{MTR(EE)}{(1+k)^{2}} \right) \cdot \frac{RV_{k}}{(1+k)^{2}} + EI
\]

When the rental payments are received at the beginning of the year, rather than the end, an adjustment must be made to the lessor’s marginal tax rate to compensate for the fact that the inherent tax liability on this revenue is paid at the end of the year, not the beginning of the year. (Equation 5).

Equation 5:

\[
\sum_{k=1}^{n} \left( 1 - \frac{MTR}{1+k} \right) = \sum_{k=1}^{n} P_{k} + L_{k} \cdot \left( 1 + \frac{CR}{1+k} \right) - \sum_{k=1}^{n} \left( \frac{MTR(EE)}{(1+k)^{2}} \right) \cdot \frac{RV_{k}}{(1+k)^{2}} + EI
\]

**END NOTES**


2 IRC § 465 refers to Section 465 of the Internal Revenue Code of 1986. All further references to code will be similarly denoted.

3 IRC § 465(a)(1).

4 The “Lease or Purchase Decision” should not be confused with the “Lease or Sale Decision.” The “Lease or Purchase Decision” is a financing decision made by the perspective user-firm (lessee). In the average case the user-firm, through its capital budgeting procedures, makes the determination to acquire certain equipment. The next decision the user-firm faces is how to finance such an acquisition. In other words, should it “purchase” the equipment outright or should it “lease” the equipment. Thus, the “Lease or Purchase Decision” compares the “cost of leasing” to the “cost of purchasing.” The “Lease or Sale Decision,” on the other hand, is a federal income tax concept wherein the IRS reviews a particular financing transaction to determine whether the parties, in substance, intended a “conditional sale” or a “lease” irrespective of the “form” of the transaction. This “Lease or Sale Decision” is fully explored in Section II hereof. As stated above, the “Lease or Purchase Decision” is a lessee financing decision and, as such, not germane to the subject matter of this paper which attempts to analyze leases from the lessor’s perspective. A concise explanation of the “Lease or Purchase Decision” can be found in an array of many excellent Finance textbooks.

5 The “at risk” provisions of the IRC § 465 have greatly impacted in this area.


7 The “leverage effect” provides the lessor with a higher expected rate of return per dollar of equity investment than a non-leveraged lease. See Childs, C. and Gridley, W., “Leveraged Leasing and the Reinvestment Rate Fallacy,” *The Bankers Magazine*, (Winter 1973), pp. 53–61.

8 ibid.

9 ibid.

10 However, the rental payments a lessor will ultimately be able to offer are certainly driven by the existence or absence of “leverage.”

11 IRC §§ 167, 168.

12 IRC § 163.

13 IRC § 1231(a)(1); but IRC § 1245 ordinary gain will exist to the extent of prior depreciation deductions.

14 IRC § 483, 1274.

15 IRC § 162(a)(3). The tax consequences to the lessor and lessee of recharacterizing a lease as a conditional sale are set forth in Rev. Rul. 72-543, 1972-2 CB 87.

16 IRC §§ 167, 168, and 179.

17 IRC § 162.

18 IRC §§ 483, 1274.

19 The Treasury Regulations impose dual requirements: the financial arrangement must (1) be consistent with normal commercial practice or (2) not be a device to avoid section 465 (Treas Reg §§ 1-465-1(b) and 1.465-4.)


21 The Appeals Court determined that the income tax savings to Lyon during the first 11 years of the lease would be approximately $1.5 million. Lyon
had estimated their value at $312,220 over that period. ibid. p and FN 16.

22 ibid., pp. 1298-1302.

23 ibid., p. 1302.

24 ibid., pp. 1303-1304.


26 72 TC 1209 (1979).

27 ibid., p. 1225.


29 ibid.


31 2001-1 CB 1156 and 2001-1 CB 1160.

32 Because the cash flows of a leveraged lease change signs three times—negative (equity investment), positive (early years’ cash flows), negative (later years’ cash flows), and positive (residual value)—the lease will actually have two IRRs, a high one and a low one. “Which IRR is correct one?” has spawned substantial debate among financial theorists. For example, see Childs, C. and Gridley, W., “Leveraged Leasing and the Reinvestment Rate Fallacy,” (supra., EN 7).
DERIVATIVE ACCOUNTING CHANGES AND EQUITY MARKET REACTIONS
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ABSTRACT
This study examines whether US equity investors earn abnormal returns around an update in derivative accounting standard. The results show that the stock market reacted positively and significantly to the introductions of FASB Statements 119, 133 and 138. FASB Statement 137 that delays the derivative reporting compliance date, however, does not come with significant market anomaly. We conclude US GAAP changes that demand additional derivative disclosure signal improved information transparency to the stock market, and cause discrete wealth benefit.

INTRODUCTION
The financial reporting policy makers have been striving for continual updates in General Accepted Accounting Principles (GAAP) to extend the financial disclosure of publicly traded firms to provide better information to investors. This study examines the price performance of US stock market when updates of US GAAP that concern financial derivative reporting are pronounced by the FASB. US stock market includes not only “domestic” American firm equities but also “foreign” non-American company shares that are issued and traded within the US, such as American Depository Receipts (ADRs). Our research therefore covers both American corporations and foreign ADR-originating firms. Do the shifts in the disclosure environment regarding firms’ derivative position contain any new information “shocks” that might materially affect the valuation of involved firm stocks? While only a few existing studies have done investigations on the similar topic regarding derivative accounting effects, they focused on FASB’s issuance of Statements of Financial Accounting Standard (SFAS) No. 133 as of June 1998. Our work covers a broader time frame that ranges from 1993 to 2003, in which SFAS 119, 133, 137 and 138 were sequentially developed and finally adopted to adjust US firms’ derivative accounting practices.

LITERATURE REVIEW AND BACKGROUND DESCRIPTION
The wealth effect of reporting practice changes and standard updates has been of particular interest to researchers. Espahbodi, Strock and Tehranian (1991), Langer and Lev (1993) and Kren and Leauby (2001) study the valuation impact of new accounting standards such as SFAS 87 and SFAS 106. However, existing evidence remain mixed concerning whether the issuance of a more transparent standard will cause negative or positive wealth effects. One hypothesis assumes that more accounting disclosure brings “bad news” or “negative shock” to the market, causing investors to re-evaluate firm liabilities, expenses and net profits, and then adjust their estimate of stock value downwardly. The opposite hypothesis predicts that more accounting disclosure should benefit the investing public with
increased transparency as of firms’ financial fundamentals, thus reaffirming investors’ confidence and boosting stock performance. Empirically, while stock prices are found to react negatively to the issuance of SFAS 106 that requires the accounting for postretirement benefits other than pensions (e.g., Mittelstaedt and Warshawsky, 1993, Warshawsky, Mittelstaedt and Cristea, 1993), Brown and Thapa (2002)’s findings indicate that S&P 500 firms’ stocks on average respond positively to the final adoption of SFAS 133, which requires firms to record derivatives as assets and/or liabilities and to expense them.

Derivative accounting updates are expected by many to have profound impact on modern-day firms, which increasingly add interest/exchange-rate sensitive derivatives to their assets-liabilities mix. Consequently, their earnings and cash flows become more than ever sensitive to exchange/interest rate risks. FASB and SEC have been attempting to update pre-existing GAAP to disclose firms’ gains and losses related to exchange/interest rate exposure, and therefore provide investors with better information access.

Existing studies examine not only the US but also foreign equity markets for possible valuation effects of accounting information. A firm’s financial decisions, such as to issue its equity in a foreign market, could be significantly affected by the accounting disclosure environment (Cheung and Lee, 1995; Huddart, 1998). Such findings suggest that foreign firm values might also be sensitive to accounting practices that they employ.

Foreign companies that desire US capital have become increasingly inclined to conform to US GAAP when reporting their earnings. ADRs are US dollar-denominated negotiable receipts for non-US shares, thus allowing foreign companies to be listed and traded in US equity markets. These securities are typically categorized into four levels. Level I issues consist of ADRs that are traded in the US “pink sheet” over-the-counter (OTC) market. No new capital is raised, and the issuer is not required to comply with US GAAP or full SEC disclosure requirements. Since Level I programs allow issuing companies to enjoy the benefits of a publicly traded security without changing their current reporting process, such issues comprise the vast majority of the sponsored programs and have become the fastest growing segment of the ADR business. Level II issues are pre-existing shares listed on an official US stock exchange (such as NYSE and AMEX) or NASDAQ, and though no new capital is raised, this category requires specific compliance with US GAAP and with SEC disclosure regulations. Level III issues involve a combination of exchange or NASDAQ listing, raising new capital, and more restrictive US GAAP and SEC disclosure requirements. For the last level (144A issues), ADRs can be issued to raise new capital through private placement with qualified institutional investors in the US, and are subject to minimal disclosure requirements under the 144A rule.

As we hypothesize, FASB’s increased requirements in derivative accounting transparency could positively affect equity values of both American companies and ADR-issuing foreign firms, particularly for those listed in NYSE, AMEX or NASDAQ and fully bound by US GAAP. Yet, few published works have examined the wealth effects of derivative accounting disclosure on US equity values, let alone on the ADR market. Our study attempts to fill in this gap by investigating the price reactions of both American equities and ADRs to some of the most recent progress made by FASB in derivative accounting.

Some of FASB’s major derivative accounting changes during 1990s are summarized in Table 1. SFASs 119, 133 and 138 either demand better reporting of firms’ financial instrument (derivative) positions and hedging activities, or solve related implementation problems. The introduction of SFAS 137, on the other hand, slows down the compliance process of derivative accounting practices. So, according to our hypothesis, if investors indeed favor more transparency and completeness in derivative accounting information, the stock market should react positively to the adoptions of the former four standards, and negatively to the issuance of the latter one. However, as some FASB standards were issued to amend previous ones, it is also likely that the adjustments are not “major” or “ground-breaking” enough to cause any material shocks to the equity market.
DATA AND METHODOLOGY

Derivative accounting standards studied are listed in Table 1, and event dates for the major adoption progress are presented in Tables 2a through 2d. The event announcement dates, on which the information about projected accounting changes became publicly available, are identified by screening the Wall Street Journal Index and the FASB publication, “Financial Accounting Series: Exposure Drafts.”

According to the FASB’s “Rules of Procedure” in which GAAP are established, all final standards must be preceded by the issuance of “Exposure Drafts (ED)”, and those ED could be either brand-new announcements or revisions of earlier documents. An ED typically discusses the identified accounting problem, presents the proposed solution, and reviews the reasons underlying the FASB’s current proposition. Since an ED requires the vote of a two-thirds majority of the FASB members in favor of publication, its announcement signals a high probability that a GAAP will be resolved in the foreseeable future. If an accounting change contains any new relevant information at all, we expect investors to acknowledge such information at (or even earlier than) the announcement of an exposure draft, rather than at the issuance of a final standard (SFAS). Whether the subsequent issuance date and/or implementation date of an SFAS may still bring any valuable information (“surprises”) to the equity market also needs investigation. The Wall Street Journal publication day for a new Exposure Draft is found to lag one day behind the FASB publication day, though the former should have broader audiences. We therefore select the FASB publication day as the event announcement day $t = 0$ and the following day (i.e., the WSJ publication day) as day $t = +1$.

We collect the time series of daily data for equity portfolios from various sources. As the proxy for US equity market portfolio, the equally-weighted market index is obtained from the Center for Research in Security Prices (CRSP) tapes and consists of all publicly traded firms listed in NYSE, AMEX and NASDAQ. The data of S&P-ADR Index, as the proxy for foreign firms that are bound by US GAAP, is obtained from Standard and Poor’s. Introduced on January 1, 1998, this index consists of non-US companies that offer either Level II or Level III ADRs and therefore, its components are required to fully comply with US GAAP. By the end of 2002, there had been more than 260 US-listed foreign stocks in the S&P ADR Index. As for foreign firms that are only required to meet minimal US GAAP compliance, we screen the online database of ADR programs sponsored by the Bank of New York (http://www.adrbny.com) and then obtain 28 Level-I ADRs which originated no later than January 1, 1998 and provided complete trading history since then. The daily closing price data of these Level-I ADRs and the rest of equity portfolio indices are downloaded from the “Historical Prices” section of the Yahoo! Finance online database.

To estimate the stock price impact of the events, we employ a Multivariate Regression Model similar to those in Cornett and Tehranian (1990), Fenn and Cole (1994) and Wagster (1996). This model is built upon a system of portfolio return equations for multiple event announcements:

$$ R_{j,t} = \alpha_j + \beta_{1j} R_{m,t-2} + \beta_{2j} R_{m,t-1} + \beta_{3j} R_{m,t} + \beta_{4j} R_{m,t+1} + \beta_{5j} R_{m,t+2} + \sum_{k=1}^{3} \gamma_{kj} D_{j,t} + \epsilon_{j,t}, \quad [1] $$

where

- $R_{j,t}$ = the return on the $j$th equity portfolio on day $t$;
- $R_{m,t-2} \sim R_{m,t+2}$ = the return on the CRSP equally-weighted index on day $t -2$ through $t + 2$, respectively;
- $\alpha_j$ = an intercept coefficient for the $j$th portfolio;
- $\beta_{1j} \sim \beta_{5j}$ = market risk coefficients for the $j$th portfolio;
\( \gamma_{kj} \) = the price reaction of the \( k \)th event on the \( j \)th portfolio (\( k = 1, 2, 3 \) for development in each accounting standard, corresponding to the date of exposure draft issuance, the publication date of the final standard, and the mandatory implementation date, respectively);

\( D_{kj} \) = dummy variable, equal to 1 during the period of the \( k \)th event and 0 otherwise;

\( \epsilon_{j,t} \) = normally distributed error terms in the \( j \)th equation.

To circumvent problems associated with asymmetry in return distributions, daily returns are in the logarithm form \( \ln P_t - \ln P_{t-1} \). For portfolio \( j \), the value of event-date dummy coefficient \( (\gamma_{kj}) \) is estimated by the Seemingly Unrelated Regression (SUR) method, which takes into account contemporaneous covariance and minimizes statistical problems. The cross-sectional performance of eleven equity portfolios with different firm- and industry-specific characteristics are jointly estimated using daily returns series over trading days beginning 120 days prior to the ED issuance. For each of the four FASB’s new derivative accounting standards, we tested the following null hypothesis:

\[ \gamma_{kj} = 0 \quad \forall \ j; \ \text{the abnormal returns for each portfolio equal zero for the} \ k \text{th event.} \]

**EMPIRICAL RESULTS**

Table 3a presents the SUR estimate results for Hypothesis 1, the abnormal return for each equity portfolio equals zero during the 2-day period \([0, +1]\) surrounding each accounting update event that leads to the adoption of SFAS 119. The eleven selected portfolios all show positive price reactions to both the issuance of exposure draft and the publication of the FASB statement, with all but two portfolios (Level-I ADRs and NASDAQ Transports) yielding price gains that are statistically significant at the 0.10-0.01 levels. The abnormal returns range from 0.744 percent for Level-1 ADRs to 2.537 percent for NYSE Financials Index around the former announcement, from 0.406 percent for NASDAQ Transports to 2.332 percent for NYSE Financials around the latter announcement. Surrounding the effective day of the final standard SFAS 119, however, the price movements of the eleven portfolios show mixed signs, and all of the abnormal return values, ranging from \(-1.135\) percent (for NYSE Industrials Index) to \(+1.030\) percent (for S&P 500 Index), are insignificantly different from zero.

Some further details of our findings are worth mentioning. First, the US stock market significantly reacts not only to the publication of a formal accounting standard, but also to the earlier step of development, that is, the issuance of an exposure draft (which first informs the public of FASB’s new work plan in publication). It appears to us that investors begin to adjust their stock valuation for potential accounting change effects as early as the introduction of an ED, rather than hold their investment decisions up till a proposal officially turns into a final rule. Second, the stock market does not strongly react when the new rule begins to take effective, as investors should have incorporated the potential wealth effects into their stock value projections back to when the new rule became approved earlier. Third, to those influential events, most of US equity portfolios are statistically reactive regardless of being relatively larger firms (Russell-1000 Index) or smaller firms (Russell-2000 Index), domestic firms (S&P-500 Index) or foreign firms (S&P ADR-Index), more regulated in listing conditions (NYSE Composite Index) or less regulated (NASDAQ Composite Index), within the financial industry (NYSE Financials Index), the manufacturing industry (NYSE Industrials Index) or the Utilities Index (NYSE Utilities Index). Among the eleven equity sub-samples being examined, the NYSE Financials portfolio gains the most significantly (at the 0.01 level) surrounding the ED issuance and the final standard publication, which implies that its component firms are the most affected by FASB’s new requirements of financial instrument accounting. Such a phenomenon could be attributed to that large financial firms, on average, tend to incorporate more financial instruments within their assets and/or liabilities for speculation and/or hedging purposes.

On the other hand, however, we find some cases that are not significantly correlated with the publications of ED or final standard of SFAS 119. For example, neither the Level-1 ADR
portfolio nor the NASDAQ Transports Index shows statistically significant gains or losses around those announcement events. Our explanations are: 1) Level-1 ADRs, unlike their Level-2 and Level-3 counterparts, are not subject to full US GAAP compliance and thus could be largely unaffected by US derivative-accounting updates, even if they carry financial derivatives in their asset-liability mix; 2) in comparison with firms in other industries, transportation firms might hold relatively smaller positions of financial derivatives therefore the impact of new rules on their stock values tend to be less material. All these possible explanations, however, need future empirical validations.

The SUR estimates for Hypothesis 1 regarding the development events of SFAS 133, 137 and 138 are presented in Tables 3b through 3d, respectively. The economic consequence of SFAS 133 and 138 largely resembles that of SFAS 119, except that surrounding the publication day of SFAS 137, the majority of the eleven portfolios yield merely insignificant gains. Although the eleven portfolios largely earned negative abnormal returns when FASB issued ED or final standard of SFAS 137, none of those losses are significantly different from zero. It appears to us that investors might not consider SFAS 137 as a major change. Mainly postponing the effective date of the previous standard for less than a year, SFAS 137 does not cause long-lasting material impact to alter investors’ stock value projections like other derivative accounting updates do.

**SUMMARY**

Our MVRM regression outcomes support the following hypotheses: (1) Investors consider the accounting information about firm derivative holding positions and hedging activities “valuable”, and favor greater transparency in reporting such information. As a result, FASB’s progress in developing derivative reporting rules is welcomed by the stock market with significant price gains (i.e., positive abnormal returns). (2) The stock market reacts positively and efficiently to the accounting updates, as early as when the FASB pronounces its mission plan by publishing the exposure draft. (3) Even for non-US companies traded in the US market (such as Level-2 and Level-3 ADR originating firms), adopting US GAAP will cause them to perform in the stock market similarly to US domestic publicly traded corporations. We expect such empirical findings, which has not yet been provided by available published works, can lead to further knowledge in derivative accounting and its economic consequences.

**TABLE 1.**

**Derivative Accounting Update Events Studied**

<table>
<thead>
<tr>
<th>SFAS</th>
<th>Title</th>
<th>Topic Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. 119</td>
<td>“Disclosure about Derivative Financial Instruments and Fair Value of Financial Instruments.”</td>
<td>This Statement requires disclosures about derivative financial instruments (futures, forward, swap, and option contracts, and other financial instruments with similar characteristics), even if they do not result in off-balance-sheet risk of accounting loss.</td>
</tr>
<tr>
<td>No. 133</td>
<td>“Accounting for Derivative Financial Instruments and for Hedging Activities.”</td>
<td>This Statement requires that an entity recognize all derivatives as either assets or liabilities in the statement of financial position and measure those instruments at fair value.</td>
</tr>
<tr>
<td>No. 137</td>
<td>“Accounting for Derivatives and Hedging Activities --- Deferral of the Effective Date of FASB Statement No. 133.”</td>
<td>This statement delays the effective date of SFAS 133 for all fiscal quarters until fiscal years beginning after Jun. 15, 2000.</td>
</tr>
</tbody>
</table>
“Accounting for Certain Derivatives and Hedging Activities --- An Amendment of FASB Statement No. 133.”

This statement addresses specific SFAS 133 implementation issues, including application of scope to commodity contracts (normal purchase and sale), interest rate hedging, hedging foreign currency Receivables/Payables and hedging foreign currency risk with inter-company derivatives.

TABLE 2.
Important Events and the Event Dates Leading to the Issuance of SFAS Examined

<table>
<thead>
<tr>
<th>FASB Announcements</th>
<th>SFAS 119</th>
<th>SFAS 133</th>
<th>SFAS 137</th>
<th>SFAS 138</th>
</tr>
</thead>
</table>

TABLE 3A.
The Abnormal Return Surrounding SFAS No. 119 Event Dates

<table>
<thead>
<tr>
<th>SFAS No. 119 Events</th>
<th>ED Issuance Day [0,+1]</th>
<th>SFAS Issuance Day [0,+1]</th>
<th>Mandatory implementation Day [0,+1]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Panel A: Portfolio Abnormal Returns (in %)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Russell 1000 (larger firms)</td>
<td>2.313 (2.396)**</td>
<td>2.065 (2.174)**</td>
<td>0.769 (1.127)</td>
</tr>
<tr>
<td>Russell 2000 (smaller firms)</td>
<td>1.865 (1.933)*</td>
<td>1.771 (1.795)*</td>
<td>0.543 (0.682)</td>
</tr>
<tr>
<td>S&amp;P 500 (domestic firms)</td>
<td>2.266 (2.467)**</td>
<td>2.128 (2.119)**</td>
<td>1.030 (1.325)</td>
</tr>
<tr>
<td>S&amp;P ADR (foreign firms, full disclosure)</td>
<td>1.997 (2.193)**</td>
<td>1.721 (1.887)*</td>
<td>0.598 (0.437)</td>
</tr>
<tr>
<td>Level-1 ADR (foreign firms, less disclosure)</td>
<td>0.744 (0.950)</td>
<td>1.394 (1.571)</td>
<td>-0.165 (-0.303)</td>
</tr>
<tr>
<td>NYSE Composite (listing more regulated)</td>
<td>2.190 (2.082)**</td>
<td>2.005 (2.214)**</td>
<td>0.844 (1.070)</td>
</tr>
<tr>
<td>NASDAQ Composite (listing less regulated)</td>
<td>1.870 (1.924)*</td>
<td>1.582 (1.780)*</td>
<td>-0.713 (-0.856)</td>
</tr>
<tr>
<td>NYSE Financials</td>
<td>2.537 (2.650)***</td>
<td>2.332 (2.857)***</td>
<td>1.220 (1.583)</td>
</tr>
<tr>
<td>NYSE Industrials</td>
<td>1.983 (2.399)**</td>
<td>1.872 (2.085)**</td>
<td>-1.135 (-1.302)</td>
</tr>
<tr>
<td>NYSE Utilities</td>
<td>1.584 (1.882)*</td>
<td>1.395 (1.793)*</td>
<td>0.472 (0.605)</td>
</tr>
<tr>
<td>NASDAQ Transports</td>
<td>1.112 (1.467)</td>
<td>0.416 (0.619)</td>
<td>-0.247 (-0.433)</td>
</tr>
<tr>
<td>Panel B: Wald Test χ²-value</td>
<td>30.324***</td>
<td>27.290***</td>
<td>13.441</td>
</tr>
</tbody>
</table>
### TABLE 3B.
The Abnormal Return Surrounding SFAS No. 133 Event Dates

<table>
<thead>
<tr>
<th>SFAS No. 133 Events</th>
<th>ED Issuance Day [0,+1]</th>
<th>SFAS Issuance Day [0,+1]</th>
<th>Mandatory implementation Day [0,+1]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Panel A: Portfolio Abnormal Returns (in %)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Russell 1000 (larger firms)</td>
<td>2.007 (2.174)**</td>
<td>1.775 (2.064)**</td>
<td>0.351 (0.858)</td>
</tr>
<tr>
<td>Russell 2000 (smaller firms)</td>
<td>1.475 (1.826)*</td>
<td>0.806 (1.205)</td>
<td>0.389 (0.937)</td>
</tr>
<tr>
<td>S&amp;P 500 (domestic firms)</td>
<td>1.749 (2.287)**</td>
<td>1.935 (2.105)**</td>
<td>0.720 (1.174)</td>
</tr>
<tr>
<td>S&amp;P ADR (foreign firms, full disclosure)</td>
<td>1.811 (1.984)**</td>
<td>2.120 (2.199)**</td>
<td>0.860 (1.395)</td>
</tr>
<tr>
<td>Level-1 ADR (foreign firms, less disclosure)</td>
<td>1.133 (1.384)</td>
<td>1.024 (1.105)</td>
<td>0.322 (0.740)</td>
</tr>
<tr>
<td>NYSE Composite (listing more regulated)</td>
<td>1.892 (2.137)**</td>
<td>1.710 (2.096)**</td>
<td>0.230 (0.386)</td>
</tr>
<tr>
<td>NASDAQ Composite (listing less regulated)</td>
<td>1.266 (1.873)*</td>
<td>1.573 (2.152)**</td>
<td>0.156 (0.291)</td>
</tr>
<tr>
<td>NYSE Financials</td>
<td>2.181 (2.257)**</td>
<td>1.869 (2.080)**</td>
<td>1.069 (1.652)</td>
</tr>
<tr>
<td>NYSE Industrials</td>
<td>1.510 (1.928)*</td>
<td>1.727 (2.110)**</td>
<td>0.795 (1.234)</td>
</tr>
<tr>
<td>NYSE Utilities</td>
<td>2.430 (2.376)**</td>
<td>1.903 (1.835)*</td>
<td>0.613 (1.086)</td>
</tr>
<tr>
<td>NASDAQ Transports</td>
<td>0.284 (0.590)</td>
<td>0.695 (1.207)</td>
<td>0.320 (0.738)</td>
</tr>
<tr>
<td>Panel B: Wald Test $\chi^2$-value</td>
<td>24.250**</td>
<td>21.986**</td>
<td>15.415</td>
</tr>
</tbody>
</table>

### TABLE 3C.
The Abnormal Return Surrounding SFAS No. 137 Event Dates

<table>
<thead>
<tr>
<th>SFAS No. 137 Events</th>
<th>ED Issuance Day [0,+1]</th>
<th>SFAS Issuance Day [0,+1]</th>
<th>Mandatory implementation Day [0,+1]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Panel A: Portfolio Abnormal Returns</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Russell 1000 (larger firms)</td>
<td>-1.019 (-1.305)</td>
<td>-0.242 (-0.525)</td>
<td>0.463 (0.890)</td>
</tr>
<tr>
<td>Russell 2000 (smaller firms)</td>
<td>-0.297 (-0.623)</td>
<td>1.220 (1.524)</td>
<td>-0.185 (-0.420)</td>
</tr>
</tbody>
</table>
### Table 3D.
The Abnormal Return Surrounding SFAS No. 138 Event Dates

<table>
<thead>
<tr>
<th>SFAS No. 138 Events</th>
<th>ED Issuance Day [0,+1]</th>
<th>SFAS Issuance Day [0,+1]</th>
<th>Mandatory implementation Day [0,+1]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Panel A: Portfolio Abnormal Returns (in %)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Russell 1000 (larger firms)</td>
<td>1.613 (1.740)*</td>
<td>1.092 (1.439)</td>
<td>0.270 (0.614)</td>
</tr>
<tr>
<td>Russell 2000 (smaller firms)</td>
<td>1.048 (1.402)</td>
<td>0.913 (1.285)</td>
<td>-0.381 (-0.510)</td>
</tr>
<tr>
<td>S&amp;P 500 (domestic firms)</td>
<td>1.791 (1.867)*</td>
<td>1.272 (1.650)*</td>
<td>0.925 (1.287)</td>
</tr>
<tr>
<td>S&amp;P ADR (foreign firms, full disclosure)</td>
<td>1.587 (1.690)*</td>
<td>0.724 (1.110)</td>
<td>0.399 (0.520)</td>
</tr>
<tr>
<td>Level-1 ADR (foreign firms, less disclosure)</td>
<td>0.735 (1.196)</td>
<td>0.593 (1.005)</td>
<td>0.280 (0.601)</td>
</tr>
<tr>
<td>NYSE Composite (listing more regulated)</td>
<td>1.409 (1.879)*</td>
<td>1.340 (1.693)*</td>
<td>0.183 (0.524)</td>
</tr>
<tr>
<td>NASDAQ Composite (listing less regulated)</td>
<td>1.671 (1.794)*</td>
<td>1.090 (1.585)</td>
<td>-0.862 (-1.323)</td>
</tr>
<tr>
<td>NYSE Financials</td>
<td>1.924 (2.273)**</td>
<td>1.246 (1.833)*</td>
<td>1.015 (1.421)</td>
</tr>
<tr>
<td>NYSE Industrials</td>
<td>1.372 (1.760)*</td>
<td>0.951 (1.297)</td>
<td>-0.033 (-0.128)</td>
</tr>
<tr>
<td>NYSE Utilities</td>
<td>1.610 (1.937)*</td>
<td>0.540 (1.007)</td>
<td>0.690 (1.450)</td>
</tr>
<tr>
<td>NASDAQ Transports</td>
<td>0.272 (0.564)</td>
<td>0.709 (1.233)</td>
<td>-0.580 (-0.926)</td>
</tr>
</tbody>
</table>
Panel B: Wald Test $\chi^2$-value

|       | 24.070** | 20.375* | 8.263 |

NOTES:
(1) Coefficients are SUR estimates. In parentheses are $t$-values. These coefficients measure abnormal returns from the regression of a system of portfolio returns and dummy variables (equal to unity as day $t = [0, +1]$, equal to zero otherwise) corresponding to the three FASB announcements regarding each SFAS.
(2) Wald test is for the hypothesis that abnormal returns for all equity portfolios jointly equals zero for the $k$th event announcement.
(3) *** Significant at the 0.01 level.
**  Significant at the 0.05 level.
*     Significant at the 0.10 level.

REFERENCES


EXPERT RECOMMENDATIONS IN THE ‘DARTBOARD’ COLUMN

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ABSTRACT

For the past several years now, the Wall Street Journal’s “Your Money Matters” column has conducted monthly stock selection contests where random “dartboard portfolios” have been pitted against professional stock analysts’ portfolios. In the professional portfolios, four stocks are selected by four experts, while the dart portfolios consists of four stocks randomly selected by Wall Street Journal staff members throwing darts onto a dartboard containing all stock listings from the NYSE, AMEX, and NASDAQ. In both portfolios each stock is given an equal weight of 25 percent. The returns for each stock are computed over a six-month holding period, and the portfolio returns are simply a weighted average of the individual security returns.

This paper analyzes completed contests from January 1990 through October 1995. Over this period the experts have won 60 percent of the time (39 out of 65). Furthermore, the returns for the expert portfolios have outpaced those of the Dow Jones Industrial Average (DJIA) on 36 of the 65 occasions. Although
interesting, these Wall Street Journal contests fail to include information that may directly impact and alter contest results. This study re-examines and presents the results of past contests, making adjustments for risk. In addition to providing performance statistics for the entire six-year period, we also consider the value of the experts' recommendations based on their ability to repeat winning performances.

Since 1987 the popular Wall Street Journal "Your Money Matters" column has conducted monthly stock selection contests where random "dartboard portfolios" have been pitted against professional stock analysts' portfolios. In the professional portfolios, four stocks are selected by four experts, while the dart portfolios consist of four stocks randomly selected by Wall Street Journal (WSJ) staff members throwing darts onto a board containing all stock listings from the NYSE, AMEX, and NASDAQ. In both portfolios each selected stock carries an equal weight of 25 percent. Stock returns are then computed over a six-month holding period with the portfolio returns (expert and dartboard) simply being a weighted average of the individual security returns. Those experts ranking first or second at the end of a contest are allowed to compete in a subsequent one.

This paper analyzes completed contests from January 1990 through October 1995. Over this period the expert portfolios have beaten the dartboard portfolios 60 percent of the time (39 out of 65) and the experts' returns have also outpaced those of the Dow Jones Industrial Average (DJIA) on 36 of the 65 occasions. Although interesting, these WSJ contests provide only cursory results and fail to include information that would render more meaningful comparisons of performance. For instance, contest returns are based solely on capital gains for the period, and risk does not factor into the determination of winners and losers. Faced with a bull market, the experts may be tempted to select more volatile stocks that will naturally capitalize on the up-market movement. In contrast, the randomly selected dartboard portfolio should contain an average amount of volatility. Furthermore, while the individual contests report the magnitude of the winner's portfolio returns over the loser's returns, the WSJ's dartboard articles merely keep a running tally of winners (i.e. 39 for the experts and 26 for the darts) ignoring the average returns over all contests for winners and losers. The inclusion of these aggregate average returns would provide useful information regarding the potential for long run returns from implementing a strategy based on the experts' choices.

Based on these considerations, this study re-examines and presents the results of past contests with the following adjustments and analyses. First, we consider the potential variability of returns in adjusting the contests for risk. This study also includes overall average return information for the expert and dartboard portfolios and the DJIA. Additionally, we consider the value of subsequent recommendations from those experts invited to repeat their winning performances. This allows us to assess the existence of potentially superior analysts, their impact on contest returns and the potential gains from an investment strategy that follows their choices.

The results of our analysis indicate that the risk reward ratio for the expert portfolios is approximately one-half that of the dartboard portfolios. Thus the expert picks not only provide a higher return, but also provide less risk than the random dartboard selections. Compared to the benchmark index portfolio, the expert portfolio returns are twice those of the DJIA. Based on total risk the experts' performance appears inferior to the DJIA, however, when only systematic risk is considered the experts actually outperform the Dow. This result is not surprising given that the four experts each select just one security, and this lack of diversification significantly increases the total risk of their portfolios.

LITERATURE

Previous literature on this topic has somewhat narrowly addressed the experts' versus market performance using the standard event study methodology. In examining early dartboard contests, Barber and Loeffler (1993) find positive abnormal returns on the 2 days immediately following the analysts' recommendations. They suggest that the returns are a result of naive buying pressure as well as the information provided by the recommendations. Metcalf and Malkiel (1994) examine the 1990-1992 dartboard contests from the perspective of
market efficiency and find that although the experts tend to pick high beta stocks, they are unable to beat the market or the darts on a risk adjusted basis. The authors find further support for the announcement effect, associated with the publicity of the contests, as reported in Barber and Loeffler. Wright (1994) also documents the ability of the experts to impact market prices through the contest with a 4.59 percent 2-day abnormal return following the contest announcement. In contrast to the earlier studies, Albert and Smaby (1996) find greater (lesser) support for the information effect (price pressure hypothesis), and their examination of experts invited back for subsequent contests suggests that the information effect is even more pronounced when these apparently superior analysts make further recommendations. Most recently, Liang (1999) finds significant announcement returns which are reversed in the following 15 trading days leading him to conclude that price pressure from naive investors is responsible for the temporary run-up.

The present study contributes to the literature by more broadly addressing the dartboard issue through a long-term detailed performance analysis for a large sample of WSJ contests. In doing so, we examine the risk of individual contests (as opposed to the risk of individual securities), re-rank the contests in terms of winners and losers based upon risk adjusted returns, and extend the previous studies to include a much larger number of contests from 1990 through 1995. In addition, we adjust the experts' and dartboard's performance to analyze the systematic component of contest risk as well as the total contest risk. Finally, the longer contest study period allows us to provide a more thorough analysis of winning experts who are selected to repeat as contestants.

METHODOLOGY AND DATA

In contrast to previous dartboard studies, which rely exclusively on the event study methodology, we evaluate contest results based on standard measures commonly used by investors to evaluate performance. First, to analyze risk we calculate the standard deviation of returns over the entire period for all contests. Next, using the standard deviation we measure total risk per unit of return by calculating the coefficient of variation for each expert and dartboard portfolio separately. This standardized measure is then used to re-rank the contest participants to determine the winners and losers on the basis of total risk.

We also consider systematic risk in addition to total risk when comparing overall performance of experts and the dartboard. Systematic risk is estimated by calculating betas for the expert and dartboard portfolios. Averaging the experts' and dartboard's returns for each of the 65 contests and regressing each sample's returns against the corresponding returns for the DJIA provides beta estimates for the portfolios. Since the concern of this study is to assess long-term performance as opposed to temporary announcement effects, we measure portfolio risk and return during the entire six-month period of the contests.

Differences in performance rankings may result from the use of different risk measures and thus for a thorough analysis we include both unsystematic and systematic risk measures. The precise measure chosen depends on the investor's current holdings. For example, the coefficient of variation as a measure of total risk is relevant when no other assets are held apart from the asset or portfolio under consideration. Alternatively, the use of beta as the risk measure is relevant under conditions where the asset or portfolio under consideration is being added to an otherwise diversified portfolio.

Similar to the total risk assessment of performance, beta estimates are employed to calculate beta per return for each expert and dartboard portfolio separately. This standardized measure is then used to re-rank the contest participants to determine winners and losers on the basis of systematic risk. Tests for statistically significant differences between the return distributions of the experts, the dartboard and the DJIA utilize the Wilcoxon Signed Rank Test (WSRT). Finally, further analysis evaluates the subsequent performance of those experts who serve as repeating contestants considering their risk-adjusted returns and winner/loser ranking.

RESULTS

Table 1 presents the win totals for the experts, the dartboard and the DJIA for the 65 contests and provides the basis for comparing return distributions of the experts versus the darts and the experts versus the Dow. The wins are tallied
TABLE 1 TALLEY OF WINNERS AND STATISTICAL TEST FOR DISTRIBUTIONAL DIFFERENCES

This table compares the number of wins and corresponding winning percentage for the experts compared to the dartboard and the experts versus the DJIA based on raw returns, returns adjusted for total risk and returns adjusted for systematic risk. Also included is the p-value from the Wilcoxon Signed Rank Test for differences in return distributions.

<table>
<thead>
<tr>
<th></th>
<th>Raw Returns Wins (%)</th>
<th>Wilcoxon p-value</th>
<th>Risk-Adjusted Wins (%)</th>
<th>Wilcoxon p-value</th>
<th>Risk-Adjusted Wins (%)</th>
<th>Wilcoxon p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experts</td>
<td>39 (60)</td>
<td>.0571</td>
<td>40 (61.5)</td>
<td>.0793</td>
<td>39 (60)</td>
<td>.0749</td>
</tr>
<tr>
<td>Dartboard</td>
<td>26 (40)</td>
<td></td>
<td>25 (38.5)</td>
<td></td>
<td>26 (40)</td>
<td></td>
</tr>
<tr>
<td>Experts</td>
<td>36 (55.4)</td>
<td>.0455</td>
<td>28 (38.9)</td>
<td></td>
<td>33 (50.8)</td>
<td>.4781</td>
</tr>
<tr>
<td>DJIA</td>
<td>29 (44.6)</td>
<td></td>
<td>37 (61.1)</td>
<td>.0001</td>
<td>32 (49.2)</td>
<td></td>
</tr>
</tbody>
</table>

TABLE 2 PERFORMANCE STATISTICS FOR CONTESTS

This table includes the mean return and standard deviation, median, minimum, and maximum returns, coefficient of variation, beta and beta per return over 65 six-month contest periods for the expert and dartboard portfolios and the DJIA.

<table>
<thead>
<tr>
<th>Summary Statistics</th>
<th>Expert</th>
<th>Dartboard</th>
<th>DJIA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>10.54%</td>
<td>4.44%</td>
<td>5.08%</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>23.83%</td>
<td>20.18%</td>
<td>7.32%</td>
</tr>
<tr>
<td>Median</td>
<td>7.75%</td>
<td>2.80%</td>
<td>4.90%</td>
</tr>
<tr>
<td>Minimum</td>
<td>-37.8%</td>
<td>-43.0%</td>
<td>-12.8%</td>
</tr>
<tr>
<td>Maximum</td>
<td>75.0%</td>
<td>72.9%</td>
<td>19.6%</td>
</tr>
<tr>
<td>Coefficient of Variation</td>
<td>2.26</td>
<td>4.54</td>
<td>1.44</td>
</tr>
<tr>
<td>Beta</td>
<td>1.96</td>
<td>1.21</td>
<td>1.0</td>
</tr>
<tr>
<td>Beta per Return</td>
<td>0.186</td>
<td>.273</td>
<td>.197</td>
</tr>
</tbody>
</table>

Based on raw returns (as reported by the WSJ) and risk-adjusted returns. Relative to the competition, the experts' raw returns exceed the dartboards' and the DJIA in 60 percent and 55.4 percent of the contests, respectively. Table 1, columns 1 and 2 illustrate that according to the
Wilcoxon Signed Rank Test (WSRT), we are able to reject the null hypothesis that the sampled populations have equal probability distributions in favor of the alternative hypothesis. Thus, the raw return distribution of the experts’ portfolios is shifted to the right of both the dartboard portfolios and the DJIA with p-values of 0.0571 and 0.0455, respectively.

To judge the contests separately on a risk-adjusted basis, we take into consideration both total risk and systematic risk. For the total risk adjustment, we use the standard deviations of both the expert and the dartboard portfolios to calculate coefficients of variation for each contest. These are then compared to each other and the appropriate coefficients of variation for the DJIA as a means of re-ranking relative contest performance. For the systematic risk adjustment, we use the estimated betas of both the expert and the dartboard portfolios to calculate systematic risk per return for each contest. These risk-return measures are then compared to each other and to those of the Dow as a means of re-ranking relative contest performance.

Table 1, columns 3 and 4 reveal that when the contests are re-ranked in this fashion using total risk as the relevant measure, the experts maintain their dominance over the darts with a 61.5 percent success rate (40 wins in 65 contests). Based on these re-rankings, the WSRT again rejects the null hypothesis of equal return distributions in favor of the alternative that the experts’ portfolio return distribution is shifted to the right of the dartboard’s with a p-value of 0.0793. When compared to the DJIA, however, the success rate of the experts drops to 38.9 percent (28 wins in 65 contests) with the distribution for the Dow now shifted to the right of the experts’ as indicated by the WSRT p-value of 0.0001. The relative strength of the DJIA reflects the benefits of diversification, while the suboptimality of naïve diversification is reflected in the weak performance of the dartboard.

When the contests are re-ranked using systematic risk as indicated in the final two columns of Table 1, the experts maintain their dominance over the darts with a 60 percent success rate (39 wins in 65 contests). Their success in comparison to the DJIA, however, drops slightly from 55.4 to 50.8 percent (33 wins in 65 contests). The WSRT rejects the null hypothesis of equal return distributions in favor of the alternative that the expert portfolio return distribution is shifted to the right of the dartboard’s with a p-value of 0.0749. When comparing the experts’ distribution to that of the Dow on a systematic risk-adjusted basis, however, we cannot reject the null hypothesis of equal return distributions for the experts and the DJIA (p-value of 0.478).

Table 2 summarizes the performance statistics on an aggregate basis for the experts, the dartboard, and the DJIA. These figures are based upon a simple averaging of the results for the 65 contests, and thus both the return (holding period capital gains) and risk measures (standard deviation and beta) are assessed over all of the six-month contest periods. A comparison of the mean returns presented in Table 2 indicates that the experts’ returns exceed those of both the darts and the DJIA by margins of more than two to one. With regard to risk the experts may also claim the highest standard deviation and highest beta. Surprisingly, the dartboard’s random selections also result in relatively high risk as measured by the standard deviation and coefficient of variation.

After adjusting the average raw returns by the standard deviation and beta to produce risk-reward ratios, Table 2 indicates that the coefficient of variation and beta per return for the experts are 2.3 and 0.186, respectively. For the DJIA the same risk-reward measures are 1.4 and 0.197, respectively. The lower coefficient of variation for the DJIA reflects the smaller standard deviation of returns resulting from a more diversified portfolio of 30 securities compared to an essentially undiversified portfolio of four stocks individually selected by the experts. Based on beta per return as a risk-reward measure, the expert portfolio provides less systematic risk per unit of return than the DJIA. The dartboard portfolio performance is again relatively poor as evidenced by its high risk-return ratios.

We further analyze the performance of various expert portfolio categories in comparison to each other and the DJIA. For example, Table 3 presents the summary statistics including the mean return and standard deviation, coefficient of variation, beta and beta per return for the DJIA and various classifications of experts based on their success. In particular, the
experts are categorized as: "WSJ Winners" comprised of those experts ranked number one or two in each contest; "Real Winners" comprised of WSJ winners who also beat the DJIA over the contest period; and "Experts" by their rank (one through four) based on their contest performance. Table 3 reveals that the title, Real Winners, is appropriate in that these experts claim the best risk-adjusted performance as measured by both the coefficient of variation and beta per return. These Real Winners are followed closely by the experts holding a number one performance ranking, and even the experts holding a number two performance ranking beat the DJIA when their evaluation is based on systematic risk. Performance deteriorates substantially, however, for those experts that rank three or four.

The final part of our analysis deals with the performance of experts who repeat their stock picking roles for the dartboard column. In each contest the four experts are ranked from one to four based on their relative performance, irrespective of the performance of the darts or the DJIA. The repeating experts are selected based on their “superior” performance in an initial contest where those experts ranked one or two in each contest are invited to repeat in a subsequent contest.

In terms of contest reporting, the Journal identifies each participant by name with his or her photograph and stock recommendation. It also reports the results of the previous six-month contest and ranks the return performance of the experts in a tabular format with the top two experts repeating (with new selections) for the current contest. Sixty-seven experts have repeated or participated in more than one contest during the 1990-1995 study period, while 61 experts have participated in only one contest.

Given that the contest winners, especially the Real Winners and the number one ranked Experts, are highly successful, an obvious question is whether mimicking the subsequent security selections of these experts leads to the realization of above market returns. The fact that the WSJ publishes the ranking of the experts and invites winners to repeat as contestants permits us to analyze the winners’ subsequent performance(s). Table 4 presents the mean returns, average ranking of the experts, standard deviations, coefficient of variation, beta and beta per return for the WSJ Winners, the Real Winners, and the number one ranked Experts in their repeat contest performances. Following the Rank 1 Experts in their repeat selections results in the highest returns and highest risk measures, yet relatively low risk to return ratios. The group with the worst performance among the repeaters is the WSJ Winners with the Real Winners outperforming the other groups when systematic risk to return is considered as the appropriate measure of performance.

Comparing this repeat performance information to the results presented in Table 3 leads to some interesting observations. First, we note that all repeat winners’ returns clearly exceed those of the DJIA, but again do so with standard deviations and coefficients of variation substantially higher than the DJIA, yet their betas per return all fall below that of the DJIA. The repeaters’ standard deviations closely approximate those of the number one ranked experts from Table 4, while their mean returns are somewhat below those of the number two ranked experts leaving them with coefficients of variation two to three times larger than the winners from Table 4. Similarly, the repeaters’ betas per return are also much greater than those presented in Table 4 for the winner categories. The average ranking in Table 5 further highlights this repeat performance problem where the repeat contestants are on average unable to achieve either a number one or number two ranking. These findings suggest that the pronounced information effect for repeating experts as reported in Albert and Smaby (1999) appears to be unwarranted.

In comparison to other studies (Barber and Loeffler (1996), Liang (1999), Metcalf and Malkiel (1994), and Wright (1994)), our overall results do indicate a generally superior performance by the experts relative to the darts. This performance, however, is essentially equivalent to the broader market as measured by the Dow, thus generally supporting the previous findings of temporary price run-ups within overall market efficiency. The results presented here clearly reveal superior performance for the winning experts with the “real” winners and number one ranked experts dominating. These winners, however, cannot be identified ahead of time, and the selections of repeating winners in subsequent contests result in risk-adjusted returns that do not on average beat the market. This is also consistent with
efficient markets where past performance can not be used to predict future returns.

**SUMMARY AND CONCLUSION**

This study analyzes the WSJ Dartboard contests over the 1990-1995 time period to assess the performance of contest participants. In contrast to previous dartboard studies, our analysis includes a larger group of contests, an examination of individual contest risk (as opposed to individual security risk), and a re-ranking of expert contestants as winners or losers based on their risk adjusted returns. We identify deficiencies in the WSJ method of ranking the winning experts and offer an alternative method for establishing contest superiority. Our approach further analyzes the contests in terms of total as well as systematic risk, and because of our longer study period, we are able to provide a more thorough analysis of winning experts who repeat as contestants. The overall findings suggest that the experts do outperform the dart selections and the DJIA, however, the experts also carry the highest level of both total and systematic risk. The dartboard’s overall performance is somewhat unique in that the returns from its selections fall below that of the market, while the risk of its selections are relatively high. In terms of risk-return performance, the experts who finish the contest with a number one or number two ranking and beat the market are judged to be superior, followed closely by those experts with a number one ranking. Further analysis of winning experts invited back for subsequent contests suggests that these experts are generally incapable of repeating their previous superior performances. Consistent with previous studies, these findings suggest that the usefulness of following experts’ selections from the dartboard column may be limited.

**REFERENCES**


TABLE 3 PERFORMANCE STATISTICS FOR THE DJIA AND WSJ DARTBOARD CONTESTANTS
Mean, standard deviation, coefficient of variation, beta and beta per return for the DJIA and different categories of experts based on their contest performance and ranking.

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Coefficient of Variation</th>
<th>Beta</th>
<th>Beta per Return</th>
</tr>
</thead>
<tbody>
<tr>
<td>DJIA</td>
<td>5.08</td>
<td>7.32</td>
<td>1.44</td>
<td>1.0</td>
<td>0.197</td>
</tr>
<tr>
<td>WSJ Winners (Rank 1 or 2)</td>
<td>32.0</td>
<td>40.8</td>
<td>1.28</td>
<td>2.58</td>
<td>0.081</td>
</tr>
<tr>
<td>“Real” Winners (Rank 1 or 2 and beat the DJIA)</td>
<td>37.81</td>
<td>37.03</td>
<td>0.98</td>
<td>2.33</td>
<td>0.062</td>
</tr>
<tr>
<td>Experts (Rank 1)</td>
<td>47.41</td>
<td>47.93</td>
<td>1.01</td>
<td>3.22</td>
<td>0.068</td>
</tr>
<tr>
<td>Experts (Rank 2)</td>
<td>16.67</td>
<td>23.96</td>
<td>1.44</td>
<td>1.94</td>
<td>0.116</td>
</tr>
<tr>
<td>Experts (Rank 3)</td>
<td>-0.28</td>
<td>21.12</td>
<td>NMF</td>
<td>1.21</td>
<td>NMF</td>
</tr>
<tr>
<td>Experts (Rank 4)</td>
<td>-21.65</td>
<td>23.53</td>
<td>NMF</td>
<td>1.46</td>
<td>NMF</td>
</tr>
</tbody>
</table>

* NMF – no meaningful figure
TABLE 4 PERFORMANCE STATISTICS FOR EXPERTS REPEATING IN SUBSEQUENT DARTBOARD CONTESTS

Mean return average rank, standard deviation, coefficient of variation, beta and beta per return for repeat winners’ selections. Repeaters are categorized based on their success in prior contests.

<table>
<thead>
<tr>
<th></th>
<th>MEAN RETURN</th>
<th>AVERAGE RANKING</th>
<th>STANDARD DEVIATION</th>
<th>COEFFICIENT OF VARIATION</th>
<th>BETA</th>
<th>BETA PER RETURN</th>
</tr>
</thead>
<tbody>
<tr>
<td>WSJ Winners (Rank 1 or 2)</td>
<td>11.20</td>
<td>2.55</td>
<td>38.87</td>
<td>3.47</td>
<td>1.92</td>
<td>0.171</td>
</tr>
<tr>
<td>“Real” Winners (Rank 1 or 2 and beat the DJIA)</td>
<td>12.09</td>
<td>2.48</td>
<td>41.28</td>
<td>3.41</td>
<td>1.65</td>
<td>0.136</td>
</tr>
<tr>
<td>Rank 1 Experts</td>
<td>15.76</td>
<td>2.47</td>
<td>48.74</td>
<td>3.09</td>
<td>2.35</td>
<td>0.149</td>
</tr>
</tbody>
</table>
An Alternative Framework to Supplement Interpretations of Consensus and Accuracy

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ABSTRACT

We first describe the framework developed by Barron, Kim, Lim, and Stevens (BKLS) (1998) to analyze earnings forecasts. Their model uses the mean squared error of forecasts, the squared error in mean forecasts, and forecast dispersion which are similar to metrics used to estimate consensus and accuracy in the behavioral literature. BKLS decompose accuracy into common and idiosyncratic components, and their consensus measure differs from traditional decision-convergence. This study replicates the data analysis of a prior experiment to demonstrate how the BKLS model allows a better understanding of the results of this experiment.
INTRODUCTION

Consensus has been a traditional indicator of decision quality in many behavioral research studies (Ashton 1982). Consensus has been defined as the extent to which the judgments of decision makers agree or converge. Thus, the dispersion or variance of judgments is commonly used as an inverse measure of consensus. That is, when the variance of judgments across decision-makers is large (small), consensus is low (high) thus reflecting disagreement (agreement) among the decision-makers. The convergence of judgments or responses among groups of decision-makers or subjects as an indicator of decision-quality stems from the relationship between response dispersion and accuracy (Libby 1981).

The predictive-accuracy of a group of subjects is the difference between their individual predictions and actual outcomes; i.e., forecasts errors. An inverse measure of accuracy is thus the mean of the squared forecasts errors. This measure of accuracy is equal to the squared error of the mean forecast plus the forecast dispersion (the inverse measure of consensus). Therefore, traditional consensus or dispersion can be factored out of the formula for accuracy, and can be determined without knowledge of actual outcomes. Thus, forecast variance is used as a surrogate for accuracy when objective measures of outcomes are absent. Barron, Kim, Lim, and Stevens (hereafter BKLS) developed a framework that also links dispersion and accuracy (Barron et al.1998). The BKLS framework is designed for use when outcomes can be objectively determined such as the forecasting of earnings or share price changes by capital market participants. BKLS use direct (as opposed to inverse) measures of consensus and accuracy. In general, BKLS-consensus is the ratio of the squared error of the mean forecast to the mean of the squared forecasts errors, and is thus an indicator of information commonality.

The BKLS-consensus has two components; the precision of common and idiosyncratic interpretations of information disclosures, respectively. Common interpretations are inferences that are tacitly shared by subjects and reflected in their individual responses. On the other hand, idiosyncratic or private interpretations are inferences that are unique to individuals. In terms of "the glass being half-empty", BKLS-consensus is the ratio of the covariance in forecast errors (i.e., common or shared uncertainty) across subjects to the average forecast errors across subjects (i.e., total uncertainty). Conversely, in terms of "the glass being half-full", BKLS-consensus is the ratio of the precision of common inferences to the precision of common and private inferences. The combination of common and private precision is termed "informedness" and is the BKLS accuracy metric.

Although low levels of BKLS-consensus can result from high levels of response dispersion, in contrast to traditional consensus, we show in this paper that this result does not necessarily signal dysfunctional judgments. In fact, low levels of BKLS-consensus that are attributed to idiosyncratic inferences can signal situations where the accuracy of the mean forecasts for a group relative to the individual forecasts of group members are greater than expected. In certain contexts, aggregate responses or forecasts can have important implications to the extent that they reflect ex ante beliefs. For example, share prices are aggregations of investor beliefs. According to Barberis and Thaler (2002), investor sentiment can result in miss-pricing in an otherwise efficient securities market. The persistence of such miss-pricing increases in the extent to which sentiment is correlated or common across investors. Uncorrelated or idiosyncratic sentiment can be diversified away reducing the opportunity for miss-pricing to persist. Thus, the ability to distinguish common versus idiosyncratic inferences is an important contribution of the BKLS framework to analyze judgmental consensus and accuracy.

The purpose of this paper is to demonstrate the additional interpretations that the BKLS framework can add to the traditional analyses of consensus and accuracy. The setting for this demonstration is an experiment conducted by Enis (1988) where actual investors predicted the price changes of chemical and drug stocks based upon sets of historic and replacement cost accounting ratios. The predictions rendered by groups of subjects were evaluated using traditional measures of consensus (or dispersion) and accuracy. This study uses the BKLS framework to highlight the additional interpretations of the results that were not able to be unveiled by the traditional approach. This experimental setting provides a controlled environment to evaluate the BKLS framework as a means to examine the dispersion and aggregation of the forecasts of unsophisticated investors, an increasingly important stakeholder group in financial markets. The remainder of this article is organized as follows. The
Consensus and Accuracy section summarizes the BKLS and traditional frameworks. The Experimental Design section provides a brief description of the motivation, experimental setting and hypotheses development found in Enis (1988), and extended to BKLS-consensus. The Results and Conclusion section compares the findings of the hypotheses tests that pinpoint the contribution that BKLS-consensus adds to the traditional interpretation of forecast dispersion reported in Enis (1988).

**CONSENSUS AND ACCURACY**

**BKLS Framework**

Accuracy depends upon the precision of the common and private information inferred by judges and incorporated into their predictions. Although predictive-accuracy is observable, accuracy alone provides an incomplete picture of the role forecasts play when they are aggregated such as, for example, in fostering an efficient securities market. Evaluations of information disclosures are insufficient without some understanding of the extent to which such disclosures affect the level of both common and private information.

The effect of public disclosures on the precision of common and private information can be estimated for groups of subjects using the BKLS model. According to the model, each subject is uncertain about the phenomena he/she attempts to predict. A portion of this uncertainty is shared by or common to all group members, and an idiosyncratic (or private) signal, $z_i = Y_e + e_i$. Each $e_i$ is independent of all other variables and is normally distributed with mean zero and precision $s$. When making a forecast ($Y_s$) each subject weights his/her public and private information (or interpretation) by its respective precision ($h$ and $s$). The intuition of the model arises from the recognition that these fundamental characteristics of subjects' inferences ($h$ and $s$) will be reflected differently in the observable characteristics of their forecasts - specifically, the squared error in the mean forecast ($SE$) and forecast dispersion ($D$). BKLS essentially characterize expected $SE$ and $D$ in terms of $h$ and $s$. They then reverse these relationships and express the precision of subjects' common ($h$) and private ($s$) inferences in terms of the expected squared error in the mean forecast ($SE$), and expected forecast dispersion ($D$) as follows for our particular setting (Barron et al.1998):

$$h = \frac{SE}{(D + SE)^2}$$

(1)

and

$$s = \frac{D}{(D + SE)^2}$$

(2)

Where:

$$D = D_{jk} = \frac{1}{n} \sum_{i=1}^{n} (Y_{sij} - \overline{Y}_{sjk})^2$$

(3)

$D_{jk} = \text{the dispersion of the percentage price change forecasts for firm } j \text{ rendered by subject group } k$. 

Analyzing response dispersion is not unique to the BKLS approach. However, prior studies of changes in dispersion failed to separate out the degree of commonality in the information environment. As response dispersion reflects both information commonality and uncertainty, the latter must be controlled to estimate the former. The BKLS model implicitly achieves this control by estimating the precision of private and common inferences based upon dispersion, and the squared error in the mean forecast.

BKLS model a setting where $n$ forecasters predict a variable $Y_e$. They assume that $Y_e$ is earnings, but this is not necessary for the application of this analytic framework, $Y_e$ is share price change in the present study. In this application, $k$ groups of $n$ subjects forecast the one-year percentage price change for $m$ firms representing two industries. Each subject $i$ observes an information set for each firm $j$ (of precision $h$) that is common to all group members, and an idiosyncratic (or private) signal, $z_i = Y_e + e_i$. Each $e_i$ is independent of all other variables and is normally distributed with mean zero and precision $s$. When making a forecast ($Y_s$) each subject weights his/her public and private information (or interpretation) by its respective precision ($h$ and $s$). The intuition of the model arises from the recognition that these fundamental characteristics of subjects' inferences ($h$ and $s$) will be reflected differently in the observable characteristics of their forecasts - specifically, the squared error in the mean forecast ($SE$) and forecast dispersion ($D$). BKLS essentially characterize expected $SE$ and $D$ in terms of $h$ and $s$. They then reverse these relationships and express the precision of subjects' common ($h$) and private ($s$) inferences in terms of the expected squared error in the mean forecast ($SE$), and expected forecast dispersion ($D$) as follows for our particular setting (Barron et al.1998):

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\( n \) = the number of subjects in group \( k \).

\( Y_{sj} = \) the percentage price change forecasted by subject \( i \) for firm \( j \).

\( \overline{Y}_{sjk} = \) the mean percentage price change forecasted for firm \( j \) by subject group \( k \).

and,

\[
SE = SE_{jk} = (\overline{Y}_{sjk} - Y_{ej})^2
\]  

\( SE_{jk} = \) squared error in the mean forecast of the percentage price change for firm \( j \) by subject group \( k \).

\( Y_{ej} = \) actual percentage price change for firm \( j \).

The precision of common (\( h \)) and idiosyncratic (\( s \)) inferences are related to the constructs of consensus, (\( ? \)) and accuracy (\( K \)) in the BKLS model as follows:

\[
\rho = \frac{h}{h + s}
\]

\( \rho = \frac{h}{h + s} \)  

\( K = h + s \)

Where:

\( ? = \) BKLS–consensus

\( K = \) informedness, the BKLS measure of accuracy.

The BKLS variables (\( h, s, ?, \) and \( K \)) are calculated separately for each firm \( j \) within each subject group \( k \). To compare a given BKLS variable between contrasted subject groups, we first calculate for each firm \( j \) the difference in the values for the given variable between the two groups. We then use t-values derived from the Wilcoxon matched-pairs signed-ranks test to determine under the null whether these differences across the \( m \) firms are zero (Conover 1980). The functional representation of the BKLS variables produces values that are prone to skewness even when the forecasts are normally distributed. Thus, non-parametric methods are used to test hypotheses, and median values obtained from the \( m \) firms for each group are the reported descriptive statistics.

**Traditional Framework**

The traditional inverse measures of consensus and accuracy for subject group \( k \) that was used in Enis (1988) are the response variance (\( RV_k \)) and accuracy variance (\( AV_k \)), respectively, as shown in equations (7) and (8).

\[
RV_k = \frac{1}{mn} \sum_{j=1}^{m} \sum_{i=1}^{n} (Y_{sj} - \overline{Y}_{sjk})^2
\]

\( RV_k = \) response variance

\[
AV_k = \frac{1}{mn} \sum_{j=1}^{m} \sum_{i=1}^{n} (Y_{sj} - Y_{ej})^2
\]

\( AV_k = \) accuracy variance

Equation (9) expresses accuracy in terms of consensus.

\[
AV_k = RV_k + \frac{1}{m} \sum_{j=1}^{m} (\overline{Y}_{sjk} - Y_{ej})^2
\]  

\( AV_k = RV_k + \) accuracy variance

The approximate relationships between BKLS-consensus (\( ? \)) and traditional consensus (\( RV_k \)), and between informedness (\( K \)) and traditional accuracy (\( AV_k \)) can be expressed by equations (10) and (11), respectively.

\[
\rho = \frac{1}{m} \sum_{j=1}^{m} (\overline{Y}_{sjk} - Y_{ej})^2
\]

\( \rho = \frac{1}{m} \sum_{j=1}^{m} (\overline{Y}_{sjk} - Y_{ej})^2 \)  

\( \rho = \frac{1}{m} \sum_{j=1}^{m} (\overline{Y}_{sjk} - Y_{ej})^2 + RV_k
\]

\( K = \frac{1}{AV_k} \)

Equations (10) and (11) are approximations because the squared differences on the right side of these equations, and in equations (7) and (8) are averaged over the \( m \) firms as well as over the \( n \) subjects in determining traditional consensus and accuracy, respectively, for a given subject group \( k \). On the other hand, the squared differences in equations (3) and (4) are averaged over only the \( n \) subjects in obtaining values for the BKLS variables for each firm \( j \) within a given subject group \( k \). In other words, the BKLS (traditional) metrics are firm (subject group) specific variables. In addition, the \( Y_s \) and \( Y_e \) variables in the traditional model are raw forecasts and outcomes, respectively. The BKLS framework, on the other hand, extracts mean industry effects to obtain firm specific forecasts and outcomes as \( Y_s \).
and $Y_e$ variables, respectively. Removing industry components mitigates any upward bias in estimating the precision of common inferences ($h$) attributable to cross-sectional correlation within the two industries represented in this exercise. This adjustment is not necessary regarding the traditional framework because the precision of common and idiosyncratic inferences are not separated out from overall accuracy.

**EXPERIMENTAL DESIGN**

**Setting**

The BKLS framework is compared to the traditional consensus-accuracy framework used in an experiment conducted by Enis (1988). The present analysis focuses on the consensus dimension because, according to equation (11), informedness ($k$) is virtually the reciprocal of the traditional inverse measure of accuracy. Furthermore, the major difference between the two frameworks lies in the interpretation of forecast-dispersion, the metric used to define traditional consensus. The data we selected from this experiment are used to compute BKLS-consensus for 20 firms from the chemical industry and 20 firms from the drug industry within two groups of unsophisticated investors. The subjects we selected were from a convenience sample of 44 unsophisticated investors that were randomly assigned to either a control group or a treatment group. Unsophisticated investors were individuals with investing experience in a capacity other than as a full time occupation. The present study focuses on unsophisticated investors because the informational needs of these individuals is of increasing importance as they gain greater direct access to financial disclosures and securities markets.

The control group was provided with a cue set made up of historic cost versions of five common accounting ratios for each of forty firms from the chemical and drug industries. The treatment group was provided with a dual cue set consisting of both historic cost (HC) and replacement cost (RC) versions of the same five ratios. These ratios were earnings per share, dividend payout, return on assets, earnings yield, and earnings growth. These ratios differed in their HC and RC versions. The subjects were also provided median ratios for the chemical and drug industries. Four of the five ratios provided are variables in a theoretical model derived by Malkiel (1963) to forecast share price changes. The HC and RC cues were calculated from actual data. The experimental task required the subjects to forecast the one-year percentage change in the share prices of these firms’ common stocks.

The two unsophisticated groups consisting of 22 members each are the focus of this extension: (1) those that received only HC data (the Cu group), and (2) those that received both HC and RC data (the Tu group).

**Hypotheses Development**

To facilitate comparisons between the interpretations of forecast-dispersion found in the traditional and BKLS frameworks, the specification of hypotheses will mirror that found in Enis (1988). High levels of inflation during the Seventies and Eighties generated interest in requiring disclosures of replacement cost (RC) and other current value data to supplement conventional historic cost (HC) accounting numbers. However, empirical investigations into the merits of such disclosures failed to produce evidence that inflation accounting numbers had relevant information content beyond that contained in traditional accounting data.

RC disclosures were mandated by ASR No. 190 (SEC 1976) in the belief that traditional accounting for inventories and depreciation overstated profits of capital intensive firms as the result of inflation’s cumulative impact upon HC based depreciation charges against earnings for assets acquired in earlier years. ASR No.190 was rescinded by ASR No. 271 (SEC 1979). Inflation accounting disclosures were also mandated by the FASB in Statement No. 33 (FASB 1979) and also subsequently rescinded by Statement No. 89 (FASB 1986). The FASB required disclosures were also shown to be disregarded by the market (Beaver and Landsman 1983), and of little use to investors (Berliner 1983).

The role of RC in this replication is to serve as a manipulation of the cue set variable where there is an a priori expectation that additional disclosures will adversely affect decision-quality. Thus, the motivation for Enis (1988) was not to examine the value relevance of inflation accounting, but to investigate the possible dysfunctional attributes of such disclosures. In other words, once prior research had virtually ruled out the positive aspects of this disclosure regime, this subsequent experiment
focused on potential negative consequences. Such adverse consequences may be attributed to the incremental content of the RC cue set being associated with incorrect forecasts, and/or information load effects. The latter effects are those attributed to the cognitive strain of subjects coping with an expanded information set such as observing and processing firm profiles containing two versions of the same financial ratios (Nystedt 1974). Furthermore, these potential negative aspects of the RC cue set were expected to have a greater impact on the judgments of unsophisticated investors, hence the focus of this extension is on these individuals.

The alternative hypotheses tested in Enis (1988) can be summarized as the control groups being expected to be associated with greater consensus and accuracy because of the alleged negative aspects of the replacement cost (RC) cue set. For comparison purposes, this exercise applies the same expectations and alternative hypotheses tests to the BKLS-consensus variables, see equation (5). That is, the Control-Unsophisticated (Cu) group is expected to be associated with greater BKLS-consensus relative to the Treatment-Unsophisticated (Tu) group, and the former group is also expected to be associated with greater precisions of common (h) and private (s) inferences. This extension also adds a hypothesis test that is unique to the BKLS framework, and is contingent on the outcome of the previous tests. The group with the lower BKLS-consensus is expected to be the group having the greater superiority of its mean forecasts relative to its individual forecasts.

Holthausen and Verrechia (1990) stress the importance of understanding the relationship between idiosyncratic inferences (s) and the superior accuracy of mean forecasts over individual forecasts. Mean forecasts are expected to be more accurate than individual forecasts to the extent that inferences are idiosyncratic (s), and thus produce errors that are diversifiable. In contrast, if subjects interpret the cues in the same manner (i.e., high levels of h), then there is little opportunity to diversify away error as the forecasters are just repeating the same common error. For example, the two subject groups that are the focus of our study consist of 22 members, each rendering 40 price change predictions for a total of 880 forecasts per group. Each group is also represented by 40 mean forecasts, one per firm. For each group, the mean 40 forecasts are expected to be more accurate than the respective 880 individual forecasts more than 50 percent of the time.

The extent to which the superiority of mean forecasts relative to individual forecasts of one group is greater than that of a contrasted group is expected to be a function of BKLS-consensus. According to equations (5) and (6), given that two groups have the same accuracy (equal \( h + s \)), the group having greater s relative to h, and hence the lower BKLS-consensus (?), is expected to have the greater percentage of frequency that its mean forecasts are more accurate than its individual forecasts. The hypothesis test is based on the exact binomial probability of observing greater percentages of more accurate mean forecasts relative to individual forecasts for the unsophisticated group having the lower BKLS-consensus.

RESULTS AND CONCLUSION

Our objective is to pinpoint the contribution of the BKLS-framework in interpreting the results of a prior experiment. This objective leads us to focus on the difference in consensus between the Control-Unsophisticated (Cu) and Treatment-Unsophisticated (Tu) groups. According to Table 1, the traditional consensus of the Cu group was significantly greater than that of the Tu group. In other words, the dispersion of forecasts among unsophisticated investors was much greater for those that had to cope with both historic and replacement cost information. These results were originally interpreted as supporting the proposition that replacement costs not only lacked value relevant information content, but may in fact have had possible deleterious decision-making properties, especially in the hands of those with lower levels of expertise.

However, the BKLS framework offers a different perspective. Although the Cu group also had greater BKLS-consensus relative to the Tu group, the more interesting findings relate to the h and s components. The Cu (Tu) group is associated with greater precision of common (idiosyncratic) inferences relative to the Tu (Cu) group. Although neither finding is designated as statistically significant in Table 1, the larger h for the Cu group just fails to achieve significance, and the larger s for the Tu group is in fact significant, but in the opposite direction as specified in the one-tail test based on the expectations derived from Enis (1988).
<table>
<thead>
<tr>
<th>Traditional Consensus Measure: (expected sign for t)</th>
<th>Unsophisticated</th>
<th>Control (Cu n=22)</th>
<th>Treatment (Tu n=22)</th>
<th>t-value</th>
<th>1-tail p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average response variance( $\bar{RV}_k$)$^a$</td>
<td>(-)</td>
<td>107</td>
<td>172</td>
<td>&lt;-3.00</td>
<td>&lt;0.01 ***</td>
</tr>
</tbody>
</table>

| BKLS-Consensus Variables: (expected sign for t)$^b$ | | | | | |
|-----------------------------------------------------|----------------|-----------------|----------------|-------|
| Median BKLS-Consensus (?$^c$) | (+) | 0.7500 | 0.6000 | 1.42 | 0.08 * |
| Median precision of common information (h$^c$) | (+) | 0.0220 | 0.0182 | 1.28 | 0.11 |
| Median precision of private information (s$^c$) | (+) | 0.0068 | 0.0132 | -1.45 | 0.92 |

| Superiority of the mean forecasts$^c$ | ( -) | 0.5534 | 0.5784 | -1.46 | 0.07 * |

* Significant at 0.10; ** significant at 0.05; *** significant at 0.01.

$^a$ $\bar{RV}_k$ is an inverse measure of consensus; i.e., lower values indicate greater consensus. In contrast, ? is a direct measure of BKLS-consensus; i.e., greater values indicate greater consensus. The alternative hypothesis states that the Cu relative to the Tu subjects are associated with greater consensus; i.e., lower values of $\bar{RV}_k$. Cu relative to Tu subjects are hypothesized to be associated with greater values of h, s, and ?.

$^b$ We calculate the difference in the stated BKLS variable between the Cu and Tu groups for each of the 40 firms. We then use the t-statistic derived from the Wilcoxon matched-pairs signed-ranks test to test the null hypothesis that these differences are zero.

$^c$ The percentage of times the mean forecast for each firm is more accurate than the 22 individual forecasts for each firm. These percentages are averaged across the 40 firms. We then use the estimated t-value associated with the binomial probability to test whether these percentages for the Cu and Tu groups differ. The group with the lowest BKLS-consensus (?) is hypothesized to be the group with the greater superiority of mean forecasts over individual forecasts.
The greater precision of idiosyncratic inferences attributed to the Tu group translate into significantly lower BKLS-consensus for the Tu group. Consistent with the expectations of the BKLS framework, the lower result in the Tu group having a significantly greater improvement in its mean forecasts over its individual forecasts relative to the Cu group.

These results point to a major incremental contribution of the BKLS framework to the traditional approaches to consensus and accuracy. High levels of response dispersion associated with a disclosure regime have been interpreted as an indicator of poor decision quality. Dispersion is also a factor in low levels of BKLS-consensus. Although low levels of BKLS-consensus can be linked to low levels of accuracy, such does not necessarily lead to the conclusion that the decision-making properties of the associated disclosure regime are entirely dysfunctional. Low levels of BKLS-consensus even when connected with lower accuracy can have a positive impact on the aggregate information that is impounded within subject responses, especially when such information is idiosyncratic. This positive feature is reflected in the extent that mean responses or forecasts are more accurate relative to individual forecasts.

The conclusion in Enis (1988) that replacement cost disclosures had a deleterious effect on the judgments of unsophisticated investors should be tempered with the observation that this diverse group of subjects rendered forecasts that captured unique interpretations of the dual cue set that were impounded in aggregate forecasts that were more informationally intensive.

In summary, the purpose of this replication is to show how the BKLS model can augment the traditional interpretation of response dispersion to offer deeper insights for behavioral researchers. Traditional consensus or dispersion of course remains an important indicator of decision-quality when outcomes are unobservable.

The BKLS framework has several appealing features. BKLS-consensus and informedness are direct rather than inverse measures. Informedness can be decomposed into two sources; i.e., the precisions of common and idiosyncratic interpretations, which in turn are components of BKLS-consensus. The ability to express BKLS-consensus in terms of common and private information provides the researcher more interpretations and insights than dispersion standing alone. Dispersion as an inverse indicator of consensus can go either up or down. However, the common and idiosyncratic components of BKLS-consensus can go up or down, move in opposite directions or in the same direction, and can change relative to each other at different rates. Finally, linking the BKLS variables to identifying situations where there is greater improvement of mean responses over individual responses is important where aggregate beliefs are of interest such as, for example, the ability of prices to aggregate information. In other words, the BKLS approach recognizes that the ability of a disclosure regime to stimulate diverse and unique information is an important criterion when evaluating an information environment.
REFERENCES


EXTENDING THE RETURNS-EARNINGS RELATIONSHIP OVER LONGER MEASUREMENT INTERVALS

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ABSTRACT

Many individual and institutional investors, including mutual fund managers, hold securities over long-term investment horizons. Evaluating earnings performance over annual or quarterly intervals may be less relevant for these investors. Accounting measurement of earnings focuses on shorter intervals of a year or less, while economic theory indicates that the exact measurement of income may be less important over very long intervals. Thus, we expect that the correlation between returns and income will approach one as the length of the interval is extended over longer intervals and approaches the expected life of the entity. Our study examines these issues from an accounting perspective and is subject to empirical limitations. The investor perspective, the focus of most prior studies on relatively short-term measurement intervals of the returns-earnings relationship, and the measurement of income in economic theory motivate our study. We predict that the relationships between returns and earnings and changes in earnings increase over longer intervals. The empirical results support this prediction. We examine empirically three different models and postulate that a risk-adjusted reinvestment model, developed in our study, may report a greater returns-earnings association than the two other models for longer measurement windows. The results tend to be consistent with this prediction. Implications for investors, standard setters, regulators, and researchers are discussed. In particular, we recommend mandatory disclosure of a cumulative multi-period income statement.
THE IMPACT OF THE INTERACTION OF SEASONALITY AND FISCAL YEAR END POSITIONS ON A MODEL OF FIRM FINANCIAL HEALTH

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ABSTRACT

This paper investigates the extra “synchronization noise” that may be introduced into the accounting signaling process due to the variation of firms’ fiscal year end positions relative to the stages of their seasonal operating cycles. It is hypothesized that this noise may cause accounting values to lack across firm comparability and may impair models using accounting values. An empirical test indicates that a model, of commercial paper credit ratings, based on data drawn from synchronized firm sets is more accurate than a “normal” composite non-synchronized model.
DESIGNATED BENEFICIARIES FOR RETIREMENT ACCOUNTS: THE NEW RULES

By Glen Cooley, Northwestern State University

ABSTRACT

Individuals with Individual Retirement Accounts (IRAs) or qualified retirement plans have new rules to follow with respect to designated beneficiaries. On April 16, 2002, the IRS issued the “final” regulations on Required Minimum Distributions (RMDs). These rules are supposed to simplify the old more complex rules. One area that has major changes is the Beneficiary Designation rules. The new rules allow the beneficiary to be determined as late as September 30 of the year that follows the year of death of the owner. These new changes make the beneficiary designation rules much more flexible and in most cases allow a longer distribution period for the retirement assets.
A COMPREHENSIVE LOOK AT SECTION 529 QUALIFIED TUITION PLANS: THE ADVANTAGES, DISADVANTAGES, AND THE INTERACTION WITH FINANCIAL AID

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ABSTRACT

In the past several years, the increase in college tuition has regularly outpaced inflation by three to four times. Specifically, last year the average cost of tuition rose 9.76 percent to $4,081 at public institutions and 5.8 percent to $18,273 at private institutions. In light of these numbers and estimates from the U.S. Department of Education which indicate that the average cost of four-year tuition will be up to $60,000 and $200,000, respectively, by the year 2007, planning for and funding a college education has become more critical than ever.

Section 529 qualified tuition plans (QTP), one of several tax-advantaged education incentives introduced to the Internal Revenue Code in 1996 and expanded in 2001, allow for contributions to state and institution-sponsored prepaid tuition plans or college savings accounts which grow tax free with subsequent qualifying distributions nontaxable. To date, approximately $25 billion has been contributed to these very popular plans. Despite the income, gift, generation-skipping, and estate tax advantages, however, there are serious potential tax and nontax pitfalls when QTPs are not properly administrated.

Further complicating the overall planning process is the impact of QTPs on eligibility for federal financial aid. Last year a record $90 billion in financial aid, an increase of more than 11.5 percent from the prior year, was awarded to students at both public and private institutions, indicating the importance of this element in the funding equation. This paper will explore both the advantages and disadvantages of 529 plans as well as the current rules associated with their treatment in the financial aid formula.

INTRODUCTION

Section 529 of the Internal Revenue Code establishes guidelines which allow parents to prepay higher education tuition costs for their children or themselves by making transfers to one of two types of state-sponsored QTPs—college savings plans and prepaid tuition plans. In the first type of QTP, the college savings plan, the account owner contributes cash to a plan account for a beneficiary, and the contribution is invested according to the terms of the plan. The funds may be withdrawn and used for qualifying purposes at any college. Distributions are generally tax-free if used for broadly defined qualifying expenses.

In a prepaid tuition plan an account owner contributes cash to a plan account, in essence purchasing tuition credits or credit hours based on then-current tuition rates. The obvious advantage to these plans is that tuition is locked in at current rates. When the beneficiary attends a college participating in the program, the tuition credits are used to pay for tuition and other college expenses, and the
distribution is considered tax free. The tuition credits may be redeemed for cash and used to pay tuition and other expenses with the same tax-free consequences even if the beneficiary attends a nonparticipating college. While currently only states may sponsor such plans, beginning in 2004, individual educational institutions may offer their own prepaid tuition plans. The first of these, the Independent 529 Plan (www.independent529), will offer tuition certificates redeemable towards tuition at any of 300 plus member colleges and universities (Hurley, p. 18).

Most of the older 529 plans were established as prepaid tuition plans which are still favored by some due to the “tuition guarantee” and non-response to the volatility of the stock market. Many of these plans, however, are restricted to residents of the sponsoring state and cover only undergraduate tuition and fees. The majority of the newer plans are college savings plans which not only cover a wider variety of qualified education expenses but are also easier and less costly for states to administer.

**TAX ADVANTAGES OF QTPS**

Because of the attractive tax treatment, participation in section 529 plans is increasing with all fifty states and the District of Columbia offering either college savings plans or prepaid tuition plans. While $9 billion was invested in these plans in 2000, the number had grown to $25 billion by the end of 2002. QTPs offer several tax advantages as follows:

1. **Federal income tax exemption.** Earnings on invested funds accumulate tax free, and withdrawals are tax free if used to fund qualified higher education expenses (QHEE) or if made upon the death or disability of the beneficiary. However, if distributions are used for non-qualifying expenses, not only is part of the distribution taxable to the person receiving the distribution (based on computations explained in Prop. Reg. 1.529-3(b)), but a ten percent penalty also applies.

2. **Coordination with other savings vehicles.** The account owner can use money in U.S. Savings Bonds and Coverdell Education Savings Accounts (ESAs) to fund a 529 plan without incurring income tax on the distributions as long as rollover requirements are met.

3. **Coordination with Hope and Lifetime Learning credits.** A taxpayer may claim a Hope credit or Lifetime Learning credit for a taxable year and exclude from income amounts distributed from QTPs on behalf of the same student as long as the distribution is not used for the same qualifying expenses.

4. **Estate planning benefits including annual gift tax and generation skipping tax exclusions.** With regard to estate taxes, QTPs offer two advantages. First, contributions to QTPs are considered a gift of a present interest thereby removing the assets from the estate as long as the donor is listed as the owner. Second, the generation skipping tax is not applicable to transfers under a section 529 plan. With regard to the gift tax, contributions to QTPs are eligible for the $11,000 annual exclusion. Further, a special provision allows contributions of up to $55,000 in one year prorated over five years. The $55,000 (or an amount up to $55,000) contribution does not reduce the donor’s unified credit and immediately removes all future appreciation of the initial contribution from the contributor’s taxable estate. If the contributor dies within the five-year gift tax period, his or her contributed funds will be treated as part of his or her estate on a prorated basis.

5. **State income tax incentives.** Many states follow federal rules in terms of deferral/exemption of tax on interest/withdrawals. In addition, thirty-two states (and the District of Columbia) grant a full or partial tax deduction for contributions to the plan. Several more states provide low and moderate income families with matching contributions or scholarships through their 529 plans. There are emerging planning opportunities in this area in terms of timing of contributions, withdrawals, and expenditures, all beyond the scope of this particular article.

6. **Exemption from creditors’ claims.** Currently, twenty-five percent of the states explicitly shield section 529 plan assets from creditor claims.
7. **Ability to change beneficiary.** Rollover rules allow one change in beneficiary per 12 month period (caution if more than one person has created an account for the same beneficiary) to a family member including son/daughter or descendent of either; stepson or stepdaughter; brother, sister, stepbrother or stepsister; father or mother or ancestor of either, stepfather or stepmother, niece or nephew, uncle or aunt, cousin (which allows grandparents to transfer among grandchildren), in-laws, spouse of the beneficiary or any of the above. This ability to change beneficiary offers unique planning opportunities. For example, a taxpayer may open a 529 plan before a child is born, name himself as beneficiary, and then, when the child is born, the taxpayer may change beneficiary, keeping in mind gift tax consequences. In another case, if a taxpayer has exceeded his/her gifts to a child in one year, he may open a 529 plan naming himself as beneficiary. Then, in a year in which the gift tax exclusion has not been reached, change the beneficiary. Of course, if the funds are not used for qualifying purposes, the ten percent penalty does apply. Finally, the ability to redirect funds without penalty is useful if the beneficiary fails to get admitted to the college where the QTP is established or if the beneficiary simply decides to change colleges.

8. **Broad definition of qualified expenses.** While the Hope and Lifetime Learning credit definition of qualified education expenses is restricted to tuition and fees, the definition for QTPs also includes books and other expenses for vocational schools, two-year and four-year colleges as well as graduate and professional education; room and board if the beneficiary attends school at least half-time; and expenses of a special needs beneficiary that are necessary in connection with his/her enrollment or attendance at eligible educational institutions.

9. **Control of funds.** As stated earlier, the account owner (either the person who establishes the plan or someone designated by the person who establishes the plan) can rollover funds to a different 529 plan or change investment strategies once a year. That is, the account owner retains the right to specify the amount, timing, and recipient of any distribution. Withdrawals may escape taxation and penalty if rolled over within 60 days to a QTP account for a family member of the beneficiary or if the withdrawal or distribution resulted from the death or disability of the beneficiary or as a result of the beneficiary receiving a scholarship.

10. **Flexibility.** Importantly, withdrawals are not limited to higher education expenses. Of course, if funds are withdrawn for nonqualified purposes, the withdrawal is subject to both ordinary income tax rates (the rates of the person for whom the withdrawal was made) plus a 10 percent penalty.

11. **No federal contribution limits.** Unlike Coverdell education savings accounts, there is no federal limit on contributions to 529 plans regardless of the income level of the account owner. Congress did not impose a requirement on the use of section 529 accounts but rather left it to each state to establish adequate safeguards to prevent contributions on behalf of a designated beneficiary in excess of those necessary to provide for the qualified higher education expenses of the beneficiary. Most states do impose a limit (approximately $250,000) based on an estimate of the amount of money that will be required to provide seven years of post secondary education with the current median limit $235,000.

**DISADVANTAGES OF QTPs**

In spite of the tax-favored treatment as well as non-tax benefits of QTPs, there are drawbacks that a well-informed taxpayer should be consider before investing in section 529 plans. Included among the disadvantages are the following points:

1. **Penalties on withdrawal.** Two types of penalties may be imposed on withdrawals—federal penalties and plan penalties. As discussed previously, section 529©)(6) imposes a ten percent penalty on the income portion of any distributions in
excess of qualified higher education expenses, computed using the annuity exclusion ratio. In addition, some plans impose penalties on "disqualified use" of funds which may include expending funds on education at a college or university that is not a member of the group, nor a "partner" (Auster, p. 337). For example, Florida's plan, the largest in the country, imposes a 100% penalty on income, which means that only original contributions are returned to the account owner upon withdrawal.

2. **Taxable earnings taxed at ordinary income rates.** Lower tax rates on capital gains, made even more attractive by the recently enacted Jobs Growth and Tax Relief Reconciliation Act of 2003, do not apply to the taxable portions of distributions from 529 plans.

3. **No capital loss treatment.** Losses on investments in 529 plans do not result in capital loss deductions. In order to recognize any losses at all, the account owner must close the 529 account (and then, of course, to prevent the withdrawal penalty, roll over the account within the required 60-day period). Any loss on the sale is treated as a miscellaneous itemized deduction subject to the 2 percent limitation, rather than a capital loss. Therefore, it is possible for there to be no resulting deduction, either because of high taxpayer AGIs or because the amount of the loss coupled with other itemized deductions is less than the standard deduction amount. Further, the loss is not deductible for alternative minimum purposes.

4. **Adverse impact on medicaid.** Since Prop. Reg. 1.529-1(c) allows the account owner to withdraw funds for nonqualifying purposes, Medicaid eligibility of that owner could be affected. There is a possibility that the state Medicaid agency could require that the 529 accounts first be used to pay for medical and long-term care expenses before Medicaid payments can begin.

5. **Interaction of 529 plans education incentives.** The value of a section 529 plan is diminished by every tax benefit that would otherwise be available for the same education expense but that cannot be claimed when the expenses are paid with funds from a section 529 plan (Auster, p. 337). Therefore, any effective planning for funding a college education includes a review of both long-term (QTPs and ESAs) and short-term (credits and deductions) education incentives. Specifically, when calculating current tax benefits for qualifying education payments, an ordering process is required. For taxpayers qualifying for the Hope or Lifetime Learning credits, qualified education expenses are first applied to the scholarship exclusion, then to credits, and finally to QTP or education savings account (ESA) distributions. If, on the other hand, the qualified higher education deduction is to be used, expenses are first applied to the scholarship exclusion, then to the QTP or ESA distributions, and finally to the deduction.

6. **Hefty fees.** Generally, management fees on the accounts vary from 1 to 1.5 percent of the account balance depending on the fund.

7. **Limited control over investments.** Investment selection is limited because, by statute, investment direction must be left to the discretion of the sponsoring state or institution. However, some plans do include a menu of options, with the better ones offering both age-based portfolios (ones that automatically increase the ratio of bonds in the account as the beneficiary gets older) and static portfolios (e.g., stocks, bonds, balanced, guaranteed income) (Poon, p. 5).

8. **Possible loss of favorable tax status in 2011.** Although experts feel that it is unlikely that Congress will fail to extend the tax-free status of qualified distributions from QTPs, the current tax-free provisions do expire in 2011.

9. **Contributions in cash.** Contributions to Section 529 plans can only be made in cash (credit card, check, electronic transfer). Thus, this method of transferring wealth from one generation to another uses the unified transfer credit dollar for dollar while alternative methods may be accomplished
with a valuation discount for transfer tax purposes (e.g., interests in family limited partnerships and limited liability companies, or shares in closely held corporations). A 25 percent valuation discount, for example, allows one-third more assets to be transferred free of transfer taxes. (Auster, p. 338). Further, to transfer other investments into a 529, the investments must be liquidated, triggering, perhaps, taxable income or capital gains.

10. *Section 529 plans are confusing.* Tax planning using 529 plans is a relatively new area of practice. Each plan has unique features that make comparisons among different programs tricky (Hurley, p. 32) and financial advisors have only recently focused attention on this new tax-advantaged savings vehicle. A comprehensive review and comparison of all available state plans as well as a wealth of information on investments, current developments, and the like may be found at www.savingforcollege.com, www.finaid.org, and www.529solutions.com.

11. *Adverse impact on financial aid eligibility.* The treatment of both qualified tuition plans and college savings plans in the federal financial aid formula may significantly decrease the amount of financial aid eligibility. The basics of the financial aid formula and the impact of QTPs on that formula are discussed in the section that follows.

**FINANCIAL AID CONSIDERATIONS**

To fully understand the impact of section 529 plans on financial aid eligibility, a basic understanding of the financial aid process is necessary. Two formulas are used to determine a student’s eligibility for financial aid—the Federal Methodology Formula (FM), established by Congress and used by every accredited college in the United States, and the Institutional Methodology (IM) used by many colleges and private scholarship programs. Although the specific items considered in each formula may vary, both formulas measure a particular family’s ability to pay against other families’ ability to pay. The information used for FM analysis is collected on the Free Application for Federal Student Aid (FAFSA) which may be found at www.fafsa.edu.gov while the IM information is collected on the CSS/Financial Aid PROFILE in addition to the FAFSA. It is possible to estimate eligibility for financial aid with financial aid calculators which may be found at www.finaid.org and www.collegeboard.com.

Table One illustrates the Financial Aid Formula Needs Analysis which determines the amount of the student’s “adjusted financial need” or eligibility for financial aid. The computation begins with the “Cost of Attendance” (COA) which includes tuition, fees, room and board, books and supplies, personal expenses including clothing and entertainment, transportation to and from college, and other needs such as a computer. The COA is furnished by each college and may be adjusted by the financial aid counselor for special circumstances. The student’s “Expected Family Contribution” or EFC (funding for a college education is expected to come from both parent and student sources), the most complex component of the financial need analysis, is then subtracted from the COA to determine the “Basic Financial Need.” Finally, the “Student’s Resources” outside of the family unit are subtracted from the basic financial need to get the “Adjusted Need.”

The EFC is the sum of the parents’ contribution from income, the parents’ contribution from assets, the student’s contribution from income, and the student’s contribution from assets. Currently, the federal formulas for financial aid are constructed on the premise that parents are expected to contribute from 22 to 47 percent (the percentage is based on the amount of income) of their “discretionary income” and up to about 5.64 percent of their discretionary assets to cover college costs. Discretionary income includes adjusted gross income (AGI) from the Form 1040 plus untaxed income and benefits less certain deductions including a living allowance or “income protection allowance” based on the number of people in the family and the number of students in college at one time and an employment expense allowance. Students are expected to contribute 50 percent of their available income (AGI plus untaxed income and benefits less deductions including a $2,350 employment expense allowance) and 35 percent of their assets to funding their education.

As attractive as 529 plans are from a tax perspective, the assets held in the plans as well as the withdrawals from the plans may be detrimental to
TABLE ONE
Financial Aid Formula Needs Analysis

<table>
<thead>
<tr>
<th>Cost of Attendance (COA)</th>
<th>Set by and provided by the college--tuition, fees, room &amp; board, books &amp; supplies, personal expenses such as clothing and entertainment, cost of computer, transportation to and from the university</th>
</tr>
</thead>
<tbody>
<tr>
<td>-Expected Family Contribution (EFC)</td>
<td>Parents’ contribution from income + parents’ contribution from assets + student’s contribution from income + student’s contribution from assets (computed by using family financial data submitted on financial aid application forms)</td>
</tr>
<tr>
<td>= Financial Need</td>
<td></td>
</tr>
<tr>
<td>-Student Resources</td>
<td>Scholarships/grants; VA benefits; cash gifts paid directly to the college for tuition; payments from prepaid tuition plan, payments from employer-provided education assistance plan; sources other than family income and assets</td>
</tr>
<tr>
<td>= Adjusted Financial Need</td>
<td></td>
</tr>
</tbody>
</table>


financial aid eligibility. In general, the impact of these plans on financial aid eligibility is dependent on two factors—the type of QTP and the identity of the account owner. Table Two summarizes both the tax advantages of QTPs and the current treatment of 529 plans in the Financial Aid Needs Analysis.

College savings plans are characterized as tax-exempt college savings vehicles with a low impact on need-based financial aid eligibility. In the FM, a College Savings Plan is classified as an asset which will reduce financial need by a percentage of the account value, 5.64 percent if the parent is the account owner and 35 percent if the student is the account owner. It should be noted, however, that some private colleges using the IM count all 529 accounts as 35 percent assets regardless of the owner. If neither the parent nor the student is the account owner, generally the plan is not considered. For this reason, grandparents, and most recently, employers are increasingly the owners of these accounts. Further, the IM treats sibling 529 plans as an asset of the parent if parent is the owner thus reducing aid by 5.64 percent of the balance. While experts disagree on whether a distribution from a college savings plan, or at least the earnings portion, is treated as student income which reduces aid by 50 cents on the dollar, most feels that non-taxable distributions will not be so classified.

A prepaid tuition plan is characterized as a low-risk, tax-advantaged investment vehicle, with earnings indexed to the average increase in tuition. However, prepaid tuition plans have a high negative impact on financial aid eligibility. Although prepaid tuition plans are not considered assets for purposes of the FM (under the IM, the plan is considered a parental asset which reduces aid by 5.64 percent of the balance), the distributions reduce the beneficiary’s need dollar for dollar either by reducing the COA or by being classified as a student resource. According to FinAid, efforts are underway (with support from states and the American Council on Education) to get Congress (through the renewal of the Reauthorization of the Higher Education Act of 1965) to change the financial aid treatment of prepaid tuition plans to that similar to college savings plans (i.e., asset of account owner and hence a low impact on financial aid), but Congress is unlikely to do anything until 2004 at the earliest. Thus, if the QTP will not be sufficient to cover expenses of the beneficiary’s entire degree program, there may be benefit to taking full advantage of financial aid for earlier years while saving QTP funds for the later years of the beneficiary’s education.

CONCLUSION

For many, section 529 QTPs offer a highly effective means of funding the ever-increasing cost of a
## Table Two
### Impact of Section 529 Plans on Financial Aid

<table>
<thead>
<tr>
<th>College Savings Plan</th>
<th>Owned by parent</th>
<th>Owned by student</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Balance:</strong> An asset of parent which reduces aid by 5.64% of balance.</td>
<td><strong>Balance:</strong> An asset of student if owned by custodial account or student; reduces aid by 35%.</td>
<td></td>
</tr>
<tr>
<td>For the IM, sibling 529 plans are also treated as asset of parent if parent is owner; reduces aid by 5.64% of balance.</td>
<td><strong>Distribution:</strong> Some consider it a “resource” of the student. Experts differ on whether earnings count as student’s income (which reduces aid 50 cents on the dollar) although most feel the non-taxable distribution is not a resource.</td>
<td></td>
</tr>
<tr>
<td><strong>Distribution:</strong> Some consider it a “resource” of the student. Experts differ on whether earnings count as student’s income (which reduces aid 50 cents on the dollar) although most feel the non-taxable distribution is not a resource.</td>
<td>529 plan for the student is not assessed if owned by a person other than the parent or student.</td>
<td></td>
</tr>
<tr>
<td>529 plan for the student is not assessed if owned by a person other than the parent or student.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Qualified Tuition Plan</th>
<th>Owned by parent</th>
<th>Owned by student</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Balance:</strong> Under FM, not an assessable asset. Under IM, a parental asset which reduces aid by 5.64% of the balance.</td>
<td><strong>Balance:</strong> Under FM, not an assessable asset. Under IM, a parental asset which reduces aid by 5.64% of the balance.</td>
<td></td>
</tr>
<tr>
<td><strong>Distribution:</strong> Under FM, a “resource” that will reduce aid dollar for dollar.</td>
<td><strong>Distribution:</strong> Under FM, a “resource” that will reduce aid dollar for dollar.</td>
<td></td>
</tr>
<tr>
<td>Financial aid treatment may change to “asset of account owner” during the next reauthorization of the Higher Education Act of 1965.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

College education. For others, however, the disadvantages—primarily the impact on financial aid eligibility and the necessity of forgoing other education incentives—may outweigh the advantages. Any sound plan for funding a college education must include a thorough review of both the advantages and disadvantages of QTPs, a comparison of the two types of QTPs to select the one most suited to the taxpayer, a thorough understanding of the other education incentives and their interaction with QTPs, and, finally, a detailed analysis of the impact of QTPs on federal financial aid eligibility. This paper serves only as a brief introduction and exploration of the very complex area.

### REFERENCES


A Threat to the Integrity of the Accounting Profession

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Abstract

It is a widely-documented and accepted truism that recent years have held great ethical challenges for members of the accounting profession. Graduates of some of the nation’s finest and most prestigious academic programs have been found at the center of corporate scandals involving accounting, deception, and greed. While there has been discussion in the academic and professional communities about the need to strengthen ethical training before and after graduation, the root cause of the recent lapses in virtue may be more sinister and endemic than has previously been thought.

Beginning in the second century A.D., a group of early Christian monks inhabited the desert land of the Middle East. Sometimes called the “Desert Fathers”, they warned of a sinister spiritual hindrance that could seriously and adversely affect one’s desire and ability to pursue virtue. Evagrius of Pontus, a monastic writer who lived in the fourth century, described this threat to virtue as “acedia.” This phenomenon could be characterized as a sort of actively-practiced apathy, or a strong resistance to stimuli that could result in greater virtue.

Few would suggest that business people are actively trained in immoral or unethical behavior, except perhaps that from the popular media. It could be argued that there has been an unspoken premise that the reason for recent ethical lapses in business people is insufficient training in ethics, or moral standards. Presumably, this would suggest a certain ignorance of proper behavior that must be overcome. If acedia is a primary cause for unethical behavior, though, it suggests that a different set of strategies should be adopted to overcome the pervasively apathetic attitude which it represents. A better understanding of this force could potentially lead to improved training in accounting and more virtuous business people and contributors to society.
HOSPITAL PROFITABILITY: A THREE YEARS STUDY OF EARNINGS DETERMINANTS FOR NOT-FOR-PROFIT HOSPITALS IN THE STATE SOUTH CAROLINA

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During the mid-nineties, Health maintenance organizations were largely successful at keeping the rise in health care cost under ten percent. During this period, reimbursements to hospitals were reduced and a number of small and rural hospitals terminated operations or were merged with larger institutions. The balance budget amendment of 1997 further reduced payments to Hospital providers across the country. Over the past four years, the cost of medical care has witnessed double digit increases. Insurers say rising technology cost and pharmaceutical cost are the major reasons for the increase. A number of studies have examined key financial ratios and hospital profitability or foreclosures. Using the 990 hospital tax returns of 35 hospitals over a three year period, this study incorporates labor cost structure as well as growth in facilities, with the traditional ratios in examining hospitalability. The goal of this study is to foster a greater understanding hospital operating cost structures and to document the characteristics of those that consistently report positive earnings.

Introduction

Hospital profitability has been the subject of numerous studies and debate. Prior to 1983 hospital were reimbursed based upon allowable charges. Essentially Medicare paid hospitals based upon the ratio of Medicare revenue charges to total Charges applied to allowable costs. Under this payment methodology, hospital benefited from high inpatient census. The longer a patient stayed hospitalized, the greater the profitability to the hospital.

Unfortunately, under this payment mechanism, there is little incentive to contain cost. Consequently, hospital cost had been growing at a rate greater than the consumer price index. To arrest the spiraling growth in hospital medical expenditures, the department of Health and Human Services began the implementation of a prospective payment system in 1983. The purpose of the prospective payment system was to introduce a form of market pricing to the health care industry. Under this prospective payment system, hospitals would be paid a fixed amount for each patient visit based upon the Diagnostic Related Group (DRG). Unlike the cost based reimbursement system, it was no longer profitable to maximize revenue through maximizing inpatient days. The shorter the inpatient stay the greater the profitability. In addition, the lower the cost of treating a particularly DRG, the greater the profitability, since the amount of reimbursement was fixed, except for certain cost and length of stay outliers.

Hospitals were not well prepared for this market approach to patient reimbursement. To address this radical shift in reimbursement, Hospitals engaged in cost shifting. That is, a portion of the cost of providing services to
Medicare patients was shifted to the private paying patients. Private Insurers were well aware of the growth in hospital costs and were being pushed by large employers to temper the rise in health care premiums. Manages care was the private sector’s response to the rapidly rising cost. Hospitals were now being squeezed on the one hand by the fixed DRG payment and on the other hand by lower negotiated managed care rates. The balance budget amendment of 1997 further exasperated the financial plight of the already stressed institutions.

This study examines the financial profitability of a sample of Not-For-Profit (NFP) hospitals in the state of South Carolina for the period 1999 – 2001. This study differs from other studies in that it uses data from the NFP tax returns of the hospitals studied. In addition, this study defines labor intensity in a manner different from previous studies. This study also uses data taken from the 990 tax returns (Annual Return of Tax exempt Organization) of the hospitals. This data is significantly less aggregated than that found in financial statements and provides other useful data not explicitly found in the Medicare cost reports used by other researchers.

PRIOR RESEARCH

A number of studies have addressed hospital profitability. Younis, et al. (2001) examined the profitability of hospitals post the prospective payment era. Their dependent variable, return on assets, was used as the measure of profitability. Some of their independent variables were as follow: ownership status (for profit, not-for-profit), Teaching hospital vs. non-teaching, adjusted number of employees, average length of inpatient stays and the hospital debt load. Using multiple regression, they determined that these variables were statistically significant in determining hospital profitability. Cody et al. (1995) conducted a similar study using returns on revenue as the dependent variable. He grouped 26 variables into four categories, business strategies, productivity management, demand and structure. Using multiple regression analysis, he determined that 10 of the twenty six variables were statistically significant to profitability. Seven of the ten variable found to be significant were non-financial in nature. The data used in this study was derived from hospitals in the metropolitan Los Angeles area.

Jordan (2001) studied the impact of deregulation on hospitals in the state of New Jersey beginning in 1992 through 1997. He found that a significant drop in the length of stays and operating margins contributed to the declining in the net assets of hospitals. Using twenty one financial and sixteen non-financial dependent variables, (Gardiner 1996) determined that cash flow to debt, equity financing, long term debt per bed and the average length of inpatient stays were all predictor of hospital failure. (Gapenski et al. 1993) found that teaching status, age of physical facility, debt utilization and labor intensity were strongly significant (p =0.01) in determining hospital profitability.

DATA AND VARIABLES

The data for this study was taken from the annual 990 tax returns for the period 199 – 2001. The data represent forty-two data years and twenty three hospitals. A descriptive summary of the variables used is given below.
Unlike previous studies that used the number of employee as a proxy for labor cost, this study uses the actual labor cost reported as a percent of total cost. In addition, Labor cost per dollar of program revenue is also specified as an independent variable. Program revenue is defined on the return as revenues generated from healthcare related services provided by the hospital. It does not include gains and losses from the sale of assets or investments. It is expected that the labor cost variable will be negatively correlated with hospital profitability. Hospital with the higher program revenue per dollar of labor cost should be more profitable.

The Independent variables for this study were grouped into three categories: liquidity, leverage and labor intensity. Profitable hospitals with stable cash flows are expected to be more liquid than those that are less profitable. In addition, these institutions would be expected to have a lower number of days of cash expenses in accounts payable, indicating that bills are being paid timely. The debt to total asset variable measures the extent to which the hospital is financing capital expansions with the use of debt funding. Increases in debt funding results in higher debt service cost thereby potentially reducing profitability. When hospitals expand through debt financing, the revenue streams generated by this new expansion should be sufficient to pay the additional debt service cost and maintain adequate contingency reserves.

The labor intensity variable measure the relative mix of human resource cost employed in providing healthcare services. Program Revenue per dollar generated has been incorporated as a measure of labor efficiency. Hospitals are technology driven. Patients demand the latest diagnostic and treatment equipment available on the market. Physicians and hospitals respond to these demands. Consequently, the technology component of providing care has risen significantly over the years. New equipment will often necessitate the employment of a new technician of training of an existing employee. To compete in this

### Table 1 Variables and Summary Statistics

<table>
<thead>
<tr>
<th>Accounts Receivable Collection Period</th>
<th>Days Expenses in Accounts Payable</th>
<th>Return on Total Revenues</th>
<th>Return on Total Assets</th>
<th>Asset Turnover</th>
<th>Debt to total Assets</th>
<th>Labor cost as percent of total cost</th>
<th>Program Revenue per dollar of labor cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARCP</td>
<td>DEAP</td>
<td>ROR</td>
<td>ROA</td>
<td>ATO</td>
<td>DTO</td>
<td>LCTC</td>
<td>PRLC</td>
</tr>
<tr>
<td>Mean</td>
<td>79.22</td>
<td>40.48</td>
<td>5.16%</td>
<td>3.55%</td>
<td>0.96</td>
<td>0.41</td>
<td>$ 0.41</td>
</tr>
<tr>
<td>Standard Error</td>
<td>3.03</td>
<td>2.22</td>
<td>0.86%</td>
<td>0.58%</td>
<td>0.09</td>
<td>0.03</td>
<td>$ 0.01</td>
</tr>
<tr>
<td>Median</td>
<td>84.06</td>
<td>40.09</td>
<td>6.02%</td>
<td>4.47%</td>
<td>0.76</td>
<td>0.39</td>
<td>$ 0.39</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>19.42</td>
<td>14.19</td>
<td>5.52%</td>
<td>3.70%</td>
<td>0.57</td>
<td>0.22</td>
<td>$ 0.08</td>
</tr>
<tr>
<td>Minimum</td>
<td>16.77</td>
<td>9.11</td>
<td>-6.42%</td>
<td>-5.72%</td>
<td>0.41</td>
<td>0.01</td>
<td>$ 0.30</td>
</tr>
<tr>
<td>Maximum</td>
<td>111.47</td>
<td>68.22</td>
<td>22.08%</td>
<td>9.37%</td>
<td>3.68</td>
<td>0.88</td>
<td>$ 0.59</td>
</tr>
</tbody>
</table>

### Table 2 Variable and Grouping

<table>
<thead>
<tr>
<th>Liquidity</th>
<th>ARCP</th>
<th>DEAP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accounts Receivable collection period</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Days Expenses in Accounts payables</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Return (Dependent)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Return on Program Revenues</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leverage</td>
<td></td>
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<tr>
<td>Debt to total Assets</td>
<td></td>
<td></td>
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<tr>
<td>Labor Intensity</td>
<td></td>
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</tr>
<tr>
<td>Labor cost as a percent of total costs</td>
<td></td>
<td></td>
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<tr>
<td>Program Revenue per dollar of Labor cost</td>
<td></td>
<td></td>
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<tr>
<td>Capital Efficiency</td>
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</tr>
</tbody>
</table>
labor intensive environment, hospitals have engaged in outsourcing certain hospital functions where feasible and instituted staffing patterns that result in lower labor costs. Hospitals that have been successful in these labor reducing strategies are expected to be more profitable.

The asset turnover variable measures how efficiently the hospital is employing all of its tangible and intangible recorded assets. The higher the asset turnover the greater the perceived level of efficiency. As inpatient days have declined over the years, profitable hospitals have found innovative ways to generate revenue through alternative use of this excess capacity.

RESULTS AND ANALYSIS

This research used simple linear regression to ascertain the relationship between each independent and the dependent variable Return on Program Revenues (ROR). The results of the regression output is provided in table three below.

Table 3 Regression Output

<table>
<thead>
<tr>
<th>Var.</th>
<th>Intercept</th>
<th>Co-efficient</th>
<th>P-value</th>
<th>Rsq</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARCP</td>
<td>.03098</td>
<td>.00025</td>
<td>.5701</td>
<td>.008</td>
</tr>
<tr>
<td>DEAP</td>
<td>.04486</td>
<td>.00016</td>
<td>.7919</td>
<td>.002</td>
</tr>
<tr>
<td>ATO</td>
<td>.09509</td>
<td>-.04521</td>
<td>.0022</td>
<td>.235</td>
</tr>
<tr>
<td>DTO</td>
<td>.09798</td>
<td>-.11403</td>
<td>.0031</td>
<td>.203</td>
</tr>
<tr>
<td>LCTC</td>
<td>.10871</td>
<td>-.13937</td>
<td>.2128</td>
<td>.039</td>
</tr>
<tr>
<td>PRLC</td>
<td>-.07055</td>
<td>.04848</td>
<td>.0016</td>
<td>.226</td>
</tr>
</tbody>
</table>

Neither of the liquidity measures (ARCP or DEAP) explained variations in the return on revenue. Both coefficients are positive but insignificant. Perhaps this should be expected in a well managed hospital. While returns on revenues or assets may increase, good collection policies may cause the collection period to remain constant. The same rationale may be applied to the length of the payment period for accounts payable (DEAP). The Asset Turnover (ATO), Debt to Total assets (DTO) and Program Revenue per dollar of Labor Cost (PRLC) variables were all significant. Although the Coefficient of the ATO variable is significant, the negative sign of the coefficient was unexpected. One plausible explanation lie in the data. One large hospital reported two consecutive years of significant losses resulting in negative returns for those years. The coefficient of the Debt to Total Asset (DTO) variable was negative and significant. This is consistent with previous studies. Hospitals with significant debt loads incur additional fixed interest cost. These result suggest that the revenue stream generated by the investments from this additional debt do not produce sufficient returns to service the debt and contribute to the bottom line (excess revenues). The coefficient of the Labor Cost as a percent of Total Cost (LCTC) variable was negative but not statistically significant. One plausible explanation is that total labor cost may not have been captured in the data. When a hospital engages on outsourcing, the new expenses are characterized as contractual services. These contracts include human resource costs as well as other costs. The data included this study only included those cost explicitly reported as employee costs.

The PRLC variable reported a positive coefficient and it was statistically significant. These result are supported by the functional relationship. Hospitals are very labor intensive institutions. As the revenue per dollar of labor cost increases, the hospital should become more profitable.

SUMMARY AND CONCLUSIONS

The liquidity variables (ARCP and DEAP) as well as the labor cost as a percent of total cost variable (LCTC) were not statistically significant. The remaining variables (ATO, DTO and PRLC) were statistically significant. This study support the finding of previous research relative to the liquidity variables. The finding of this study suggest that program revenue per labor dollar is a very important variable that can explain variations in return on revenue. The findings of this study is limited to not for profit hospitals in the state of South Carolina. Further studies which include a representative sample of not for profit hospitals across the United State is necessary to confirm the above findings.
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The Role of Critical Thinking in a Traditional Managerial Accounting Principles Course

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The Role of Critical Thinking in a Traditional Managerial Accounting Principles Course

Abstract.

Critical thinking and problem solving are generally and increasingly considered important skills in all aspects of education and business - including accounting education and practice. In this paper we examine the association between critical thinking and exam performance, at the problem level, in a 'traditional' managerial principles course.

Data from more than 200 undergraduate students at a large Midwestern university enrolled in a required managerial principles accounting class, (including the Watson-Glaser Critical Thinking Appraisal, overall exam scores at problem-level, scores on individual problems and ACT scores), were reviewed to determine any potential statistical relationships between student performance on the exam, either in it’s entirety or on a subset of the exam, and WGCTA scores and ACT scores.

An initial factor load analysis of the problem scores identified four exam factors which were used as the basis for further analysis including correlations between ACT scores and exam performance and between ACT scores and critical thinking subscales. Additionally, regression techniques were used to determine the influence of critical thinking skills on exam performance.

We find problem-level exam performance can largely be expressed in terms of four factors - two procedural based and two decision based. Critical thinking is associated with all four factors, but most strongly so with the decision based factors. This paper provides support for the development or application of critical thinking skills in a traditional accounting principles course. Possible implications of these findings to related research and accounting education are discussed.

Key words. Accounting, Critical Thinking, Exam Performance, Traditional Education.
This paper examines the value relevance of earnings before interest, taxes, depreciation, and amortization (EBITDA) in the context of a merger. The merger of two firms results in the creation of a new entity with an earnings stream that may be different from the earnings stream of either of the two firms. Coupled with the inherent uncertainties that exist in such a context, the prediction of the merged firm’s future earnings may be quite challenging, and, consequently, the usefulness of current earnings may be decreased. While earnings-per-share (EPS) is a popular measure for firm valuation, EBITDA, a pro-forma performance measure that has received a great deal of attention from management and analysts, may provide an alternative valuation metric that might provide greater insight into a firm’s future cash flows than earnings during a merger.

Results suggest that in the year of the merger, EBITDA provides value-relevant information beyond earnings and operating cash flow. This finding supports the contention that the quality of earnings in the year of the merger is difficult to interpret, and given this weakness, alternative measures of operating income can aid in the explanation of abnormal security returns. Additional analyses indicate that in the year of the merger the value-relevance of EBITDA is not influenced by either the purchase or pooling method of recording the merger. This result suggests that EBITDA will continue to provide value relevant information even after the elimination of the pooling-of-interest method of accounting for mergers.
LOTTERY TICKETS, INVESTOR BEHAVIOR AND
UTILITY MAXIMIZATION: THE VALUE OF THE DREAM

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Abstract

This paper examines the utility functions proposed by Von Neumann-Morgenstern and Friedman-Savage and their respective explanations of observed behavior. By examining total utility, it is shown that lottery ticket purchases by risk-averse, utility maximizing individuals can be explained by a simple extension of the Von Neumann-Morgenstern utility function. This extension can also explain what appears to constitute “irrational” investor behavior.

I. INTRODUCTION

In a world of certainty, a risk-averse individual should have no difficulty deciding which of many choices will yield the greatest level of utility. However, when uncertain choices are presented, the decision of utility maximization becomes more difficult. Two examples of uncertain decisions that face individuals are the purchase of lottery tickets and the purchase of insurance.

Friedman and Savage (1948) contend that the traditional utility function proposed by Van Neumann and Morgenstern (1947) cannot explain the behavior of individuals who both participate in gambles and purchase insurance. The purpose of this paper is to demonstrate that the behavior observed by Friedman and Savage can be explained with a Von Neumann-Morgenstern utility function.

II. COMPETING THEORIES

Traditional utility theory was first developed by Bernoulli (1738, translated 1954). The theory Bernoulli developed to explain choices involving risk was brought to modern light by Von Neumann and Morgenstern (1947). The Von Neumann-Morgenstern theory of utility simply states that individuals faced with uncertainty will make choices that maximizes their expected utility. The major assumption underlying the Von Neumann-Morgenstern theory is that of diminishing marginal utility. With diminishing marginal utility, the expected utility of wealth is less than the utility of expected wealth. This implies individuals are risk-averse. An example of a typical Von Neumann-Morgenstern utility function for wealth is shown in Figure 1.

A significant problem with the Von Neumann-Morgenstern theory of utility is that it does not appear to be able to explain the behavior of an individual that buys insurance and at the same time is willing to take a fair gamble. In the first instance, the individual is paying a premium to eliminate uncertainty, while in the latter case, he is willing to pay to take on uncertainty. For an individual with a utility function of wealth similar to that depicted in Figure 1, the utility lost from losing a dollar is greater than the utility that would be gained from winning a dollar due to the diminishing marginal utility of wealth.
Therefore, it would appear rational to purchase insurance to prevent a loss if the cost of the insurance reduces the individual’s utility less than the reduction in expected utility from the loss of wealth. However, it would not appear rational for the same individual to participate in a fair gamble. Given diminishing marginal utility, if the chance of winning or losing an equal amount is the same, the expected loss of utility will always be greater than the expected gain in utility. Marshall (1920) summed up the criticism by stating that “Gambling involves an economic loss, even when conducted on perfectly fair and even terms . . .  A theoretically fair insurance against risk is always an economic gain.”

Friedman and Savage (1948) observe that individuals purchase insurance and participate in both fair and unfair gambles. They also observe that lower income individuals are more likely to participate in lotteries than higher income individuals. Friedman and Savage conclude that these observations are not consistent with the Von Neumann-Morgenstern theory of utility. They reason that individuals could not be risk-averse (insurance buyers) and risk-seekers (gamblers) at the same time given a Von Neumann-Morgenstern utility function. Friedman and Savage’s solution was to derive a utility function like the one shown in Figure 2.

Friedman and Savage claim this “double-humped” utility function can explain why individuals would buy insurance and purchase lottery tickets. This is possible given that the utility function has two distinct portions that indicate both risk-aversion and risk-seeking behavior. If an individual is at point A in Figure 2, he would be willing to buy fairly priced insurance to prevent sliding down the utility curve to point B. However, at the same time, the individual would also be willing to purchase a lottery ticket that could move him to point C. The utility from the gain of winning the lottery that would result in moving to point C is greater than the loss in expected utility.

The Friedman-Savage utility function can also explain why lower income individuals are more likely to participate in lotteries than upper income groups. Given that there is not another concave from above section of the utility function, there is no rationale for upper income groups to participate in lotteries. However, this utility function can still explain why upper income groups buy insurance. Dowell and McLaren (1986) found that decisions involving risk were consistent with a Friedman-Savage utility function.

III. ALTERNATIVE EXPLAINATIONS

Several economists have offered alternative explanations as to why we observe risk-averse individuals participating in fair (and unfair) gambles. Arrow (1965) suggests that individuals do not understand the probabilities associated with lotteries and thus do not realize that they are participating in an unfair game. Since the perception of the odds is skewed, the participants feel the odds are in their favor.

Hirshleifer (1965, 1966) claims that most gambling must be pleasure-oriented since wealth-oriented gambling is not rational. He concurs with Arrow that wealth-oriented gambling would take place if it was based on “hunches.” Hirshleifer also contends that
wealth-oriented gambling would be restricted to lower income groups. Pope (1983) states that people can “dream ... that they will become millionaires after the next drawing” (p. 156). See Conlisk (1993) for a more thorough review of the relevant literature.

IV. HYPOTHESIS

The hypothesis of this paper is that a Von Neumann-Morgenstern utility function can adequately describe the behavior of risk-averse individuals that gamble. This hypothesis is based on the following assumptions:

- Marginal utility is both positive and diminishing,
- Individuals have a consistent set of preferences,
- Individuals make choices that will maximize their expected utility,
- Individuals will not pay more than the “fair” price for an item, and
- Utility synergies are possible.

The fair price of an item is considered to be the wealth equivalent of the utility derived from the item. Given these assumptions, it will be shown that pleasure-oriented gambling, specifically participation in lotteries, is consistent with a Von Neumann-Morgenstern utility function. Unlike Hartley and Farrell (2002), the hypothesis is not dependent on the relative levels of interest rates or time preferences.

A common definition of utility is that it is the overall satisfaction one receives from consuming a commodity. A major problem encountered with utility theory is how to measure this satisfaction. The amount of wealth given up for an item can be used to determine the utility derived from the item. In a world of certainty, the price of an item or service can be used to measure its utility. Thus, the price, relative to wealth, is often equated to utility. Using notation that is consistent with Copeland and Weston (1989), this can be formally stated as:

$$U(X) = U(W_X)$$  \[1\]

which, when assuming certainty, is equal to:

$$E[U(X)] = U[E(X)] = E[U(W_X)]$$  \[2\]

where $E$ is the expectations operator, $U$ is the amount of utility, $X$ is the good or service and $W_X$ is the wealth used to purchase $X$, i.e. its price. Thus,

$$U(X) = E[U(W_X)].$$  \[3\]

In a world of uncertainty, Equation 3 does not hold if only the fair or actuarial value of $X$ is considered. In the case of uncertainty:

$$U[E(X)] > E[U(X)]$$  \[4\]

and

$$U[E(W_X)] > E[U(W_X)].$$  \[5\]

If only the expected dollar value of an uncertain choice is considered, fair gambles or lotteries would not be participated in, since an individual’s expected utility of wealth would always be less than the utility of their expected wealth. In other words, the expected utility gained from buying the ticket would always be less than the utility lost from the purchase of the ticket.

As defined above, utility is the total overall satisfaction one receives from a commodity or activity. A problem with only considering the actuarial value of an item in a world with uncertainty is that it may not capture all of the total utility associated with the item. This argument is supported by Vickrey (1945), who states that there must be “consideration other than the maximization of the mathematical expectation of utility.”

In particular, the hypothesis developed above contends that utility synergies can occur. These synergies result in a higher amount of expected utility as compared to the combined expected utility of the two individual items. A practical illustration uses gloves. One would receive an equal amount of utility from two left-hand gloves or two right-hand gloves. However, the total utility and comfort would be greater if a person had one left- and one right-hand glove, even though the total number of gloves remains unchanged. Although individuals can dream of winning the lottery and becoming wealthy, the dream’s value is greatly diminished unless it is accompanied by the purchase of a lottery ticket.

A major problem with Friedman and Savage’s rejection of the Von Neumann-Morgenstern theorem is that they fail to acknowledge that there is a significant amount of synergy that
takes place when a lottery ticket is purchased. Friedman and Savage only focus on the actuarial value of the gamble but ignore any additional utility that may be derived from purchasing a lottery ticket. They claim that lotteries “present risk in a relatively pure form, with little admixture of other factors.” Although Friedman and Savage minimize the affect of pleasure on decisions involving risk, recent studies and anecdotal evidence suggest otherwise.

V. THE VALUE OF THE DREAM

Lotteries sponsored by state governments are touted as game shows and the way to participate is to buy a ticket. Even though a state may take 40% - 50% of the gross revenues, individuals persist in buying lottery tickets. Why do rational individuals continue to purchase tickets when the odds are heavily against them? It is the contention of this author that they are buying more than the actuarial value of the lottery ticket. They are also buying a dream.

The concept that dreams have real value is supported by Roston (1990). In an interview with Mr. Markovitz, an executive with a lottery consulting firm, Mr. Markovitz states that “You have all the excitement between when you bought the ticket and when you lost . . . . You can imagine what you would do if you won.” Becker (1989) discusses the “pleasure poor bettors get from dreaming of a better life with less drudgery.” Even a former advertising slogan for the New York State Lottery addressed this concept. The slogan: “All You Need Is A Dollar And A Dream!”

For a utility function to completely describe choices in an uncertain world, not only must the actuarial value be considered, but also any additional satisfaction received. Given the assumptions that individuals make choices that will maximize their expected utility and that they will not pay more than the “fair” price of an item, the expected utility from the actuarial value of the lottery plus the expected utility from “the dream” will equal the total expected utility of the price (the wealth given up) for the ticket. This can be stated as:

$$U[E(W_x)] = E[U(W_x)] + E[U(D)] \quad [6]$$

where $U(D)$ is the utility from the entertainment value of the dream of winning the lottery.

Equation 6 can be used to explain why lower income individuals are more likely to buy lottery tickets than higher income individuals, given that it considers not only the actuarial value of an uncertain choice, but also all other utility derived from that choice.

For example, suppose an individual with a logarithmic utility function, which is consistent with a Von Neumann-Morgenstern utility function, has a current wealth of $10,000. She buys a lottery ticket for $1, with a fair chance of winning $1,000,000. Since the gamble is fair, her expected wealth is: $.999999*(9,999) + .000001*(1,010,000) = $10,000 which is equal to 9.2103 utiles (which is equal to ln $10,000). The certainty equivalent of the gamble is: .999999*(ln $9,999) + .000001*(ln $1,010,000) = 9.2102 utiles, which is equivalent to $9,999.05. Using Equation 6, if she buys a lottery ticket, the utility of the dream associated with the gamble must be $0.95 or .0001 utiles. This amounts to .0095% of the individuals wealth. This is similar to the risk premium defined by Markowitz (1959). However, rather than paying this amount to avoid the gamble, the individual is willing to pay this amount to be entertained by the dream of becoming a millionaire.

Now suppose an individual has a current wealth of $1,000,000 and also buys a $1 ticket for a chance to win $1,000,000 and double his wealth. His expected wealth remains at $1,000,000. However, the certainty equivalent is: .999999*(ln $999,999) + .000001*(ln $2,000,000) = 13.8156 utiles, which is equivalent to $999,999.69. Thus the value of the dream is only worth $0.31, which is just .000031% of his current wealth.

Given these examples, it can be concluded that the dream of winning $1,000,000 is worth relatively more to lower income individuals than it is to higher income individuals. In can also be concluded that the incentive for an individual to purchase a lottery ticket increases as the size of the prize increases. This can also explain why higher income individuals typically participate in lotteries when the prize reaches very high levels (in excess of $20 million is one suggestion.)

Equation 6 can also be extended to explain why individuals pay more for insurance than the actuarial fair risk premium. The additional
amount paid over the risk premium would be paying for the individual’s “peace of mind.”

VI. Investor Behavior

Goetzmann and Kumar (2001) examine over 40,000 equity investment accounts and find that on average, investors are under-diversified. Over 25% of the portfolios examined consisted of only 1 stock while over 50% had 3 or fewer stocks. As expected, these portfolios exhibit greater volatility than the market. The hypothesis is that investors are either unwilling or unable to diversify.

Goetzmann and Kumar contend that these investments are not “play money.” However, it is quite possible that investors do view the few stocks they hold as they view lottery tickets. They simply hold only one or two stocks, rather than a well diversified portfolio, in hope that they will get the big payoff. The individual investor dreams of what they would do if the stocks were to greatly increase in value.

VII. CONCLUSIONS

This paper has examined the historical rejection of the Von Neumann-Morgenstern utility function to explain choices under uncertainty by Friedman and Savage. It has shown that the “double-humped” utility function proposed by Friedman and Savage is unnecessary. The behavior that Friedman and Savage set out to explain, that an individual will both gamble and buy insurance, can be explained by a simple extension of the utility function originally proposed by Von Neumann and Morgenstern. This extension can also explain why lower income groups are more likely to purchase lottery tickets than higher income groups. All that is required is that the total utility of a choice be considered and not just the utility provided by the actuarial value of that choice.

The advantage of this extension over the utility function proposed by Friedman and Savage is that behavior is continuous over all wealth classes. In addition, it is more realistic than the “double-humped” utility function in that it does not require that the classes be segregated into only higher and lower income groups. Just as Friedman and Savage state of their hypothesis, this extension of the Von Neumann-Morgenstern utility function “cannot be declared invalid for a particular class of behavior until a prediction about that class proves false. No other test of its validity is decisive.” The value of the dream can be extended to describe observed investor behavior.

REFERENCES


The Effects of A New Stock Index: Evidence from the Creation of the Euro STOXX 50 Index

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ABSTRACT

Because the S&P 500 Index is one of the most successful stock indexes in the U.S., most previous studies on stock indexes focus on how the deletions from and additions to the S&P 500 Index affect the value of these added and deleted companies. One common result from most studies is that the price of an added (deleted) company increases (decreases) significantly, resulting in the so-called the “S&P effect.”

This paper differs from previous studies in that we examine the valuation effects of a new stock index (the Euro STOXX 50 Index) by estimating the abnormal stock return and changes in trading volume of companies that were selected to join the new stock index. By employing the commonly used event-study methodology documented by Mikkelson and Partch (1988 and errata), this research finds that the announcement abnormal return of a 2-day window, the cumulative abnormal return of the transition period (from the announcement date to one day before the effective date), and the cumulative abnormal return of the post-effective-date period are all not statistically significant. As a result, neither of the price pressure, downward-sloping demand curve, information, and liquidity hypotheses, which are used to explain the findings in previous S&P 500 Index studies, can explain our empirical result.

The little valuation effect of a newly created stock index on the added companies may be attributed to three reasons. First, firms selected into the Euro STOXX 50 Index have been the largest and most actively traded stocks in major European financial markets. The recognition of new index membership may convey little or no new information about the prospects of these companies. Second, because the Euro STOXX 50 Index was new in February 1998, no mutual funds actually tracked this new index before its launch. So, there might not be any index-fund buying over the event period, leading to no significant increase in demand for shares of 50 companies. Finally, since it may take some time for a new stock index to become successful through promoting the use of the index by derivative contracts, institutional investors, money managers, newspapers, other media, and the investing public, there is uncertainty about the future of the new stock index. Therefore, the potential success of the new index may not be capitalized upon the announcement of the creation of the index, resulting in insignificant abnormal stock returns.
ABSTRACT

Over the past decade, the accounting profession has suffered from a decline in the number of college students choosing to major in the field of accounting. Recent studies suggest that one reason for the decline is lack of interest in accounting, other fields of study such as information systems and financial management have peaked student curiosity. Students are either uninformed or misinformed about the role of the accountant in business and about the career opportunities available to them in the field of accounting. This paper examines whether or not the increased publicity that the accounting profession has had in recent years due to corporate scandals and fraud has had an impact on students perceptions of the accounting profession. The results indicate that students believe that more government regulation is necessary and that both accounting firms and companies are responsible for the recent events. Overall, students view the scandals as having a negative impact on the accounting profession. However the majority of the students indicated that the publicity has not affected their choice of major.
INTRODUCTION

Accounting enrollment during the late 1990’s across university and college campuses nationwide has declined. Studies have shown a decline not only in accounting enrollments but also in accounting interest (Gabbin, 2002). New fields of study such as information systems, e-business, and financial management have peaked student curiosity to major in these new exciting fields. Many students perceive accounting as bookkeeping with no future. Students are either uninformed or misinformed about the role of accountants in business and about how an accounting education and career can benefit them. Many students still think of accountants as number crunchers who add no value. They do not realize all of the possibilities an accounting education and a career in accounting can provide (Barsky & Catanach, 2001).

In recent years corporate scandal and fraud in the corporate world and in public accounting has focused the public eye on accountants and the accounting profession. This scrutiny may have a further impact on enrollments in accounting programs. With all this recent publicity of accountants in the corporate world and accounting scandals in some of our nation’s most notable companies, it would be of interest to study students’ perceptions about these events and the effects on the profession and accounting as a career choice. The remainder of the paper is presented in four parts. The first section will discuss reasons why student enrollment and interest in accounting has declined and possible ways to bring students back to the accounting profession. The next section will focus on the corporate/accounting scandals and how it has affected the accounting profession. The third section will present the research methodology of the survey used to solicit feedback from students at Nicholls State University and the results of that survey. Concluding remarks will be given in the final section.

ACCOUNTING INTEREST

Gabbin (2002) reported that the percentage of college students majoring in accounting dropped to two percent in 2000 from four percent in 1990. He also reported that the percentage of high school students who intend to major in accounting fell to one percent in 2000 from two percent in 1990. Faculty who were surveyed said there are fewer qualified accounting students than five years ago and many employers are offering higher starting salaries to those with majors in consulting and information systems. Accounting starting salaries have decreased when compared to other fields.

What are the possible reasons for the declining interest in accounting? Barsky and Catanach (2001) note that many students, as well as parents, lack knowledge of the profession of accounting. One reason for the supply and demand problem is that many business students are not aware that the accounting industry has been changing, with some of the main services now being offered by firms including such things as consulting projects that join tax and audit work (Freer, 2001). Students do not understand how the role of accountants in businesses and the education of accountants have dramatically changed over the past years. Barsky and Catanach (2001) note many students do not major in accounting because it is viewed with a bookkeeping stereotype. An accountant’s role has gone from advisor on traditional cost, financial, and tax accounting matters to consultant on broad based management issues. Some of these issues include performance improvement, human resource systems, and other financial matters. Accounting is not viewed as cutting edge the way ecommerce and computer information systems is viewed and this viewpoint is hurting the accounting profession’s ability to gain students.

The accounting profession needs to once again gain student interest. According to Barsky and Catanach (2001), awareness is the key to changing student perception. Their approach to changing students’ perceptions is based on four issues: the changing role of the profession, the impact
of the profession’s change on accounting education, management of the student’s undergraduate learning experience, and the realistic evaluation of career option. Students need to be informed during their high school years about the accounting profession through business classes or through career days. Professionals and educators need to go into the classrooms to make an impression on the next generation of accounting students. Students need to know that the education they will receive at colleges and universities will prepare them for future careers.Gabbin (2002) reported that the relationship between alumni CPAs and accounting educators has never been more important. Alumni CPAs can provide students with valuable information about what is going on in the business world. The opportunity for students to interact with practitioners through internships and activities can be used to attract students and inform them about future employment opportunities. While the accounting profession academia have to deal with declining enrollments due to a decline in accounting interest, the accounting profession also has to deal with the recent corporate/accounting scandals.

CORPORATE/ACCOUNTING SCANDALS

The unfolding debacles throughout corporate America have made many professionals as well as students think about their careers in a different light. In 2000, Russell et al. (2000) reported on research done by the American Institute of Certified Public Accountants (AICPA). This research found that educators and practitioners who had majored in accounting said they would not major in accounting if completing their education again. Students tell us through their choice of major that an accounting degree is not perceived to be as valuable as other business degrees.

What affects are the recent accounting/corporate scandals having on students, professionals, and the rest of corporate America? For students who are now majoring in accounting, they are seeing first hand what happens if rules are not followed. For example, the Enron situation is providing an opportunity for students to analyze the mistakes made by Enron executives and accountants so that they will not repeat those same mistakes. The Enron scandal is also opening up some of the specialized fields of accounting to a new generation such as forensic accounting. Accounting students are gaining an ethical awareness about the profession and about what can happen when rules and standards are not followed (Orland, 2002).

According to Crowley (2002), the accountants representing the profession are taking an unfair share of criticism. Accountants, along with the accounting and auditing standards, are only one part in a group responsible for keeping the integrity of the financial system intact. The Securities and Exchange Commission (SEC), stock markets, and company executives also share in the responsibility of maintaining the integrity of the financial system. In order for there to be effective restructuring of company financial statements and reporting, all facets of the financial information system must be dealt with at the same time.

Investors in corporate America also have a stake in the recent accounting/corporate scandals. Investors may not have money invested in one of the companies affected by the scandals, but the scandals are affecting them. Why should they care? This was a question posed by CNN.com to economist Donald Ratajczak. According to Ratajczak, if you are an investor, you need to rely on the information presented by the company as being correct. This is a reason for having audited data. Auditors are supposed to indicate whether appropriate processes are being used, allowing an investor to make a sound decision as to whether to invest in a company or not (Accounting Scandal, 2002). With declining accounting enrollments, decreased student interest, and the recent corporate/accounting scandals, it is not known how students’ perceptions of the accounting profession have been affected. This research is an attempt to determine how students now perceive the accounting profession.

RESEARCH METHODOLOGY

To aid in gathering information on how college business students perceive the recent accounting scandals, a student
survey was created with input from accounting professors, practitioners, and students (see Appendix A). The survey begins with a brief introduction to let the students know that during the past year, the corporate/accounting scandals in some of our nations most notable companies have left us with situations like the Arthur Andersen/Enron/WorldCom debacles. It also explains that the purpose of the survey is to solicit input from business students to determine how these situations have affected their career choices, as well as their perceptions of other related issues. This survey is divided into three sections of questions and begins with demographics about gender, age, classification, previous accounting education, and major. The second section asks students if and how the recent corporate/accounting scandal publicity affected their choice of major. The survey concludes by asking students to rank, on a Likert scale from 0 – 9, questions relating to their perceptions on awareness, accountability, impact, ethics, and regulations about the corporate/accounting scandals. This survey was distributed to eleven lower level accounting classes at Nicholls State University. Seven of the classes were financial accounting classes, while the other four were managerial accounting classes. A total of 296 surveys were collected and analyzed.

**SURVEY RESULTS**

The first section of general question analysis provided the breakdown of how many students in each category responded to the survey. The results are as follows: 137 (46.3%) males and 159 (53.7%) females responded to the survey. The largest age group surveyed was the 20 – 22 year old category with 145 (49%) followed by the 18 – 19 year old category with 65 (22%). The majority of students were either sophomores (119 (40.3%)), or juniors (104 (35.3%)). Students were then asked if they took an accounting class as part of their high school curriculum; 225 (76%) respondents answered they did not take an accounting class in high school. Table 1 below presents the results of the major category along with the percentage of student respondents.

<table>
<thead>
<tr>
<th>MAJOR</th>
<th>NUMBER OF STUDENT S</th>
<th>PERCENTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accounting</td>
<td>29</td>
<td>9.8</td>
</tr>
<tr>
<td>Business</td>
<td>89</td>
<td>30.1</td>
</tr>
<tr>
<td>Computer Information System</td>
<td>29</td>
<td>9.8</td>
</tr>
<tr>
<td>Finance</td>
<td>11</td>
<td>3.7</td>
</tr>
<tr>
<td>Management</td>
<td>32</td>
<td>10.8</td>
</tr>
<tr>
<td>Marketing</td>
<td>31</td>
<td>10.5</td>
</tr>
<tr>
<td>Other</td>
<td>75</td>
<td>25.3</td>
</tr>
</tbody>
</table>

In the next section, students responded to whether the publicity from the recent corporate/accounting scandals affected their choice of major; 289 (97.6%) responded that the publicity has not affected their choice of major. Of the seven (2.4%) students who responded that the publicity has affected their choice of major, two students changed their major to accounting, and five students changed their major from accounting to another major. Of the two students that changed to accounting, one was a marketing major, and the other was a general studies major. Of the five students that changed their major from accounting, two students changed to marketing, two students changed to business, and the other student changed to management.

The third section of the survey asks students to rate on a Likert scale from 0 – 9 five questions regarding awareness, accountability, impact, ethics, and regulation. Table 2 shows the overall means of the five questions.
First students are asked to rate their awareness of the corporate/accounting scandals with 0 as unaware and 9 as aware. The overall mean of responses is 4.82, which indicates that students are indifferent. They do not know one way or the other about the recent scandals. The next question asks the students who they perceive more accountable for the recent corporate/accounting scandals with 0 as the accounting firm and 9 as the company. The responses resulted in a mean of 4.93. This indicates that students hold both the company and the firms accountable for these scandals. However, this indicates that students hold the companies slightly more accountable than the accounting firm. Students then rate whether they view the recent corporate/accounting scandals as having a positive or negative impact on the accounting profession with 0 as negative and 9 as positive. The students do view these scandals as having a negative impact on the profession with a mean of 2.90. In light of the recent corporate/accounting scandals, students are asked if they perceive the accounting profession as more ethical or less ethical with 0 as less ethical and 9 as more ethical. The students perceive the accounting profession as less ethical with a mean of 3.83. The last question asks the students if they believe there should be more or less governmental regulation on the accounting profession in light of the recent scandals with 0 as less regulation and 9 as more regulation. The students believe there should be more governmental regulation on the accounting profession with a mean of 6.19.

In further analysis of the data collected, the different factors of gender, age, classification, high school accounting, and major were set up as independent variables to the questions ranked on the scale about awareness, accountability, impact, ethics, and regulations to see if there were noticeable differences. Under the category for gender, the main difference is that males are more aware of the corporate/accounting scandals than females. Under the age category, the students in the 30+ category are more aware of the scandals. Finance majors seem to be the group most aware of the corporate/accounting scandals, with non-business majors most unaware of the scandals. The remaining categories showed little variation between responses.

**CONCLUSION**

Professionals and educators are dealing with tremendous changes throughout the accounting profession and curriculum. The issues of gaining student interest and increasing enrollments toward the accounting profession remain at the forefront of concern for many in the profession. It is yet to be seen if enrollments in accounting education will continue to decrease or begin to increase in light of the recent corporate/accounting scandals. It is unknown if student interest will increase or decrease in the accounting profession and accounting as a career choice due to the recent corporate/accounting scandals. The recent corporate/accounting scandals are having an impact on the accounting profession; however, it is yet to be seen how the affects will change the accounting profession in the future. The portrayal of the accounting profession has been seen in many different ways and continues to change.
REFERENCES


GOVERNANCE PRACTICES – OMISSIONS AND EXTENSIONS

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Abstract

Governance is the term applied to the interactions between senior management, the board of directors and the stakeholders of corporations (or other types of organizations). The literature focuses on such topics as overall structures of governance, the code of conduct, the composition of personnel and the due diligence practices of board members in an attempt to minimize the fraudulent actions of the governors and to improve the level of trust in corporations.

Two areas of importance to accountants that have been neglected for the most part by the literature have been the information available to directors and the performance assessment of directors.

Technological developments in information systems and management control systems provide the potential to improve corporate governance. The focus of this paper is to describe how the developments of Enterprise Resource Planning systems and the addition of Strategic Enterprise Management systems can alleviate governance difficulties and the reasons why they should be added to the governance discussions. ERP/SEM systems can provide relevant and accessible information needed for governance. In addition, they include appropriate mechanisms for measuring the performance of directors using best practice tools such as balanced scorecards modified to suit director performance.

¹ Acknowledgement:
Some of the background for this study and much of its research resulted from the visit of Chunmei Zheng, Department of Accounting, Wuhan University to Saint Mary’s University. Reviews by Xiaofei Song and Karen Lightstone of Saint Mary’s University strengthened the clarity of the paper.
AN EMPIRICAL STUDY OF THE USE OF PAYBACK METHOD: OPPORTUNISTIC BEHAVIOR OR EFFICIENT CHOICE

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ABSTRACT

While economic theory prescribes the use of discounted cash flows (DCF) methods for capital budgeting, which is unanimously subscribed by all textbooks in corporate finance and managerial accounting, surveys over last three decades have consistently shown the persistence of payback method in practice. Ease in computation and understanding was a frequently cited reason for the popularity of payback in early surveys; however, this conjecture seems losing ground in more recent studies given the advance of computing technology and increased acceptance of DCF methods among financial managers. Apparently, traditional capital budgeting theory is at odds with practice, but few empirical studies have examined this conflict. Generally speaking, the accounting literature contains two competing explanations for the choice of alternative accounting methods. An opportunistic view focuses on incentives that motivate management to select accounting methods to maximize their individual wealth instead of firm value. Agency theory often provides justification for this view. In contrast, an efficient choice explanation posits that management consists of rational individuals who are motivated to select the most appropriate accounting methods to fit the firm’s operating environment. That is what contingency theory predicts. This study develops and tests hypotheses based on these two competing views to explain the use of payback in capital budgeting. Using survey and archival data, this study shows that the opportunistic view, not the efficient choice explanation, has empirical validity in the case of payback. The results of this study have implications for both theory and practice.
THE IMPACTS OF POLITICAL EVENTS ON FOREIGN INSTITUTIONAL INVESTORS AND STOCK RETURNS: EMERGING MARKET EVIDENCE FROM TAIWAN

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ABSTRACT
This objective of this paper is to investigate the possible valuation impact of political events on foreign capital and stock performance. Our event-study results show that surrounding the occurrences of some specific political incidents (especially cross-strait political events), Taiwan’s stock market reacts with an abnormal price performance that is statistically significant. The statistical difference in the values of abnormal returns between low- and high-foreign-holding-firm portfolios also indicates that the infusion of foreign capital brings stabilizing influence onto Taiwan’s stock market. We also provide some evidence supporting the hypothesis that price reactions to political events differ between the firms with high- and low-foreign-holding proportions.

INTRODUCTION
The purpose of this paper is to test whether political events affect the trading behaviors of Qualified Foreign Institution Investors (hereafter, QFII) and stock markets in Taiwan. After a series of internationalization and institutionalization policies by Taiwan’s government since 1983, QFIIs have played a more important role on affecting Taiwan’s equity markets. Their influence will become even stronger after Taiwan was successfully granted the membership at the World Trade Organization (WTO) on January 1, 2002. However, due to Taiwan’s special political and economic environment, its stock market is widely believed to exposed to substantial political risk. We aims to examine: (1) whether the market is efficient in reacting to political events; and (2) when the events occur, whether Foreign Institutional Investors trade differently from the individual investors.
LITERATURE REVIEW
Political Risk and Stock Returns

So far most studies mainly focus on effect of economic events on stock prices, whereas merely a few works have examined the impact of political events on the stock markets. Peel and Pope (1983), Manning (1989), and Gemmill (1992) focus on the stock price behaviors during election and they find that there may be some inefficiency in share prices around the time of elections and lead to a profitable trading rule. They believe that changes in government administration caused by election tend to affect financial policies or legislation, thereby affecting stock prices. Cutler, Poterba, and Summers (1989) did study the impact of political events on stock price but find no evidence of significant impact of non-economic events on stock market in the U.S.

In emerging markets, both Chan and Wei (1996) and Kim and Mei (2001) document that political news increases stock volatility in Hong Kong. Bilson, Brailsford, and Hooper (2002) reveal that political risk is far more prevalent in emerging markets, especially those in the Pacific Basin, than in the developed markets. Ma, Sun, and Tang (2003) use the Tiananmen Square Incident to examine the effect of unexpected political event on the share prices of U.S. firms with joint ventures in China. Their results shows that the incident had a significant impact on U.S. firms with joint ventures in China and the U.S. markets react efficiently to the high- and low-degree of risk exposure of the joint ventures located in different locations in China.

With respect to the natural catastrophe on stock markets, Lamb (1998) find that Hurricane Hugo and Andrew produce substantially negative impact on property and casualty (P&C) firms and the stock market demonstrate an ability to discriminate by magnitude of hurricane and by P&C firms based on their degree of loss exposure. Shelor, Anderson, and Cross (1992) and Aluppa, Carney, and Krueger (1993) examine the market response of P&Cs around October 17, 1989 California earthquake. Interestingly, their results exhibit a significant positive reaction, implying that investors anticipate the possible positive effects of increasing demand for insurance policies may have outweighed the negative potential losses from the earthquake.

QFIs and Opening of Equity Market

As for how the foreign institutional investors affect the equity market in the developing countries, the results are more mixed and controversial. The equity markets in the developing countries are characterized by a large portion of individual investors who tend to be affected by the “news” within stock price movements, leading to a volatile, unstable stock market. In contrast, QFIs’ investment schemes tend to rely more on “fundamental” value of stocks and should function as a stabilization factor. Bekaert and Harvey (1997) and Choe, Kho, and Stulz (1999) find that opening a stock market to QFIs does not drive up emerging market volatility, and Kwan and Reyes (1997) also observe that liberalization measures have successfully decrease volatility in Taiwan's stock market.

On the other hand, QFIs have also been blamed for lack of long-term commitment, making emerging markets more vulnerable and volatile to international capital flight and speculation. Also, QFIs dissenters claim that economic or political uncertainty overseas could easily affect home economy after opening up of equity market to QFIs. Dornbush and Park (1995) argue that QFIs make the stock market overreact to changes in fundamental value of stocks. Several studies including Tesar and Werner (1995), Brennan and Cao (1997), and Froot, O’Connel, and Seasholes (2001) show that QFIs pursue both positive feedback and herding strategies, indicating that they find no evidence of stabilization impact on stock prices. Wang and Shen (1999) report that foreign investment increases the volatility of currency exchange rate in Taiwan but its effects on stock return are mild. Whether the introduction of QFII will
stabilize or destabilize the emerging markets, particularly Taiwan’s stock market, demands for further debates.

QFIIS REGULATIONS AND MAJOR POLITICAL EVENTS DURING 1996-2001

The Development of QFIIs in Taiwan

Taiwan’s stock market is currently the third largest in Asia and among the most volatile. In the early 1990s, small individual investors controlled almost 95% of all stocks. By accelerating efforts in attracting institutional investors, the percentage of institutional holdings has increased to nearly 20% in 2001.

Based on the “Plan of the three stages of Foreign Investment” proposed by the Ministry of Finance, foreign brokerage firms were licensed to operate locally in June 1989 (Stage I). Stage II started in December, 1990, permitted direct investment by QFIIs. Stage III became effective since March 1996, allowing not only QFII but also all foreign individuals to directly purchase Taiwan securities. Moreover, the percentage limitation on foreign ownership (the 50% upper bound) of most Taiwanese securities was also eliminated since December 30, 2000. However, despite these efforts, the overall influence from QFIIs’ trading at Taiwan Stock Exchange (TSE) is still relatively small and their trading value is only about 5.5% of the whole market trading value during our sample period.

Some Major Political Events in Taiwan During 1996-2002

Table 1 lists 9 of the most notable political events occurred during 1996-2001 in which their effects on Taiwan’s equity market and how QFIIs react to them will be examined in this study.

The tension between Taiwan and Mainland China has long been viewed as the most influential political factor affecting Taiwan’s stock prices. Therefore, our first event was the presidential election on Saturday, March 23, 1996 in which Mr. Tung-Hui Lee successfully won the election at a wide margin as expected. Earlier, on February 6, 1996, however, mainland China in an attempt to influence the election outcome announced that there would be a series of military maneuvers near Taiwan Strait. The news shocked the equity market instantly and has induced a public panic selling. Another major source of political uncertainty came in July 9, 1999, when President Lee proposed a “Special State-to-State Relationship” with mainland China during an international press interview. Mainland China responded with announced plans for additional military exercises near Taiwan.

On March 18, 2000, Taiwan again held presidential election, which Shui-Bian Chen, the nominee from the pro-independence Democratic Progressive Party (DPP), finally won. The result came as a surprise to all because this was the first in Taiwan's history that an opposition party leader has even won the presidency. Other sensitive election-related political events include the Legislative election on December 1, 2001 that made the DPP the majority party in the congress. However, the political atmosphere between the two sides of Taiwan Strait is not always so tense. Taiwan's government, on March 29, 2002, announced the "Policy Guidelines for Investment in Wafer Plants on the Mainland," and "the Implementation Plan with Supporting Measures for Investment in Wafer Plants on the Mainland." The decisions liberalize Taiwan’s investment in 8-inch wafer plants and those of smaller size on the mainland China.

Besides the above-mentioned cross-strait politics, some other events are also examined in this study. On September 30, 2000, the Minister of Economic Affairs submitted their proposal to the congress to halt the construction of Nuclear Power Plant No 4, raising controversial debates within the whole Taiwan Island and causing the TSE market index to plummet on the same day. In the morning of September 21, 1999, a devastating earthquake stroke Taiwan, and the stock market was forced to close until September 27. The September 11, 2001 terrorist attack in the U.S. also caused panic in Taiwan and the TSE to be closed on the following day.
DATA AND METHODOLOGY

We first calculate the average of the percentage of share outstanding hold by QFIIs during the period between April 1, 1998 and March 30, 2000 for all firms listed on the Taiwan Stock Exchange (TSE) sorted by industry classification. We retrieve data from the Taiwan Economic Journal database (TEJ), a local dataset bank, in which the monthly ownership data for individual stocks hold by QFIIs, the daily return series and market capitalization for each stock, and the daily market returns are available. A total of 100 TSE-listed firms, of which 50 for the highest and 50 for the lowest QFII ownerships, are employed for examining whether there exist any differences in the QFII holding and stock price reactions between these two sub-samples. Figure 1 depicts the Taiwan Weighted Stock Index from January 1996 through June 2002.

To minimize statistical problems associated with non-synchronous trading, calendar clustering or industry clustering problems, we employ a Multivariate Regression Model (MVRM) in the estimation process concerning the possible impact of political events on stock returns in the second part of analysis. Such a model applies the Seemingly Unrelated Regression (SUR) estimation procedure that estimates coefficients of variables of a system of equations, and it is widely used in previous studies (Cornett and Tehranian, 1990; Wagster, 1996; and Ghosh et. al., 1998) for the reaction of stock prices to public event announcements.

Parameters for the abnormal returns are generated from the following multivariate regression and are run separately for high- and low-QFII holding stock portfolios:

$$ R_{jt} = \alpha_j + \beta_{j1} RM_{t-1} + \beta_{j2} RM_t + \beta_{j3} RM_{t+1} + \sum_{k=1}^{9} \gamma_{jk} D_{kt} + \epsilon_{jt} $$

[1]

where $ R_{jt} $ is the portfolio return $ j $ (high- or low-QFII holding stock portfolios) on day $ t $, $ RM_t $ is the return on the TSE Weighted Stock Index on day $ t $, $ D_{kt} $ is the binary variable that captures the impact of an event $ k \ (k = 9) $ on portfolio return and equals 1 if day $ t $ is during the window period and zero otherwise, and $ \epsilon_{jt} $ is a random error. Each estimation period begins 10 trading days before the first event day (February 6, 1996) and ends 10 days after our last event day (March 29, 2002). The event period is selected as the two trading days, $ t = 0 $ and $ t = -1 $.

By estimating Equation [1], the following null hypotheses are tested:

Hypothesis 1: $ \gamma_{jk} = 0 \ \forall j, k $; all abnormal returns for each portfolio equal zero.

Hypothesis 2: $ \gamma_{jk} = 0 \ \forall j $; the abnormal return for each high- or low-QFII holding stock portfolio equals zero for the $ k $th event.

Hypothesis 3: $ \sum_{k=1}^{9} \gamma_{ik} = \sum_{k=1}^{9} \gamma_{jk} \ \forall j, i \ (i \neq j) $; the nine events have the same aggregate influence on either high- or low-QFII holding stock portfolios.

EMPIRICAL RESULTS

We test Hypothesis 1 to investigate whether the nine selected political events, put together, might affect the price performance of two sub-portfolios at all. The test outcome rejects the null hypothesis 1 at the 5% level with the F-statistic of 2.03, which is greater than the critical value $ F_{18, 3318, 5\%} = 1.57 $. It indicates that the nine sample events aggregate yield a statistically significant valuation impact on both
sub-portfolios, materially affecting their price movements. Therefore, the incidences of selected political/natural events generally do convey new information to the stock market, and consequently cause abnormal returns on portfolios with both low- and high-foreign-holding proportion of firm equities.

The MVRM results for Hypothesis 2, whether each specific event might significantly affect the performance of low- and high-QFII holding firms, are presented in Table 2. For the high-foreign-holding-firm portfolio, only the 5th event (Pro-independence Shui-Bian Chen won the presidency) is associated with abnormal return that is significant at the 10% level (AR = 1.274%, \( t = 1.950 \)), while no observations of significant AR can be found for the other eight event dates examined. For the firms with smaller foreign ownerships, only the 9th event (permission of transferring 8-inch wafer plant facilities to Mainland China) is associated with significant abnormal return (at the 1% level, AR = 1.945%, \( t = 3.59 \)).

Such findings suggest that political events might cause abnormal price performance on Taiwanese firm equities, yet most of these abnormal returns are merely insignificantly different from zero, regardless of the proportion of foreign holding in Taiwan’s firms. Two possible explanations for this phenomenon are: 1) Political events tend to influence Taiwan’s stock market as a whole rather than impact some specific groups of firm stocks, as Taiwan’s market economy is relatively fragile and sensitive to political turmoil; and 2) the overall proportion of foreign capital in Taiwan’s equity market remains so far as low as 10% approximately, with local individual investors’ ownership exceeding 75%. As a result, the actual gap between “high” and “low” foreign equity holdings alone might be too insignificant to yield any material performance differentials for our sample firms.

We further apply the MVRM model to test Hypothesis 3, whether the joint valuation effects of all nine events might differ between the high- and low-foreign-holding portfolios. The F-statistic equals 4.72, which is greater than the critical value \( F_{c[1,3318,5\%]} = 3.87 \); hence the null hypothesis

\[
H_0: \sum_{k=1}^{9} \gamma_{ik} = \sum_{k=1}^{9} \gamma_{jk}, \ \forall i, j (i \neq j)
\]

is rejected, suggesting that to the occurrences of political events, those low-foreign-holding firms react differently from their counterparts with relatively higher foreign holding proportions. Such evidence supports our hypothesis that in reaction to various political events, Taiwan’s foreign institutional investors and local individual investors might apply different trading strategies to their stock holdings.

We also use traditional event study methodology (Brown and Warner, 1985) to estimate the abnormal returns surrounding the occurrence of the nine selected events. The findings are basically in line with the MVRM-SUR estimates, though the significant abnormal price performance is more frequently found by using the “traditional” way.

**CONCLUSIONS**

This empirical study, focusing on the Taiwan’s stock market, attempts to investigate the possible valuation impact of political events on foreign capital and stock performance. We apply both the traditional event-study approach and the multivariate regression analysis to examine the price movement patterns of two portfolios of Taiwanese common stocks (50 high-foreign-holding firms vs. 50 low-foreign-holding firms) surrounding the dates of announcements or occurrences of nine major political incidents. Our objectives are to test for Taiwan’s stock market efficiency under political environment fluctuations, and also test for the parity in trading behaviors between foreign and local stockholders.

Our event-study results show that surrounding the occurrences of political incidents, especially those events closely related to elections, economic development, and cross-strait relationship, Taiwan’s stock market generally reacts with an abnormal price performance that is statistically significant. This evidence suggests that Taiwan’s stock market still be inefficient, at least in the semi-strong form. In addition, the statistical difference in the values of abnormal returns between low- and high-foreign-holding-firm
portfolios also indicates that the infusion of foreign capital brings stabilizing influence onto Taiwan’s stock market, as those larger-foreign-capital-stake firms on average experience a lesser valuation impact in association with the political events examined, possibly due to that foreign institutional investors, who have asymmetry in information gathering and market analysis, trade their stock holdings more rationally and professionally in comparison with local individual stockholders, who are usually worse informed and less experienced. Finally, the MVRM outcomes also provide some evidence supporting the hypothesis that price reactions to political events differ between the firms with high- and low-foreign-holding proportions.

FIGURE 1
The Taiwan Weighted Stock Index During January, 1996 and June, 2002

<table>
<thead>
<tr>
<th>Event</th>
<th>Occurrence Day</th>
<th>Event Day 0</th>
<th>Event Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>February 6, 1996</td>
<td>February 6, 1996</td>
<td>Mainland China announced its military exercise near the Taiwan Strait</td>
</tr>
<tr>
<td>2</td>
<td>March 23, 1996</td>
<td>March 25, 1996</td>
<td>Mr. Tung-Hui Lee was elected President</td>
</tr>
<tr>
<td>3</td>
<td>July 9, 1999</td>
<td>July 9, 1999</td>
<td>President Tung-Hui Lee proposed a “Special State-to-State Relationship” with Mainland China</td>
</tr>
<tr>
<td>4</td>
<td>September 21, 1999</td>
<td>September 27, 1999</td>
<td>A powerful earthquake hit Taiwan</td>
</tr>
<tr>
<td>5</td>
<td>March 18, 2000</td>
<td>March 20, 2000</td>
<td>Mr. Shui-Bian Chen was elected President</td>
</tr>
<tr>
<td>6</td>
<td>September 30, 2000</td>
<td>September 30, 2000</td>
<td>The plan to build the Nuclear Power Plant No.4 was halted</td>
</tr>
<tr>
<td>7</td>
<td>September 11, 2001</td>
<td>September 13, 2001</td>
<td>The terrorist attack on the U.S.A.</td>
</tr>
<tr>
<td>8</td>
<td>December 1, 2001</td>
<td>December 3, 2001</td>
<td>The Legislative election was held</td>
</tr>
<tr>
<td>9</td>
<td>March 29, 2002</td>
<td>March 29, 2002</td>
<td>Taiwan’s government allowed chip makers in Taiwan to invest in building 8-inch wafer plants in China</td>
</tr>
</tbody>
</table>

TABLE 2
Tests of Hypotheses that the Abnormal Returns for the two Sub-portfolios Equal Zero on Each Event Date
Notes: Coefficients are SUR estimates. In parentheses are t-statistics.
* Significant at 10% level. ** Significant at 5% level. *** Significant at 1% level.

## REFERENCES


<table>
<thead>
<tr>
<th>Event</th>
<th>Panel A. Degree of QFII-Holding</th>
<th>Panel B. F-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Missile Crisis (February 6, 1996)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High QFII</td>
<td>0.032</td>
<td>0.62</td>
</tr>
<tr>
<td>Low QFII</td>
<td>0.380</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.06)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.70)</td>
<td></td>
</tr>
<tr>
<td>2. Presidential Election (March 23, 1996)</td>
<td></td>
<td>0.54</td>
</tr>
<tr>
<td>High QFII</td>
<td>0.335</td>
<td></td>
</tr>
<tr>
<td>Low QFII</td>
<td>0.566</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.86)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1.04)</td>
<td></td>
</tr>
<tr>
<td>3. Special State-to-State Relationship Announcement (July 9, 1999)</td>
<td>-0.418</td>
<td>1.66</td>
</tr>
<tr>
<td>High QFII</td>
<td>(-1.06)</td>
<td></td>
</tr>
<tr>
<td>Low QFII</td>
<td>-0.017</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(-0.03)</td>
<td></td>
</tr>
<tr>
<td>4. Strong Earthquake in central Taiwan (September 21, 1999)</td>
<td>0.545</td>
<td>2.32*</td>
</tr>
<tr>
<td>High QFII</td>
<td>(1.39)</td>
<td></td>
</tr>
<tr>
<td>Low QFII</td>
<td>0.106</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.20)</td>
<td></td>
</tr>
<tr>
<td>5. Presidential Election (March 18, 2000)</td>
<td>1.274</td>
<td>1.93</td>
</tr>
<tr>
<td>High QFII</td>
<td>(1.95)*</td>
<td></td>
</tr>
<tr>
<td>Low QFII</td>
<td>1.319</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1.45)</td>
<td></td>
</tr>
<tr>
<td>6. The Halt to build Nuclear Power Plant No.4 (September 30, 2000)</td>
<td>0.516</td>
<td>0.96</td>
</tr>
<tr>
<td>High QFII</td>
<td>(1.32)</td>
<td></td>
</tr>
<tr>
<td>Low QFII</td>
<td>0.724</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1.33)</td>
<td></td>
</tr>
<tr>
<td>7. Terrorism attack on the U.S.A. (September 11, 2001)</td>
<td>0.281</td>
<td>0.42</td>
</tr>
<tr>
<td>High QFII</td>
<td>(0.71)</td>
<td></td>
</tr>
<tr>
<td>Low QFII</td>
<td>0.138</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.25)</td>
<td></td>
</tr>
<tr>
<td>8. Legislative election (December 1, 2001)</td>
<td>-0.326</td>
<td>0.38</td>
</tr>
<tr>
<td>High QFII</td>
<td>(-0.82)</td>
<td></td>
</tr>
<tr>
<td>Low QFII</td>
<td>-0.277</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(-0.50)</td>
<td></td>
</tr>
<tr>
<td>9. Allowing micro-chip manufacturers in Taiwan to build 8-inch wafer plants in Mainland China (March 29, 2002)</td>
<td>0.476</td>
<td>11.05***</td>
</tr>
<tr>
<td>High QFII</td>
<td>(1.22)</td>
<td></td>
</tr>
<tr>
<td>Low QFII</td>
<td>1.945</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(3.59)**</td>
<td></td>
</tr>
</tbody>
</table>

95-111.


In the past few years, SEC investigations have uncovered “earnings management” practices among many major corporations. In most instances, the original purpose of these practices was simply to “smooth” reported earnings. However, in all too many instances these practices later evolved into abusive – even fraudulent – schemes designed to mislead investors. Statement users are naturally interested in finding methods of detecting such schemes. Recent literature (e.g., Magrath and Weld, 2002) has suggested that a lack of correlation between operating income and operating cash flow may be an early warning sign that indicate abusive earnings management schemes may be present. As a preliminary test of that hypothesis the authors examined two companies, one of which is known to have engaged in abusive financial reporting practices and one is which is not. The results do not seem to support the hypothesis that the correlation between income and operating cash flow is useful as an indicator of the presence of an abusive earnings management scheme.

Financial statement users are understandably concerned about these practices, and they want reliable methods of determining when companies are engaging in them. Recent literature (e.g., Magrath and Weld, 2002) has suggested various early warning signs that indicate abusive earnings management schemes may be present. These include:

- Cash flows that are not correlated with earnings.
- Receivables that are not correlated with revenues.
- Allowances for doubtful accounts that are not correlated with receivables.
- Reserves that are not correlated with balance sheet items.
- Questionable acquisition reserves.
- Earnings that consistently and precisely meet analysts’ expectations.

Magrath and Weld further note that “one of the most obvious warning signs that companies are engaging in improper revenue recognition is the lack of correlation between cash flow from operations and earnings.” The purpose of this paper is to examine tools that the analyst can use to detect abusive earnings management schemes – specifically, tools the analyst can use to examine the correlation between revenue and operating cash flow – and then to test the ability of those tools to detect the presence of those schemes.

Design

Unfortunately, many of the tools that analysts regularly use to measure operating cash flows are
ill-equipped for this purpose. For example, one of the most commonly-used indicators of operating cash flow is EBITDA, “Earnings before Interest, Taxes, Depreciation and Amortization.” EBITDA supposedly measures Operating Cash Flow before interest and taxes. Its use is apparently so widespread, and its importance to financial statements users is apparently so great, that EBITDA is one of the “summary measures” specifically cited by the FASB in its background paper [Bossio, 2001] for a proposed agenda item on “Reporting Information About the Financial Performance of Business Enterprises.”

Yet, EBITDA’s flaws are manifold: In computing EBITDA, the analyst begins by computing “Net Income plus Depreciation” (NIPD, also know as “analysts’ cash flow”). Twenty years ago, Gombola and Ketz [1983] examined the relationships among NIPD, operating income, and operating cash flow. They reported that NIPD correlates very highly with (that is, “measures”) operating income, while it is much less well correlated with operating cash flow. In other words, NIPD is does a better job of measuring operating income than operating cash flow. Or, to use the language of the Statement of Financial Accounting Concepts No. 2, one could conclude from these findings that NIPD lacks “representational faithfulness” as an indicator of operating cash flow.

Having computed this flawed measure of operating cash flow, the analyst then completes the computation of EBITDA by adding interest expense (rather than cash paid for interest) and income tax expense (rather than cash paid for income taxes). One could, therefore, reasonably predict that EBITDA measures Operating Cash Flow before Interest and Taxes at least as badly as NIPD measures Operating Cash Flow.

EBITDA’s inherent correlation with operating income is especially problematic when the analyst wishes to examine the relationship between revenue and operating cash flow (a warning flag for abusive earnings management practices.) EBITDA will always tend to correlate relatively well with revenue – irrespective of whether or not operating cash flow actually correlates with revenue – and therefore give the analyst a false sense of security regarding the way in which those revenue is being measured.

A better framework for analyzing the relationship between revenue and operating cash flow is the operating section of the Statement of Cash Flows, prepared according to GAAP. GAAP requires that all changes in all working capital accounts – as well as all noncash charges and credits to income – be taken into account in determining net cash provided/used by operating activities. Therefore, the operating section of that statement provides a correct measure of operating cash flow. Furthermore, the statement must disclose cash paid for interest and cash paid for income taxes, so an analyst who is concerned with operating cash flow before interest and taxes is able to determine it correctly.

But even properly-prepared cash flow statements are not necessarily as useful as they might be for analyzing the relationship of revenue to operating cash flow. Accounting Trends and Techniques – 2001 reported that 99% of the 593 companies it surveyed reported net cash from operating activities using the indirect approach, illustrated in Table 1.

<table>
<thead>
<tr>
<th>Operating Activities</th>
<th>Net Income</th>
<th>$xx</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adjustments</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Change in Accounts Receivable, net</td>
<td>$xx xx</td>
<td></td>
</tr>
<tr>
<td>Change in inventory</td>
<td>xx</td>
<td></td>
</tr>
<tr>
<td>Change in accounts payable</td>
<td>xx</td>
<td></td>
</tr>
<tr>
<td>Etc.</td>
<td>xx xx</td>
<td></td>
</tr>
<tr>
<td>Net cash from operating activities</td>
<td>$xx</td>
<td></td>
</tr>
</tbody>
</table>

The indirect form of the statement reports net cash provided/used by operating activities, but it does not report gross cash collections or gross cash payments. Using this information, the analyst can easily test the relationship between revenue and net cash operating flow (cash receipts minus cash payments). But the more important relationship between revenue and gross cash receipts is still not easy to examine.

Clearly, the better tool for examining the warning signals of abusive earnings management would be a cash flow statement prepared under the direct approach, shown in Table 2. Unlike the indirect approach, the direct approach reports gross receipts and payments separately, allowing a more careful examination of the relationships between revenues and cash receipts and between ex-
expenses and cash payments. In order to examine this relationship properly, however, one must be very careful about how one computes cash collected from sales and cash paid for operating expenses.

<table>
<thead>
<tr>
<th>TABLE 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Operating Activities</strong></td>
</tr>
<tr>
<td><strong>Cash Received</strong></td>
</tr>
<tr>
<td>Sales</td>
</tr>
<tr>
<td>Etc.</td>
</tr>
<tr>
<td>Total cash received</td>
</tr>
<tr>
<td><strong>Cash paid</strong></td>
</tr>
<tr>
<td>Purchases of merchandise</td>
</tr>
<tr>
<td>Operating expenses</td>
</tr>
<tr>
<td>Etc.</td>
</tr>
<tr>
<td>Total cash paid</td>
</tr>
<tr>
<td>Net cash from operating activities</td>
</tr>
</tbody>
</table>

The conventional methods of computing cash collected from sales (and cash paid for operating expenses) are presented in equations [1] and [2], respectively. The problem with this approach is that “Change in Accounts Receivable (net)” is actually the result of three different changes: Accounts receivable collected, Accounts receivable written off, and Bad debt expense. Both collections and write-offs of accounts receivable represent differences between revenue and cash collected, so they belong in the computation of cash collected from sales. Bad debt expense, on the other hand, is a noncash operating expense, and as such it should be reported as an adjustment to Cash Paid for Operating Expenses, not as an adjustment to Cash Collected from Sales.

\[
\text{Cash collected from sales} = \text{Sales revenue} - \text{Change in Accounts Receivable (net)} + \text{Change in Unearned Revenues} - \text{Bad debt expense} \quad [3]
\]

\[
\text{Cash paid for operating expenses} = \text{Operating expenses} + \text{Change in Prepaid Expenses} - \text{Change in Accrued Expenses} - \text{Noncash Expenses (including Bad debt expense)} \quad [4]
\]

A comparison of the two sets of computations yields some immediate conclusions. First, while the conventional approach (equations [1] and [2]) reaches the correct value for net operating cash flow, it systematically overstates both cash receipts and cash payments. The amount of the misstatement is, of course, bad debt expense. Second, misclassifying the effects of bad debts expense biases the apparent correlations between revenues and cash receipts and between expenses and cash payments: Inclusion of a Noncash expense in the computation of cash receipts will reduce the apparent correlation between revenues and cash receipts. Failure to remove a noncash expense from the computation of cash payments will increase the apparent correlation between expenses and cash payments.

**Results**

As a preliminary test of the usefulness of the cash flow statement in detecting earnings management schemes, the authors examined two companies: HealthSouth, a company where it appears that there has been abusive earnings management, and Apple, a company in which no evidence of abusive earnings management has been reported. Data was collected regarding the revenues and operating expenses of each company, and then operating cash receipts and cash payments (direct approach) were also computed. That data is presented in Table 3. Finally, correlations between revenues and cash receipts and correlations between expenses and cash payments were computed for each of the companies. Those results are presented in Table 4.
expenses and cash payments for the two companies are amazingly high. In fact, there is virtually a perfect – one-to-one – correlation in each case. Second, there is no apparent difference between the companies. Of course, this was a very preliminary test and the sample size (2 companies; eight years for one company and nine for the other) was quite small. But this preliminary test does not provide any evidence to support the assertion that lack of correlation between earnings and operating cash flows is useful as a warning flag to indicate the presence of abusive earnings management practices.

### TABLE 4

<table>
<thead>
<tr>
<th>Correlation</th>
<th>HealthSouth</th>
<th>Apple</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revenues and Cash Receipts</td>
<td>0.991</td>
<td>0.988</td>
</tr>
<tr>
<td>Expenses and Cash Payments</td>
<td>0.996</td>
<td>0.933</td>
</tr>
</tbody>
</table>

### REFERENCES


ABSTRACT

In January 2003, the Financial Accounting Standards Board (FASB) issued FASB Interpretation No. 46, *Consolidation of Variable Interest Entities, an Interpretation of Accounting Research Bulletin ARB No. 51*. This Interpretation came about as a result of many years of debates over the issue of consolidation and was spurred by many of the recent accounting scandals, the most famous being Enron. Under the Interpretation, many investors or other interest holders would have to consolidate entities previously held off the balance sheet.

FIN 46, which was amended by FIN 46R (with the same title), in December 2003, sets forth a new consolidation model, based on “variable interests” – a new term defined by the Interpretation as “contractual, ownership, or other pecuniary interests in an entity that change with changes in the entity’s net asset value.” In certain cases, an enterprise may have to consolidate an entity in which it holds variable interests (a “variable interest entity” or VIE). The enterprise would use an analysis of qualitative considerations and expected losses and expected residual returns to determine whether or not it is the “primary beneficiary” of the VIE. A primary beneficiary in a VIE must consolidate the VIE.

FIN 46R will have a major impact on an enterprise’s financial statements and financial ratios. In addition to financial statement effects, FINR will impact the economics of various transactions, as well as debt/loan covenants, regulatory capital, and credit ratings. Understanding of the application of this Interpretation is still evolving, however, and, as a result, the true impact of FIN 46R will often be difficult to determine. Compounding this problem is the inconsistent application of the Interpretation by various companies and various interpretations by auditors.
INTRODUCTION

In January 2003, the Financial Accounting Standards Board (FASB) issued FASB Interpretation No. 46, Consolidation of Certain Variable-Interest Entities, an Interpretation of Accounting Research Bulletin No. 51 (FIN 46), which establishes guidance for the consolidation of variable-interest entities (VIEs). FIN 46 significantly changes the method of analysis required for determining whether entities included in its scope will be consolidated by their investors or other interest holders. FIN 46 introduced the “variable interest” consolidation model, which must be applied to variable interest entities. The Exposure Draft that preceded this Interpretation referred to the entities subject to its requirements as special-purpose entities (SPEs). Because some entities that have been commonly referred to as SPEs may not be subject to this Interpretation and other entities that have not commonly been referred to as SPEs may be subject to FIN 46, the Board decided to use the term variable interest entity. VIE is a new term in accounting literature that is defined in FIN 46. Since FIN 46 was first issued, companies and their auditors have been struggling to implement its complex and vague rules which involve significant amounts of management and auditor judgment. Therefore, the FASB has issued several FASB Staff Positions and an amendment to modify and clarify several of the Interpretation’s requirements, provide additional scope exceptions and defer its effective date. The final amended version on FIN 46, issued at the end of December 2003, is called Consolidation of Variable Interest Entities (Revised December 2003), also referred to as FIN 46R. However, the accounting guidance in FIN 46R remains complex with many implementation issues that will have to be resolved over time. Because of its complex requirements, which sometimes will involve significant judgments and estimates that are based on assumptions, considerable amounts of management and auditor judgment and time are required in applying the guidance set forth in FIN 46R.

WHAT ARE VIES AND WHY ARE THEY USED?

VIEs are often created solely to carry out specific activities or a series of transactions directly related to specific purposes. A VIE may take any legal form that can be used to conduct business activities or hold assets, including a corporation, a partnership, a limited liability company, a trust, etc. VIEs may be used to set up favorable operating lease arrangements (i.e., a synthetic lease) and other types of off-balance sheet arrangements. They may also used to obtain debt financing at lower costs through securitizations and asset-backed obligation conduits, shelter certain assets from bankruptcy, hedge risks, achieve tax benefits or efficiencies, remove assets and related liabilities from the balance sheet, reinsurance, and many other purposes.

WHY FIN 46 WAS ORIGINALLY ISSUED

Prior to the issuance of the FIN 46, the accounting guidance related to the consolidation of VIEs was fragmented and limited in both scope and application. Accounting Research Bulletin 51, Consolidated Financial Statements (ARB 51), was the model used to determine which party should consolidate another non-special purpose entity and is generally based on ownership of a majority of the entity’s outstanding voting stock. For a special-purpose entity, the consolidation model under FASB Emerging Issues Task Force Issue Nos. 90-15, Impact of Nonsubstantive Lessors, Residual Value Guarantees, and Other Provisions in Leasing Transactions and EITF Topic D-14, Transactions involving Special-Purpose Entities, was generally based on whether an independent third party made a substantive equity investment equal to at least three percent of the fair market value of the assets in the special-purpose entity. However, in EITF Topic D-14, an SEC observer noted that “…the SEC staff believes that nonconsolidation is not appropriate by the sponsor or transferor when the majority owner of the SPE makes only a nominal capital investment, the activities of the SPE are virtually all on the sponsor’s or
transferor’s behalf, and the substantive risks and rewards of the assets or the debt of the SPE rest directly or indirectly with the sponsor or transferor”. The original FIN 46, amended as FIN 46R, now requires the enterprise that bears the majority of the risks and/or rewards of a VIE to consolidate it.

FIN 46’S NEW REQUIREMENTS, AS AMENDED BY FIN 46R

FIN 46R maintains the “variable interest” consolidation model introduced by FIN 46, which must be applied to all variable interest entities within its scope. The model, which is explained and illustrated below, relies on an analysis of qualitative characteristics and the potential variability in expected losses and residual returns of an entity to determine the party that consolidates a VIE.

Step 1: Does the Enterprise Hold A Variable Interest?

- Variable interests are contractual, ownership, or other pecuniary financial interests in an entity that change with changes in the value of the entity’s net assets. Variable interests absorb an entity’s losses and receive its returns. Variable interests can arise by contract (e.g., debt guarantee), as a loan, as ownership interest, or other arrangements such as leasing, asset-back debt obligations, etc. Thus, they expose their holders to risks and rewards of the VIE. Variable interests can include: equity or debt investments; derivative contracts with counterparties; guarantees; lease arrangements, management agreements; service contracts and other interests whose values change with changes in the value of the VIE’s net assets. Appendix B of the original FIN 46 described examples of different types of variable interests in VIEs. Note that these examples have been deleted from the amendment, revised, and reissued as Appendix B in FIN 46R.

Equity investments in a VIE are variable interests to the extent they are at risk. Equity investments at risk are described in paragraph 5a of FIN 46R as interests that are required to be reported as equity in an entity’s financial statements. Investments in subordinated beneficial interests (i.e., rights to receive all or portions of specified cash inflows to a trust or other entity, whether in the form of debt or equity) or subordinated debt instruments issued by a variable interest entity also are variable interests. The holder of the most subordinated interest in an entity will absorb all or part of the expected losses of the entity and the expected return on that risky investment usually is a high interest rate or some form of significant participation in residual returns.

Step 2: Is the Entity Scoped out of the Interpretation?

The next step is to determine if an entity that is subject to FIN R is scoped out of the Interpretation, by evaluating the guidance in paragraph 5. FIN 46R applies to all entities, with the following exceptions:

- Not-for-profit organizations (as explained in paragraph 4a of FIN 46R) and amended.
- Employee benefit plans subject to specific accounting requirements in existing FASB Statements.
- A governmental organization or a financing entity established by a governmental entity, unless the financing entity: is not a governmental organization and is used as a VIE in an effort to circumvent the provisions of FIN 46R.
- Transferor of financial assets (including its affiliates) to a qualifying special-purpose entity (QSPE), as described in paragraph 35 or a “formerly qualifying SPE”, as described in paragraph 25 of SFAS 140.
- Holders of beneficial interests in a QSPE that do not provide unilateral ability to (1) liquidate the entity or (2) change the entity so that it no longer qualifies as a QSPE.
- Separate accounts of life insurance enterprises as described in the AICPA Audit and Accounting Guide, *Life and Health Insurance Entities*.
- An enterprise subject to SEC Regulation S-X Rule 603(c)(1) would not
consolidate any entity that is not also subject to that same rule.

- An enterprise with an interest in a VIE or potential VIE entity created before December 31, 2003, is not required to apply FIN 46R to that entity if the enterprise, after making an exhaustive effort, is unable to obtain the information necessary to apply the Interpretation. This new “information out” scope exception applies only as long as the reporting enterprise continues to be unable to obtain the necessary information. (Note that this inability to obtain the necessary information is expected to be infrequent.)

Entities that meet the definition of a business in EITF Issue No. 98-3, Determining Whether a Nonmonetary Transaction Involves Receipt of Productive Assets or of a Business (EITF 98-3), as modified in FIN (R), provided that none of the following conditions are present:

1. The reporting enterprise and/or its related parties [i.e. all parties identified in paragraph 16 of FIN R, except de facto agents under item 16(d)(i)] were involved in the design or redesign of the entity. However, this condition would not apply if the entity is a franchisee or an operating joint venture under joint control of the reporting enterprise and one or more independent parties.

2. Substantially all of the entity’s activities either involve or are conducted on behalf of the reporting enterprise and/or its related parties.

3. The reporting enterprise and/or its related parties provide more than half of the entity’s subordinated financial support (which could include equity, subordinated debt, guarantees, etc.).

4. The entity’s activities primarily involve asset-backed financing or leasing or the entity’s assets are comprised primarily of financial assets.

**Step 3: Is the Entity a Variable Interest Entity?**

An enterprise is required to determine whether or not an entity is a VIE when it first gets involved with the entity. According to paragraph 5 of FIN 46R, an entity is a VIE if either of the following two conditions exist:

1. Its total equity investment at risk (i.e. equity interests that are required to be reported as equity in that entity’s financial statements) is not sufficient to finance its activities without additional subordinated financial support provided by any other parties (including equity holders). For this purpose, the total equity investment at risk:
   - Includes voting and non voting equity investments in the entity, only if they participate significantly in the profits and losses.
   - Does not include amounts provided to the equity investor (by fees, contributions or other payments) or financed for the equity investor (for example, by loans or guarantees of loans), directly or indirectly by the entity or by other parties involved with the entity, unless the provider or party is a parent, subsidiary, or affiliate of the investor that is required to be included in the same set of consolidated financial statements as the investor.

2. As a group the holders of the equity investment at risk lack any one of the following three characteristics of a controlling financial interest:
The direct or indirect ability to make decisions about the entity’s activities through voting or similar rights (such as those of a corporate common shareholder or a general partner). The equity investors lack this characteristic if: the voting rights of some investors are not proportional to their obligations to absorb the expected losses of the entity, their rights to receive the expected residual returns of the entity, or both and (ii) substantially all of the entity’s activities (for example, providing financing or buying assets) either involve or are conducted on behalf of an investor that has disproportionately few voting rights.

The obligation to absorb the expected losses. The equity holders lack this characteristic if they are directly or indirectly guaranteed a return or they are protected from losses by the entity itself or by other parties involved with the entity.

The right to receive the expected residual returns. The equity holders lack this characteristic if their return is capped by the entity’s governing documents or other arrangements with other variable interest holders.

What Constitutes Sufficient Equity At Risk?

Paragraph 9 of FIN 46R states that an equity investment of less than 10 percent of the entity’s total assets (which is up from the 3% required under the GAAP that was used prior to the issuance of FIN R) should not be considered sufficient to permit the entity to finance its activities on its own (without additional subordinated financial support) unless the equity investment can be demonstrated to be sufficient in at least one of the following three ways:

a. The entity has demonstrated an ability to finance its activities without additional subordinated financial support.

b. The entity has at least as much equity invested as other similar entities that operate with no additional subordinated financial support.

c. The amount of an entity’s equity exceeds a quantitative estimate of the entity’s expected losses.

To emphasize the importance of qualitative and quantitative analysis, the guidance on the sufficiency of the equity investment at risk, paragraph 9 was modified to emphasize that a thorough qualitative analysis [paragraph 9(a) and 9(b)] should be completed prior to a quantitative analysis [paragraph 9(c)]. If, after diligent effort, a reasonable conclusion about the sufficiency of the entity’s equity at risk cannot be reached based solely on qualitative considerations, the quantitative analyses implied by paragraph 9(c) should be made. In instances where neither a qualitative assessment nor a quantitative assessment, taken alone, is conclusive, the determination of whether the equity at risk is sufficient shall be based on a combination of qualitative and quantitative analyses.

On the other hand, paragraph 10 indicates that some entities may require an equity investment of greater than 10%, if for example, they are engaged in high-risk activities, hold high-risk assets, or have exposure to risks not reflected in the entity’s assets or liabilities.

Step 4: Is the Variable Interest in Specific Assets and Liabilities of the Entity?

Once an enterprise determines it has a VIE, that enterprise may need to break the VIE up into so called “silos”. If an enterprise has a variable interest in the specific assets of a VIE, as discussed below, it is not considered...
a variable interest in the VIE, unless the specific assets represent more than half of the VIE’s total assets or the enterprise has other variable interests in the VIE. A holder of variable interests in any identifiable subgroup of assets (such as a guarantee or subordinated residual interest) will treat a portion of the entity as a separate VIE (silo) if: (1) the overall entity is a VIE, and (2) those specified assets (plus any credit support) are essentially the only source of payment for specified liabilities or other specified interests. In addition, the silo’s assets and financing cannot be used to support other activities of the VIE. This is an important observation because expected losses and residual returns from a variable interest in specific assets are not considered part of the VIE’s expected losses and residual returns when trying to determine the primary beneficiary.

Step 5: Determining the Primary Beneficiary of the VIE?

An enterprise should determine whether it is the primary beneficiary of a VIE at the time the enterprise becomes involved with the entity. An enterprise should consolidate a VIE if it has a variable interest (or combination of variable interests, including those of its related parties, as discussed in paragraph 16 of FIN 46R that will absorb a majority of the entity’s expected losses. If no individual party absorbs a majority of the expected losses, the one that receives the majority of the residual returns is the primary beneficiary.

Expected Losses and Expected Residual Returns

Expected losses and expected residual returns represent the present value of potential unfavorable and favorable variability from the expected value (of the probability-weighted) expected cash flows from the VIE, based on the guidance in FASB Concept Statement No. 7, *Using cash Flow Information and Present Value in Accounting Measurement*. This is probably different from the cash flow analyses that most practitioners previously used. Generally, the risk-free rate of interest should be used to estimate the present value of the probability-weighted cash flows, if they are appropriately adjusted for risk by the probability weights. Otherwise, a risk-adjusted discount rate should be used. The fair value calculated should approximate fair value of the entity. Board decided to revise the guidance in paragraph 8 to indicate the following:

a. A VIE’s expected losses shall include the expected variability of the probability-weighted negative variability in the fair value of its net assets that are not variable interests.

b. A VIE’s expected residual returns shall include the expected variability of the probability-weighted positive variability in the fair value of its net assets that are not variable interests.

c. A VIE’s expected losses and expected residual returns shall also include the expected variability in fees paid to a decision maker (if there is a decision maker) and the expected variability in fees paid to providers of guarantees of the values of all or substantially all of the entity’s assets (including writers of put options and other instruments with similar results) and providers of guarantees that all or substantially all of the entity’s liabilities will be paid.

Estimating Expected Losses and Residual Returns

One example of how expected losses and expected residual returns are estimated is provided in Exhibit 1. This simple hypothetical example assumes the following: The VIE Entity owns a pool of financial assets with a total face value of $1,000. Two variable interest holders have 60% and 40% equity participation in profits and losses and there is no decision maker. All cash flows are expected to occur in one year or not at all. The cash flows provided in column 1 have already been discounted at a risk-free rate of 5 percent, after adjusting for, by estimating probability-weighted, expected cash flows. No other factors affect the fair value of the assets. As
demonstrated in Exhibit 1, expected losses and expected residual returns are ($240) and $240, respectively.

**Allocating Expected Losses and Residual Returns**

Once the expected losses and expected residual returns are estimated, more judgment is needed to allocate them among the parties involved with the VIE, in order to determine the primary beneficiary. FIN 46R (paragraph 14) provides very little detailed guidance on how to calculate the primary beneficiary. The FASB has recently decided to allow the use of a number of different methods currently being applied in practice for allocating expected losses and expected residual returns to variable interest holders, in order to determine the primary beneficiary. The application of one allocation method, called the Standard Allocation Approach, is illustrated below. This method requires the following steps:

1. Step 1-Subtract expected losses from expected cash flows of the entity.
2. Step 2-Allocate remaining cash flows (from step 1) to the VIE holders, based on the contractual terms of their profit sharing.
3. Step 3-Compute the difference between the expected cash flow return of each enterprise and the allocated cash flows from step 2. This represents the expected loss absorbed by each individual variable interest holder.

**Example of Allocating Expected Losses using the Standard Allocation Method**

Refer back to Exhibit 1, where it was assumed that two variable interest holders had 60% and 40% equity participation in the profits and losses of the VIE. Expected cash flows are $1,000 and expected losses and expected residual returns are $240. According to their equity participations, the VIE’s expected cash flows of $1,000 would be distributed to the variable interest holders as: $600 to Party A and $400 to Party B.

Step 1 – Subtract the expected losses from the expected cash flows of the entity. Expected cash flows are $1,000, expected losses are ($240). Thus, the Remaining Expected Cash Flows to use in steps 2 and 3 are equal to $760.

Step 2- The remaining cash flows from Step 1 should be allocated to the variable interest holders. Distributions to variable interest holders would occur based upon the contractual 60-40% allocation. Therefore, Party A would receive 60% of $760 or $456 and Party B would receive 40% of $760 or $304.

Step 3- Compute the difference between the expected cash flow return of each enterprise and the allocated cash flows from Step 2 to arrive at the expected losses to be absorbed by each variable interest holder. This is illustrated in the following table.

<table>
<thead>
<tr>
<th>Party</th>
<th>Expected Cash Flow</th>
<th>Difference - Expected Losses</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>$600</td>
<td>($144)</td>
</tr>
<tr>
<td>B</td>
<td>$400</td>
<td>($ 96)</td>
</tr>
<tr>
<td>Total</td>
<td>$1,000</td>
<td>($240)</td>
</tr>
</tbody>
</table>

Since Party A absorbs a majority ($144) of the expected losses ($240) it would be considered the primary beneficiary. If the first test fails to find a primary beneficiary for the VIE (that is, nobody has the majority exposure to expected losses), apply the same methodology illustrated above to the expected residual returns. The variability component of expected residual returns is the same as the expected losses. Expected residual returns also include the probability-weighted present value of fees paid to “decision makers” and guarantors of substantially all of the VIE’s assets or liabilities.
Initial Measurement

The primary beneficiary of a VIE should initially measure the assets, liabilities, and noncontrolling interests of the newly consolidated entity (except for enterprises under common control) at their fair values at the date the enterprise first becomes the primary beneficiary. The primary beneficiary of a VIE that is under common control with the primary beneficiary should initially measure the assets, liabilities, and noncontrolling interests of the VIE at the amounts at which they are carried in the accounts of the enterprise that controls the variable interest entity (or would be carried if the enterprise issued financial statements prepared in conformity with generally accepted accounting principles).

According to paragraph 9 of FIN 46R, the excess of the fair values of the newly consolidated assets and the reported amount of assets transferred by the primary beneficiary to the VIE over the sum of the fair value of the consideration paid, the reported amount of any previously held interests, and the fair value of newly consolidated liabilities and noncontrolling interests, should be allocated and reported as a pro rata adjustment of the amounts that would have been assigned to all of the newly consolidated assets, as required by paragraphs 44 and 45 of SFAS 141, Business Combinations. The excess of the sum of the fair value of the consideration paid, the reported amount of any previously held interests, and the fair value of the newly consolidated liabilities and noncontrolling interests over the fair value of the newly consolidated identifiable assets and the reported amount of identifiable assets transferred by the primary beneficiary to the VIE, should be reported in the period in which the enterprise becomes the primary beneficiary as:

- Goodwill, if the variable interest entity is a business
- An extraordinary loss, if the variable interest entity is not a business.

After the initial measurement, the assets, liabilities, and noncontrolling interests of a consolidated variable interest entity should be accounted for by the primary beneficiary in consolidated financial statements as if the entity were consolidated based on voting interests, according to the principles of ARB 51.

Effective Dates and Transition

Public companies may choose to apply either the original FIN 46 or FIN 46R to their interests in special purpose entities (as defined in accounting literature issued before FIN 46) as of the first interim or annual period ending after 12/15/03.

Public companies must apply FIN 46R to their interests in SPEs (if they previously applied the original FIN 46 prior to revision) no later than the end of the first interim or annual period ending after 3/15/04.

- Public companies that are not small business issuers must apply FIN 46R to their interests in entities that are not SPEs as of the first interim or annual period ending after 3/15/04.
- Public companies that are small business issuers must apply FIN 46R to their interests in entities that are not SPEs as of the first interim or annual period ending after 12/15/04.

If an enterprise has applied the original FIN 46 in previously issued financials, it must continue to apply either FIN 46 or FIN 46R in its financial statements for periods between the previously issued financials and the new effective dates.

Potential Impacts of FIN 46R on Corporate Financial Statements and Valuations

FIN 46R may have a major impact on the financial statements of many of the enterprises that are affected by the standard. Indeed, depending on the VIE, consolidating what was previously an off-balance-sheet transaction, could have an impact on most line items in the financial statements.” Consolidation may also affect performance measurements such earnings
per share, earnings before interest, taxes, depreciation and amortization (EBITDA), free cash flows, etc. and many financial ratios, particularly leverage and coverage ratios. In addition, some investors may discover that a company they have invested in is more risky than previously thought, after evaluating its consolidated financial statements with higher debt ratios. This could increase the required rate of return they would demand on this investment, which could have a negative impact on its stock price. Although the exact magnitude of the impact that FIN 46R will have on financial statements is difficult to ascertain, it certainly will be less than that anticipated from the original Interpretation that was issued in January 2003. This is because of the additional scope exceptions that were included in paragraph 4g (the so-called “information out” exception) and paragraph 4h (the “business entity” exception), which will allow many more enterprises to escape the consolidation requirements in FIN 46R.

In addition, the delayed effective dates in FIN 46R provide enterprises that would have been affected by the Interpretation with more time to restructure their transactions with VIEs in order to keep them off their balance sheets.

FIN 46R will hopefully achieve more consistent application of GAAP consolidation policies to VIEs and improve comparability between entities engaged in similar activities, whether or not some of those activities are conducted through variable interest entities. The difficulties associated with estimating expected losses and expected residual returns that may be based on discounted, probability-weighted cash flows, continue to represent significant challenges in applying the new standard. These and any other challenges should be offset by the benefits to be received from investors in terms of the quality and consistency of the disclosures relating to VIEs that will now be reported in financial statements.


## Exhibit 1: Calculation Of Expected Losses And Expected Residual Returns

<table>
<thead>
<tr>
<th>Estimated Discounted Cash Flows</th>
<th>Probability</th>
<th>Expected Cash Flows—(Col. 1 x Col. 2)</th>
<th>Col. 1 - $1,000 (Losses) Residual Returns</th>
<th>Probability</th>
<th>Expected (Losses) Expected Residual Returns Col. 4 x Col. 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>$ 400</td>
<td>0.3</td>
<td>$ 120</td>
<td>$(600)</td>
<td>0.3</td>
<td>$(180)</td>
</tr>
<tr>
<td>800</td>
<td>0.3</td>
<td>240</td>
<td>(200)</td>
<td>0.3</td>
<td>(60)</td>
</tr>
<tr>
<td>1,200</td>
<td>0.1</td>
<td>120</td>
<td>200</td>
<td>0.1</td>
<td>20</td>
</tr>
<tr>
<td>1,600</td>
<td>0.2</td>
<td>320</td>
<td>600</td>
<td>0.2</td>
<td>120</td>
</tr>
<tr>
<td>2,000</td>
<td>0.1</td>
<td>200</td>
<td>$1,000</td>
<td>0.1</td>
<td>100</td>
</tr>
<tr>
<td>$1,000 (Expected Cash Flow)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(240)</td>
</tr>
</tbody>
</table>

240
ASSESSING THE EFFECTS OF RECENT ACCOUNTING SCANDALS: STUDENT PERCEPTIONS

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ABSTRACT

Beginning with the bankruptcy of Enron, a number of accounting-related scandals have shocked the business world and reverberated throughout the profession and academia. The immediate, short-term consequences of these reported scandals have received considerable publicity. Clearly accountants have seen better days. While not completely responsible for every transgression, much of the blame rests with this once-respected profession.

In order to gain a better understanding of how the recent corporate scandals have affected student perceptions of the accounting field, a study was conducted to determine whether the accounting scandals changed business students’ perceptions of the profession or their career choices. Surveys were administered by the authors in several accounting classes (ranging from the sophomore through graduate level) to over 200 students in a small midwestern school of business.

Results generally indicated that the students believe: 1) business executives, accountants employed by the corporation, and external auditors (in that respective order) were most responsible for the scandals; 2) business executives and accountants who committed fraud should be fined rather than imprisoned; 3) accounting firms that regularly engage in illegal activities should be banned from subsequently providing services to clients; 4) additional government regulation of the accounting profession is not needed; and 5) the general public has not lost
confidence in the accounting profession. All of these results were generally consistent, regardless of the academic level or specific major of the students.

While the students reported that the accounting profession contributes significant value to business and society, they have a much less favorable perception of what accountants do and how they act as a result of the publicity surrounding the scandals. Although accounting is not necessarily viewed now as a less attractive field of study in general, undeclared sophomores demonstrated a slightly lower propensity to choose accounting as a major as a result of the scandals.
ABSTRACT

This paper presents the preliminary results from an on-going study comparing the ability of neural network models and multiple discriminant analysis (MDA) models to predict bond rating. Data was collected on more than 900 bonds that had their Standard and Poor’s Corporation rating changed during the period 1997 to 2002. This dataset was matched with an equal number of corresponding bonds (based on initial rating, industry and approximate asset size) whose rating was not changed. Several neural network models and multiple discriminant analysis were used to predict both the general direction of a bond change and the movement from a particular bond rating to another bond rating. The predictive variables were financial ratios and rates of change for these ratios. In almost all cases, particularly for the larger sample studies, the neural network models were better predictors than the multiple discriminant models.

INTRODUCTION

Various agencies – such as Standard and Poor’s Corporation and Moody’s Investment Service - rate the risk classification of bonds. This classification system is important to investors since the higher the rating assigned to an issue the lower the required return to satisfy investor expectations. Ederington, Yawitz, and Roberts (1987) argued that if ratings affect bond yields, there is an incentive for bond traders to attempt to forecast these changes and to trade accordingly. Pinches and Singleton (1978) suggest that bond ratings are the principal source of investor information about the “quality” and marketability of various bond issues. It is not exactly clear how S&P and Moody’s determine their ratings. It is assumed that both employ both publicly available information, such as accounting statements, and nonpublic information to assign quality ratings to individual corporate bonds.

There have been numerous studies examining how one could predict bonds’ values and ratings. Burnie (1989) used an ARIMA model to predict bond returns. Foss (1995) examined the use of the interest coverage ratio to predict the value of bonds. Hand (1989); Steadman (1990) and Phillips (1992) have examined how bond rating changes impact a firm’s stock returns. Kamstra, Kennedy and Suan (2001) used Logit for predicting bond ratings.

Our specific area of interest is predicting the change in a bond’s rating. Again, we find a large number of studies. Wilbur, (1977)
examined corporate bond rating changes with respect to market efficiency. McAdams (1980); Soldofsky, Bhandari and Boe (1980) and Bhandari, Soldofsky and Boe (1983) used multiple discriminant (MDA) models to predict bond rating changes. Raman (1981, 1982) examined municipal bond rating changes. Copeland and Ingram (1982) also used MDA to predict municipal bond rate changes. Other authors - Metaew (1985) and Ibrahim, Metawae and Aly (1990) – have compared MDA models with another technique – statistical decomposition – for predicting bond rating changes. Other bond rating change studies which specifically compared alternative prediction techniques include Lewis, Patton and Green (1988) who compared statistical model vs. analysts’ prediction of bond rating changes.

The area that we wish to investigate is the use of a new approach – neural networks - to predicting bond rating changes. We based our work on models developed by Horrigan (1966) and Pinches and Mingo (1973, 1975) and built our test models using samples of different sizes. Although some work has been done [Dutta and Shekhar (1988) and Moody and Utans (1991, 1992, and 1995)] has directly focused on using neural networks to predict bond rankings very little has bee done on using neural nets to predict bond rating changes.

Neural networks represent an approach in artificial intelligence research and are often referred to as a connectionist approach – see Figure 1.

The term connectionist comes from its use of the brain, and its myriad interconnections, as the basis for information processing. The fundamental unit in the brain is the neuron, which in connectionist terms finds its analog in the processing element or node. Just as neurons are interconnected by dendrites and axons so nodes, in neural networks are interconnected. The phenomenal number of interconnections of neurons through the dendrites and axons in the human brain provide for a number of characteristics that are desirable in a computer system. These include fault tolerance, learning by example, adaptability, and pattern recognition.

Neural networks can be of different architectural forms; however, one of the most common form possesses an input layer and an output layer and sometimes with one or more hidden layers. In addition to the architecture, their respective learning algorithm can distinguish neural networks. Further, each learning algorithm may be characterized by a wide number of parameters. Once a particular learning algorithm and parameter values are initially select, the neural network is repeatedly exposed to a training data set. This may involve thousands of iterations until the system converges to a solution. This research examines two issues - (1) how effective - vis-à-vis standard statistical methods - could back-propagation and other neural network paradigms be in discriminating amongst more than three-group classifications – increase in ranking; decrease in ranking; ranking remains the same and (2) what is the accuracy of these classifications in future periods. Much of the literature has argued that neural nets are attractive because they make no assumption – such as, linearity - about the underlying structure of the data or the relationships amongst the variables.

Neural networks have been used in a variety of forecasting studies. In the area of finance McLeod, Malhotra and Malhotra (1993)


One particular branch of neural network studies that have a particular bearing on this paper is their use in a number of bankruptcy and bank failure studies. In most of these studies the predictive capability of neural network formulations have been compared with more standard statistical models, such as linear regression, logit, and multiple discriminant analysis (MDA). Salchenberger, Cinar and Lash (1992); Costs and Fant (1993); and Wilson and Sharda (1994) found that neural network models outperformed other statistical techniques. This type of finding was extended to foreign bankruptcy studies - Tsukuda and Baba (1994) examined neural networks for predicting Japanese bankruptcies; Luther (1998) found that neural nets could be used to accurately predict the outcome of Chapter 11 proceedings. Abid and Zouari (2002) used nine different neural network formulations to predict failure for Tunisian firms; Zapranis and Ginoglou (2000) found that neural networks outperformed MDA models for a dataset of Greek firms. Brockett, Cooper, Golden and Pitaktong (1994) and Brockett, Cooper, Golden and Xia (1997) examined using neural networks as an “early warning” mechanism for insurer insolvency.

**RESEARCH DESIGN**

In our study we identified more than 900 corporate bonds whose stand and Poor’s rating had been changed during the period 1997 to 2002 – see Figure 2. These were then matched with a corresponding number of bonds whose rating had not been changed. The matching criteria included that the firms had same bond rating prior to a change, were in the same industry and had approximately comparable level of total assets.

**Figure 2.**
Number of Firms with Bond Rating Changes Used in This Study

Using the work of Dutta and Shekhar (1988); Moody and Utans (1991, 1992, and 1995) and Larrymore (1999), we identified a set of accounting ratios which were used as the basis for building both MDA and neural network models. Data was collected for the five years prior to the bond rating change for both groups. We examined two sets of outcome variables. In the first set, we simply identified the movement of the bonds’ ratings – this produced three outcome variables – a decline in the rating, an
improvement in the bond rating or the rating remained the same. In the second set of outcome variables, we broadened the outcome options to include not just the direction of the change but breadth of the change for investment class bonds vs. non-investment class bonds. This coding scheme produced ten outcome categories. This ten category outcome scheme comes from examining five outcomes for each of the two groups - investment class bonds vs. non-investment class bonds. The five outcomes consists of (1) a two or more rank decline in the rating, (2) a one rank decline in the rating, (3) a two or more rank improvement in the bond rating, (4) a one rank improvement in the bond rating and (5) the rating remained the same. Drawing upon the data for just the period 1997 and 1998, we used three sample sizes to test the neural nets vs. the multiple discriminant analysis model. There were 120 firms that had a bond rating change for those two years. We matched these 120 with another 120 firms whose bonds’ rating had not changed. Given this total data set we built models using - (1). We used 30 randomly chosen firms whose bond ratings had changed and 30 matching firms whose bond ratings had remained the same – this first constituted 25% of the original 240 firms; (2). we used 60 randomly chosen firms whose bond ratings had changed and 60 matching firms whose bond ratings had remained the same – this first constituted 50% of the original 240 firms; and (3). we used 90 randomly chosen firms whose bond ratings had changed and 90 matching firms whose bond ratings had remained the same – this first constituted 75% of the original 240 firms. After building the models for each different data set, we tested the models against the holdout firms. The results for the holdout firms are given in Tables 1, 2 and 3.

To solve the multiple discriminant analysis model we used the SPSS software package and for the neural network models we used PREDICT by Neuralware. This software package has an imbedded artificial intelligence routine which optimizes the structural design of the neural network model.

The results of these tests clearly indicated the superiority of the neural networks model, particularly for the largest sample. However, we noticed several issues with our data. First, the number of bond rating changes increased significantly from 1997 to 2002. This should not be surprising given the downturn in the economy and the pressure placed on firms. The second point we noticed was the increasing number of bond rating changes in particular industries in particular years. This has been called a “contagion effect”. We have decided to investigate the impact of this effect by segmenting the data base on the basis of industry type. The preliminary results

Table 1

| Results for Models 1997-1998 Using 25% of the Sample (N=180) |
|---------------------------------|-----------------|-----------------|-----------------|-----------------|
|                                | 5 Years Out     | 4 Years Out     | 3 Years Out     | 2 Years Out     | 1 Year Out      |
| LDA Model - No Change % Correct | 50%             | 59%             | 79%             | 80%             | 83%             |
| LDA Model - Change % Correct   | 53%             | 61%             | 86%             | 85%             | 88%             |
| LDA Model - Overall % Correct  | 51%             | 60%             | 83%             | 83%             | 85%             |
| NN1 Model - No Change % Correct| 48%             | 53%             | 73%             | 83%             | 75%             |
| NN1 Model - Change % Correct   | 50%             | 60%             | 81%             | 83%             | 73%             |

NN1
<table>
<thead>
<tr>
<th>Model - Overall % Correct</th>
<th>49%</th>
<th>56%</th>
<th>77%</th>
<th>83%</th>
<th>74%</th>
</tr>
</thead>
<tbody>
<tr>
<td>NN2 Model - No Change % Correct</td>
<td>43%</td>
<td>51%</td>
<td>65%</td>
<td>76%</td>
<td>70%</td>
</tr>
<tr>
<td>NN2 Model - Change % Correct</td>
<td>46%</td>
<td>56%</td>
<td>73%</td>
<td>83%</td>
<td>65%</td>
</tr>
<tr>
<td>NN2 Model - Overall % Correct</td>
<td>44%</td>
<td>54%</td>
<td>69%</td>
<td>79%</td>
<td>68%</td>
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<table>
<thead>
<tr>
<th>NN2 Model - Overall % Correct</th>
<th>55%</th>
<th>56%</th>
<th>77%</th>
<th>83%</th>
<th>74%</th>
</tr>
</thead>
<tbody>
<tr>
<td>NN2 Model - No Change % Correct</td>
<td>43%</td>
<td>51%</td>
<td>65%</td>
<td>76%</td>
<td>70%</td>
</tr>
<tr>
<td>NN2 Model - Change % Correct</td>
<td>46%</td>
<td>56%</td>
<td>73%</td>
<td>83%</td>
<td>65%</td>
</tr>
<tr>
<td>NN2 Model - Overall % Correct</td>
<td>58%</td>
<td>58%</td>
<td>75%</td>
<td>87%</td>
<td>73%</td>
</tr>
</tbody>
</table>

Table 2.

Results for Models 1997-1998 Using 50% of the Sample N=(120)

<table>
<thead>
<tr>
<th>LDA Model - Overall % Correct</th>
<th>55%</th>
<th>62%</th>
<th>67%</th>
<th>87%</th>
<th>70%</th>
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</thead>
<tbody>
<tr>
<td>LDA Model - No Change % Correct</td>
<td>58%</td>
<td>58%</td>
<td>70%</td>
<td>82%</td>
<td>75%</td>
</tr>
<tr>
<td>LDA Model - Change % Correct</td>
<td>57%</td>
<td>60%</td>
<td>68%</td>
<td>84%</td>
<td>73%</td>
</tr>
<tr>
<td>NNI Model - Overall % Correct</td>
<td>53%</td>
<td>63%</td>
<td>68%</td>
<td>90%</td>
<td>73%</td>
</tr>
<tr>
<td>NNI Model - No Change % Correct</td>
<td>52%</td>
<td>58%</td>
<td>72%</td>
<td>83%</td>
<td>75%</td>
</tr>
<tr>
<td>NNI Model - Change % Correct</td>
<td>53%</td>
<td>61%</td>
<td>70%</td>
<td>87%</td>
<td>74%</td>
</tr>
<tr>
<td>NNI Model - Overall % Correct</td>
<td>55%</td>
<td>60%</td>
<td>75%</td>
<td>90%</td>
<td>72%</td>
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<tr>
<td>NNI Model - Change % Correct</td>
<td>62%</td>
<td>55%</td>
<td>75%</td>
<td>83%</td>
<td>73%</td>
</tr>
<tr>
<td>NNI Model - Overall % Correct</td>
<td>58%</td>
<td>58%</td>
<td>75%</td>
<td>87%</td>
<td>73%</td>
</tr>
</tbody>
</table>

Table 3.

Results for Models 1997-1998 Using 75% of the Sample (N=60)

<table>
<thead>
<tr>
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<th>58%</th>
<th>68%</th>
<th>73%</th>
<th>93%</th>
<th>83%</th>
</tr>
</thead>
<tbody>
<tr>
<td>LDA Model - No Change % Correct</td>
<td>60%</td>
<td>65%</td>
<td>73%</td>
<td>90%</td>
<td>85%</td>
</tr>
<tr>
<td>LDA Model - Change % Correct</td>
<td>59%</td>
<td>66%</td>
<td>73%</td>
<td>91%</td>
<td>84%</td>
</tr>
<tr>
<td>NNI Model - Overall % Correct</td>
<td>63%</td>
<td>70%</td>
<td>78%</td>
<td>93%</td>
<td>80%</td>
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<td>73%</td>
<td>75%</td>
<td>88%</td>
<td>85%</td>
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<tr>
<td>NNI Model - Change % Correct</td>
<td>63%</td>
<td>71%</td>
<td>76%</td>
<td>90%</td>
<td>83%</td>
</tr>
<tr>
<td>NN2 Model - No Change % Correct</td>
<td>68%</td>
<td>75%</td>
<td>83%</td>
<td>95%</td>
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<td>75%</td>
<td>78%</td>
<td>98%</td>
<td>88%</td>
</tr>
<tr>
<td>NN2 Model - Overall % Correct</td>
<td>66%</td>
<td>75%</td>
<td>80%</td>
<td>96%</td>
<td>86%</td>
</tr>
</tbody>
</table>

indicate that neural networks are superior to multiple discriminant analysis for some industries but not others. Those industries generally have a larger sample size. This tends to support our prior find of the importance of sample size in our comparison of analytical tools.

We view this paper as the preliminary statement of findings and plan extensive further studies investigating the extent to which these models remain accurate into the time period 1999 to 2002. We will also examine, in detail the impact of specific bond ratings and their impact on overall accuracy.

**BIBLIOGRAPHY**


ABSTRACT

Federal law requires that most American passenger and cargo airlines report financial and operating information to the U.S. Department of Transportation (DOT) on a monthly, quarterly, or semi-annual basis. Generally, airlines fulfill the statutory requirements by forwarding electronic versions of several reports to the Bureau of Transportation Statistics (BTS). Referred to by the name of one of the required traffic reports, “Form 41 data” include balance sheets, income statements and other financials as well as traffic statistics.

The level of detail in Form 41 reporting is much greater than that provided in most publicly-traded airlines’ Securities and Exchange Commission (SEC) filings, making the DOT dataset a wonderful resource for teaching financial ratio analysis, benchmarking, and airline industry analysis. Despite the richness of detail available from the Form 41 system, academics seldom used this data due to the time required to obtain it, the level of industry knowledge required to use it, and/or the expense of subscribing to more user-friendly third-party vendors’ products. Now, DOT has made airline information available on the Web through TranStats, the “Intermodal Transportation Database”. Along with the ability to download the data, users are now able to access a transportation thesaurus and reference materials to provide assistance with correct interpretation and analysis of the data.

Faculty in accounting, finance, economics, and information systems will be interested in accessing this data source for real-world examples and for comparison to reporting required by SEC. This paper provides an introduction to the airline data resources available from http://www.transtats.bts.gov/ as well as how-to hints on getting started with these resources in the classroom. It is aimed at an audience which has little or no airline industry experience and points out the three key tables that can teach anyone to speak “Conversational Airline” at the beginner level.
ABSTRACT

American passenger and cargo airlines are required to file detailed quarterly and annual financial reports with the U.S. Department of Transportation (DOT), including balance sheets, income statements and detailed cost accounts. These reports, known as “Form 41 data”, are now available for free on the Web at DOT’s website called TranStats, the “Intermodal Transportation Database” at http://www.transtats.bts.gov/.

US airlines’ ownership structure generally consists of a parent holding company with one or more airline subsidiaries. The publicly-traded parent company files consolidated financial reports with the SEC. While segment information and broad categories of revenue and expense accounts are sometimes reported for the subsidiary airlines, most carriers’ parent companies do not report much airline detail to the SEC. This means that the DOT reports by the carriers contain a rare glimpse into the inner workings of airline cost structures. While DOT filings are supposed to tie back to the company’s GAAP statements, the connections are not always obvious.

This paper presents a preliminary review of several major passenger and cargo carriers, comparing their SEC filings to those presented to DOT. It briefly discusses some of the complications in interpreting financial reports made to DOT by the airlines. Financial analysts and faculty in finance and accounting who have not studied the airlines will be interested in the Form 41 reports; industry analysts will be interested in DOT’s new format for presenting this information on the Web.
ABSTRACT

In recent years, position statements from various accounting groups have pointed out that accounting graduates need problem-solving ability to be successful in the profession. Accordingly, accounting educators are now challenged to develop ways of teaching problem solving that are appropriate for their specific missions and the educational objectives of their individual institutions.

To address the challenge of improving the problem-solving ability of accounting majors, we conducted a study to determine if exposing students repeatedly to an entire generic problem-solving model in a case-based accounting course is related to increases in problem-solving performance. Research has been conducted in other disciplines (such as mathematics and science education) that indicates student awareness of generic problem-solving models can increase student problem-solving ability. This study’s objective was to determine if using such a problem-solving model would affect accounting students similarly.

Statistical analyses were performed to determine the effect on student problem-solving performance of repeatedly exposing students to an entire generic problem-solving model while solving specific cases using the student’s initial problem-solving ability as a
covariate. A generic problem-solving model is a sequence of stages designed to organize an individual’s cognitive processes and resulting actions so that a problem can be solved effectively and efficiently. These models are designed to be used across a wide variety of disciplines and are not part of the content of a specific problem or case study.

Our findings suggest that, in a case-based course, repeatedly exposing accounting students to an entire generic problem-solving model (compared to repeated exposure to only a portion of the model) did improve the problem-solving performance of students (as measured by their scores on written case solutions) in an Intermediate Financial Accounting II course. Both experimental and control groups’ problem-solving ability improved, but the improvement of the experimental group was significantly higher than that of the control group. Apparently, helping students to become aware of how their thinking fits into the “big picture” does increase their ability to explore alternative approaches to solve the problem.

In addition, a review of the written analyses showed that the students in the treatment group identified more possible alternative courses of action, discussed more of the alternatives they identified, identified more stakeholders, and discussed more impacts that possible alternatives could have on the stakeholders.

The positive results of this study suggest that our approach offers accounting faculty a means by which they can improve their students’ problem-solving abilities. However, studies designed to determine the most efficient and effective format for teaching a generic problem-solving model to accounting students need to be conducted.
PRO FORMA EARNINGS: A BETTER MEASURE OR JUST “EARNINGS BEFORE THE BAD STUFF”? 

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ABSTRACT 

Recent years have seen many firms issuing press releases emphasizing so-called “pro forma earnings” that are calculated "as if" certain ordinary items, usually expenses, didn't exist. Companies label these nonstandard profit measures with terms like "pro forma earnings," "cash earnings" or "operating earnings" and contend that they are a better measure of “true” performance than GAAP-based income. For example, in the fourth quarter of 2002, Intel announced earnings that excluded “write-offs of purchased in-process R&D, amortization of acquisition-related intangibles and costs, and write-offs of acquisition-related intangibles”. The exclusion of these items increased net income by ten percent. 

Furthermore, no uniform definition for “pro forma” or “operating” earnings exists, with the result that the figures may not be comparable from company to company (even within the same industry) or, in some cases, from period to period for a firm. Essentially it can mean just about whatever a company wants it to mean. 

Research in psychology shows that people often have trouble ignoring information that they want to see (e.g., relatively more favorable pro forma earnings) even when more accurate information (e.g., relatively less favorable, but more objective, GAAP earnings) is presented simultaneously. In addition, research shows that people’s response to the same information can differ depending on the form in which the information is presented. For example, Patrick Hopkins’ research showed that analysts provided with the same GAAP financial performance results valued stocks differently depending on the form in which the GAAP results are presented. Therefore, it is reasonable to wonder whether investors, especially less-sophisticated investors, are able to identify the misleading information conveyed by “pro forma” earnings, even when GAAP earnings are presented simultaneously. The purpose of this research is to examine press releases of various companies that present “pro forma” earnings to determine if “pro forma” earnings really is just “earnings before the bad stuff”.

ACCOUNTING MODEL VERSUS BUSINESS MODEL FAILURES: THE ENRON, WORLDCOM, UNITED AIRLINES, AND FEDERAL MOGUL BANKRUPTCIES

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ABSTRACT

We compare two accounting model failures, Enron and WorldCom, with two business model failures, United Airlines and Federal Mogul. Using accounting performance measures, cash flow performance measures, market based performance measures, and statistical models such as logit analysis and multiple discriminant analysis, we analyze financial and stock market data to determine if there were any early signs of financial distress with the four firms. Our results consistently predict the impending demise of firms with poor business models, that is, Federal Mogul and United Airlines. With few exceptions, the measures we examine, including stock market measures, generally failed to foresee the bankruptcies of WorldCom and Enron.

Introduction

In this study, we compare two accounting model failures, Enron and WorldCom, with two business model failures, United Airlines and Federal Mogul. In particular, we analyze financial and stock market data to determine if there were any early signs of financial distress with these four firms. We explore whether the existing models to predict bankruptcy would have identified the failures of Enron and WorldCom. Furthermore, we explore the implications of the purported lack of knowledge by the parties most closely associated with the companies’ financial reports.

In the next section, we report a brief description of each company’s filing of Chapter 11 protection. In the subsequent section, we review the research on predicting bankruptcy and then report our findings. Finally, we include a discussion of our findings and the current regulatory response.

BRIEF DESCRIPTION OF THE FOUR BANKRUPTCIES

Enron
Enron provides products and services related to natural gas and electricity to wholesale and retail customers through its subsidiaries and affiliates. A year prior to filing bankruptcy, the company had unveiled a strategic plan to become the world’s number one energy company, surpassing ExxonMobil. With the 1996 deregulation of commodity markets, Enron’s plan was to expand its energy trading expertise into a vast array of new commodities. At that time, its stock was selling at its all time peak $90 per share and the company was a Wall Street favorite.
Enron’s revenues increased from $40 billion in 1999 to $100 billion in 2000, but its earnings per share went down from $1.27 per share in 1999 to $0.99 per share in 2000. Its year-end stock prices were $28.53 in 1998, $44.38 in 1999, and $83.13 in 2000, a sharp increase over the three years prior to its filing for bankruptcy protection.

Enron used complex, off-balance-sheet partnerships to finance its big growth plans and maintain its investment grade rating. The company, however, has been blamed for inadequate disclosure and a lack of independence of these partnerships. Enron used creative accounting techniques to hide massive debt, inflate revenue from the sale of assets to partnerships, and guarantee partnership debt with its stock. The company became vulnerable when its stock price and the value of partnership assets started falling in the market.

WorldCom
WorldCom started as a small, mom-and-pop, discount long-distance company in 1983 and grew to become the second largest telecommunications company in the U.S. through a series of mergers and acquisitions. The company provides a broad range of enhanced data and voice communications and has an extensive worldwide telecommunications network. It is known for pioneering competition in the long distance telecommunications industry and being the first commercial provider of Internet services.

WorldCom’s revenues increased from $19.7 billion in 1999 to $21.4 billion in 2001, and its earnings per share went up from $0.00 per share in 1999 to $0.48 per share in 2001. Its year-end stock prices were $47.83 in 1998, $53.06 in 1999, $14.06 in 2000, and $14.08 in 2001. Its stock price dropped sharply after 1999 but held steady during 2000 and 2001.

United Airlines
At the time of its bankruptcy, United Airlines was the second largest commercial airline in the U.S. United Airlines’ revenues declined from $18 billion in 1999 to $16 billion in 2001, and its earnings per share dropped from $9.97 per share in 1999 to –$39.80 per share in 2001. Its year-end stock prices were $59.69 in 1998, $77.56 in 1999, $38.94 in 2000, and $13.50 in 2001. The sharp decline in its market value over the last three years suggests that the stock market may have anticipated its decline.

In July 1993, pilot, flight attendant and machinist unions of United Airlines agreed to wage and benefit concessions for 55% ownership of the company, three seats on the company’s board, and an effective labor veto over the choice of CEO. It was approved by shareholders in July 1994, creating one of the largest majority employee-owned companies in the U.S. It was heralded as an exemplary corporate governance model at the time -- employees, by becoming long-term owners of the company, aligned their interests with those of the company, which in turn promised long-term corporate profitability and growth.

Just the opposite happened. Employees and union leaders of the company negotiated the costliest labor agreements the industry had ever seen. Labor costs were $5.5 billion in 2001, representing 45% of total operating expenses, which was 68% higher than those of Southwest Airlines (the most consistently profitable big airline in the country).

Federal Mogul
Federal Mogul is an automotive parts manufacturer that serves customers in the automotive and industrial markets worldwide. Its principal customers include many of the world’s original equipment manufacturers of automobiles and industrial products, including the Alliance Group, BMW, Fiat, NAPA, Autozone, Ford/Jaguar/Volvo, DaimlerChrysler, General Motors, Renault, Peugeot, Caterpillar, Cummins, Carquest, and Volkswagen/Audi.

Federal Mogul’s revenues declined from $6.5 billion in 1999 to $5.5 billion in 2001, and its earnings per share dropped from $3.59 per share in 1999 to –$12.93 per share in 2001. Its year-end share stock prices were $59.50 in
1998, $20.13 in 1999, $2.31 in 2000, and $0.79 in 2001. The sharp decline in its market value over the four years suggested an impending financial crisis for the company.

Federal Mogul filed for Chapter 11 protection on Oct 1, 2001, in an attempt to resolve its asbestos liabilities. The company itself has only limited involvement with asbestos. However, it was overwhelmed with asbestos litigation, approximately 365,000 asbestos claims, that arose from its series of mergers and acquisitions over years.

**RESEARCH ON PREDICTING BANKRUPTCY**

We group research models into four categories: accounting measures, cash flow measures, market-based measures, and statistical measures.

**Accounting Measures**
The foundation for our first category of measures, accounting ratios, is the firm's published financial statements. At the heart of reported statements is net income. Data are reported based on the conventions of generally accepted accounting principles. In other words, net income is a concept rather than an uncontested fact, and the way it is calculated must be set forth by rules and guidelines. While there is general conformity on measurement techniques, it is still possible to distort income.

Research has indicated that financial statement ratios, including profitability, tend to decline in quality as the firm approaches bankruptcy (Beaver, 1966). So we might expect to see ratios, such as return on assets and return on equity, become worse over time as a firm's loses its ability to meet debt obligations. Despite the appeal of accounting ratios, there is little agreement about which measures best determine the likelihood of financial distress.

**Cash flow measures**
The second category of measures is based on cash flow, which analysts generally see as being more reliable than accounting-derived data. The accounting model and its accompanying ratios have come under attack because of the possibility for shifting revenues and expenses between time periods. Cash flow, on the other hand, is a verifiable asset whose measurement is not subject to interpretation and judgment. When looking at cash flow, the analyst’s primary concern for assessing a firm’s health is cash from operations, as distinguished from cash generated from financing or investing activities. Further, cash from operations is the foundation for calculating a firm’s free cash flow, the key component for estimating the value of a firm.

Research indicates a market shift away from traditional accounting measures, like net income, in favor of cash flow measures (Wild et al., 2001). Use of cash measures is particularly relevant for firms approaching failure, since managers tend to convert assets to cash rapidly to avoid bankruptcy (Gentry et al., 1987). Studies have also shown that operating cash flows of bankrupt firms differ significantly from non-bankrupt firms up to five years prior to bankruptcy (Aziz et al., 1988).

**Market based measures**
A third category of measures is based on changes in the market price of company stock. The issue of concern is whether investors have discounted stock prices due to a heightened risk of bankruptcy. The assumption underlying the usefulness of market values is the efficient market hypothesis, which purports that stock prices reflect information beyond that contained in the firm’s reported data. These measures often include the effect of the market by combining an accounting or cash measure with the firm’s publicly traded stock price. Analysts use several types of market-based measures, such as price-to-earnings, dividend yield, and price-to-book ratios.

There is a substantial body of evidence suggesting that the market anticipates financial distress. Various studies have shown that a distressed firm’s stock prices begin to fall one to three years before bankruptcy (Altman and Brenner, 1981; Clark and Weinstein, 1983). One bankruptcy prediction model based on stock prices returns found volatility in firm-specific market returns four years before formal bankruptcy.

**Statistical measures**
The fourth category is not a grouping of measures as such, but rather represents index scores based on data primarily taken from the three previous categories. The most popular
measure is the Z-score, a credit evaluation model widely used in industry (Altman, 1968). A discriminant analysis function was used to select from historical financial data those ratios that best explain which firms would eventually go bankrupt. It is computed as:

\[ Z = 1.2X_1 + 1.4X_2 + 3.3X_3 + 0.6X_4 + 1.0X_5 \]  

\[ X_1 \] is working capital/assets, \( X_2 \) is retained earnings/assets, \( X_3 \) is earnings before interest and taxes/assets, \( X_4 \) is market value of equity/book value of debt, and \( X_5 \) is sales/assets. When Z-scores are applied to individual firms, a low score of less than 1.81 indicates a high probability of bankruptcy, while a high score greater than 2.99 indicates a low probability of bankruptcy. A firm receiving a score between 1.81 and 2.99 is in a gray area with low levels of predictability. Research has shown that the Z-score correctly predicted 72% of bankruptcies two years prior to the event (Eidleman, 1995).

Another statistical approach for predicting bankruptcy is logit analysis (Ohlson, 1980). This measure is based on the following formula:

\[ \text{Probability of bankruptcy} = \frac{1}{1 + e^{-Y}} \]

where \( Y = 1.32 - 0.407X_1 + 6.03X_2 - 1.43X_3 + 0.0757X_4 - 2.37X_5 - 1.83X_6 + 0.285X_7 - 1.72X_8 - 0.521X_9 \)

\[ X_1 \] is company size, \( X_2 \) is total liabilities divided by total assets, \( X_3 \) is current liabilities divided by current assets, \( X_6 \) is working capital from operations divided by total liabilities, \( X_7 \) represents a score — 1 if net income was negative the last two years or 0 if net income was not negative the last two years, \( X_8 \) is also a score — 1 if liabilities exceed assets or 0 if liabilities do not exceed assets, and \( X_9 \) is the change in net income divided by the sum of absolute values of current and prior years’ net income. In equation 2, e is approximately 2.718282.

**FINDINGS**

Exhibits 1 through 4 display the results for our four subject firms for the period 1996-2001. The financial and stock market data are derived from information originally reported in published financial statements in FIS Online and MultexInvestor.com. Six years of data analysis are reported for Federal Mogul, United Airlines, and WorldCom. However only five years are shown for Enron since it ceased publication of financial statements after its bankruptcy in December of 2001.

**Accounting measures**

We report in Exhibit 1 a comparison among our four subject companies for one commonly used accounting measure, Return on Equity (ROE). ROE has performed fairly well in reporting an impending problem for the business model failures (Federal Mogul, United Airlines); the ROE of these firms have been significantly declining since 1997. The accounting model failures (WorldCom, Enron), however, show generally poor ROE since 1996 but no significant drop over the six-year period. The results suggest that these firms would likely manipulate their earnings, given their consistent poor performance and the need to get capital to fund their ambitious growth plans (Beneish, 1999).

We also report for the four subject firms in Exhibit 1 a common measure of solvency, total liabilities to total assets. This ratio offers insight on changes to debt obligations, a key to avoiding bankruptcy. Results are mixed, however. Of the business model failures, Federal Mogul shows a trend of higher debt over the six years reported. While United Airlines six-year trend indicates less debt, it reports increasingly high levels of debt for two years preceding bankruptcy, thus indicating some signs of distress. Both accounting model failures show slightly increased debt. Enron, in particular, reports a higher debt level in the last year before failure. However, it is likely that the debt trends for both Enron and WorldCom could be explained away if analysts saw these firms as healthy. Moreover, WorldCom’s debt is relatively low, hovering in the 40% range for all years, while the other three firms report ratios that are greater than 70%.

**Cash flow measures**

In Exhibit 2, we find that operating cash flows offer different pictures of distress for the four subject firms. The business model failures
(United Airlines, Federal Mogul) show significant decreasing trends in cash from operations as a percent of assets and sales in the four years prior to bankruptcy. In contrast, the accounting model failures (Enron, WorldCom) indicate stability or growth. Enron reported increasing cash, and WorldCom’s cash flow showed signs of only moderate decline. The failure of cash flow measures to predict the failures of Enron and WorldCom may be explained by deceptive accounting practices. For example, WorldCom misclassified maintenance expenses as investments, which resulted in overstatements of operating cash flows and understatements of cash for investing.

**Market-based measures**

When market measures are applied to our study of business failures versus accounting failures, differences emerge. Exhibit 3 shows how each firm’s annual stock returns deviated from average S&P 500 returns as well as from its average industry returns beginning 1996. Federal Mogul and United Airlines, the business model failures, posted lower returns for three and two years, respectively, before bankruptcy. However, WorldCom’s and Enron’s failures were not fully recognized in the market place.
WorldCom showed negative market returns in two of the three years before its failure. Nonetheless, WorldCom’s stock price beat the S&P and industry indices in 2001, the year preceding its bankruptcy. Enron’s market returns were greater than the comparative index in two of the three years preceding failure, including the year 2000, immediately prior to its bankruptcy. Clearly, the market did not see beyond the deceptive accounting practices of Enron and WorldCom and failed to discount their stock prices for increased credit risk.

Statistical measures
A graph showing the Z scores for the four firms in this study appears in Exhibit 4. We find that three firms, Federal Mogul, United Airlines, and WorldCom, had scores lower than 1.81 in the years 2000 and 2001. Thus the Z-score model correctly identified these three firms as having a high probability of bankruptcy. However, the model failed to predict distress for Enron, which posted Z scores above 2.0 for the three years prior to its bankruptcy. With regards to the focus of this study, the Z-score model was very effective in predicting bankruptcy for both business model failures (Federal Mogul, United Airlines), but it predicted bankruptcy for only one of the accounting model failures (WorldCom). It is somewhat remarkable that the Z-score correctly predicted WorldCom’s demise, given the huge amount of error in its published financial reports.

Exhibit 4 also reports results from a logit analysis. The probabilities for the business model firms (Federal Mogul, United Airlines) indicate a steep increase in probability of failure.
for the two years preceding bankruptcy. However, the probabilities for the accounting model firms (WorldCom, Enron) show no dramatic change in the two years prior to bankruptcy. Thus, logit analysis offered analysts reason for concern but only for the business model failures.

Summary of findings
Table 1 summarizes the results of Exhibits 1-4. Traditional measures consistently signaled distress in the business model failures (Federal Mogul, United Airlines); we find that all eight measures gave early indications of bankruptcy. However, only two of the eight measures provided any early distress signals for the accounting model failures (WorldCom, Enron). Furthermore, one of these two measures, Z-scores, identified WorldCom but failed to identify Enron as having a high probability for bankruptcy.

**DISCUSSION**
Our results consistently predict the impending demise of firms with poor business models, that is, Federal Mogul and United Airlines. The opposite, however, is the case for the failure of firms with poor accounting models. With few exceptions, the measures we examine generally failed to foresee the bankruptcies of WorldCom and Enron.

WorldCom and Enron have each lost investor confidence. After all, they misrepresented themselves to investors and creditors, who relied on audited and presumably reliable published financial statements. However, few in the financial world would be so naïve as to believe that published financial statements are
TABLE 1: SUMMARY OF FINDINGS

<table>
<thead>
<tr>
<th>Category</th>
<th>Measure</th>
<th>Business Model</th>
<th>Accounting Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accounting Measures (See Exhibit 1)</td>
<td>1. ROE 2. Total Liabilities/Total Assets</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No</td>
<td>Yes slightly</td>
</tr>
<tr>
<td>Cash Flow Measures (See Exhibit 2)</td>
<td>1. Cash Flow from Operations/Total Assets 2. Cash Flow from Operations/Sales</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Market-Based Measures (See Exhibit 3)</td>
<td>1. Market-adjusted Stock Returns 2. Industry-adjusted Stock Returns</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Statistical Measures (See Exhibit 4)</td>
<td>1. Z-score (Multiple Discriminant Analysis) 2. Probability of Bankruptcy (Logit Analysis)</td>
<td>Yes</td>
<td>Yes-WorldCom No-Enron</td>
</tr>
</tbody>
</table>

the only source of information about a firm’s viability. The need for more detailed information is reflected in the firm’s annual report, which offers insights on business segment strategies, along with management’s discussion of results, and the auditor’s extensive footnotes. Companies regularly disclose current information in press releases and filings with the Securities and Exchange Commission. Perhaps the greatest opportunity for full disclosure comes from the frequent interplay between management and Wall Street analysts, who directly communicate about the firm’s past results and future direction.

REGULATORY RESPONSE AND THE CASE FOR FURTHER RESEARCH

The ability of investors and creditors to identify financially distressed firms depends on reliable financial data. The U.S. Sarbanes-Oxley Act of 2002 does much to create a climate of confidence in the business community. Among the many provisions of this new law are criminal sanctions for falsified accounting statements, the creation of an independent oversight committee to enforce auditing independence, independence mandates for corporate audit committees, a requirement to have a financial expert on audit committees, and regulations restricting consulting by auditors. The Securities and Exchange Commission is also investigating the practices of Wall Street analysts. A proposal to separate the stock brokerage business from the investment banking business is under consideration.

Auditors themselves have implemented new audit guidelines requiring improvements in procedures to detect fraud (SAS No. 99). Both the NASDAQ market and the New York Stock Exchange have proposed new self-regulations for its member companies to ensure more board independence and financial disclosure. The NASDAQ has also proposed new self-regulations for its members who are registered investment advisors and brokers. Many business schools, including Harvard, Wharton, Stanford, Chicago, Duke, have started new finance and accounting executive education programs for corporate directors and senior managers.

Despite these recent actions to ensure more independence for board directors, analysts, and auditors, more effective financial disclosure, and more education for all parties involved, there is no guarantee that falsified, or even exaggerated, financial reports will not appear again. We believe the recent proliferation of accounting
failures and bankruptcies offers researchers the opportunity to explore the reasons underlying market failures. With regulatory actions beginning to unfold, further research can indicate to policy makers where the greatest concentration of responsibility lies, thus prompting more appropriate regulative responses.

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EXPERIENTIAL LEARNING: ARE THERE NON-ACADEMIC CONSTRAINTS ON YOUR UNIVERSITY’S SUPPORT?

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ABSTRACT

Experiential learning is a common element of modern business education. This paper describes an innovative experiential learning service project for which Accounting, Finance, and Information Technology students receive internship academic credit. The paper illustrates how this Student Textbook Co-Op Business Experience and Service Learning Project: 1) directly supports the University and Business School educational mission, values, and objectives, 2) allows the Business School faculty to mentor experiential learning in support of the University and Business School educational mission, and 3) provides students with a challenging, realistic, and comprehensive business learning experience. Finally, this paper describes how, despite these positive features, benefits, and considerable student, faculty, and administrative support, this experiential learning internship project has been opposed - for non-academic reasons - by several key university officers.

EXPERIENTIAL LEARNING

Kolb’s Model

The value and importance of experiential learning has been discussed by a number of theorists over the years but few if any have elaborated a more comprehensive model than the Experiential Learning Theory (ELT) set forth by Kolb (Kolb 1984).

Kolb’s Experiential Learning Theory (ELT) model was developed by drawing on the works of many theorists but emphasized, in particular, the work of John Dewey, Kurt Lewin, and Jean Piaget. According to Kolb, “the process of experiential learning can be described as a four-stage cycle involving four adaptive learning models-concrete experience, reflective observation, abstract conceptualization, and active experimentation” (Kolb 1984, 40.)

Kolb’s model is best characterized by the following six propositions: learning is best conceived as a process, not in terms of outcomes; learning is a continuous process grounded in experience; the process of learning requires the resolution of conflicts between dialectically opposed models of adaptation to the world; learning is a holistic process of adaptation to the world; learning involves transactions between the person and the environment; and learning is the process of creating knowledge (Kolb 1984, 26-36.)

University Experiential Learning
Colleges and universities often utilize experiential learning opportunities as part of their endeavors to create knowledge. The range of practices from school to school is considerable. Some schools have elaborate experiential learning components that are required of all students while others have limited opportunity for students to gain recognition or credit from experiential learning endeavors. The recognized benefits of experiential learning include:

- Employers value it when recruiting.
- It provides workplace preparation and builds confidence.
- Professional and leadership preparation.
- Provides career decision information.
- Translation of theoretical classroom knowledge and skills to practical workplace applications.

The University of Baltimore, University of Maryland, Towson University, George Mason University, James Madison University, and Radford University, all in our Mid-Atlantic region, recognize the importance of experiential learning and feature it in their informational materials (University Web Sites/Various, 2003).

Applications

The types of experiential learning opportunities that colleges and universities provide include the following:

Class Project: A class project is an assignment, required as part of a class, in which the students work with an outside organization to solve a particular problem(s) or attain a certain goal(s).

Consulting Project: A consulting project is an assignment, typically equivalent in credit to a regular class, in which the students work with an outside organization to solve a particular problem(s) or attain a certain goal(s). A consulting project is longer than a class project, requires more extensive deliverables, may be completed in any geographic location, and is done either in lieu of a class or in conjunction with a limited number of class meetings.

Internship: An internship is work experience in industrial, business, or government that leverages the class experience through practical work experience. It allows students to translate academic theories and principles into action, to test career interests and to develop skills and abilities through carefully planned and supervised programs.

Job Shadowing/Externships: Job shadowing is an informal process, usually of short duration, in which students observe the daily routines and activities of employed professionals in the student's field of study. Job shadowing provides an opportunity for students to see, on a limited basis, how skills and knowledge acquired in the classroom are applied in the real world.

Service Learning: Service learning is a method by which students learn and develop through active participation in organized service experiences that meet actual community needs and are coordinated with the institution and the community. Service learning can be integrated in the students' academic curriculum (i.e., done to fulfill part of course requirements) or done separately from course requirements. The primary goal of service learning is the educational value of the project(s). An example of service learning is the national Volunteer Income Tax Assistance Program. (American Institute of CPAs Web Site/internships, 2003)

ACCOUNTING EDUCATION INTERNSHIPS

Core Competencies and Experiential Learning

The American Institute of Certified Public Accountants (AICPA) conducted a study of its membership, through focus groups, survey questionnaires, and meetings, to determine the core competencies essential to professional accounting success. These core competencies are organized into three major categories: functional competencies, personal competencies and broad business perspective competencies. In order to characterize the importance of experiential learning, the AICPA has linked the attainment of these core competencies with experiential learning programs in the table below, taken from the AICPA web site. (American Institute of CPAs Web Site/internships, 2003)
GUIDELINES FOR ACHIEVING THE AICPA CORE COMPETENCIES THROUGH EXPERIENTIAL LEARNING PROGRAMS

This chart links the AICPA Core Competency Framework to the skills that could be developed as a result of an internship experience. Internships are an opportunity to test and develop "personal competencies", functional competencies", and "broad business perspective competencies" as well. Each school will need to evaluate their respective program to determine the extent to which these competencies are met. (American Institute of CPAs Web Site/internships, 2003)

<table>
<thead>
<tr>
<th>AICPA Core Competencies</th>
<th>As a result of the internship, a student will be able to...</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Functional Competencies</strong></td>
<td></td>
</tr>
<tr>
<td>Decision modeling</td>
<td>? Understand cause and effect of decisions</td>
</tr>
<tr>
<td>Risk analysis</td>
<td>? Understand business risk and financial risk of the company and the industry</td>
</tr>
<tr>
<td>Reporting</td>
<td>? Construct concise and clear documentation</td>
</tr>
<tr>
<td>Research</td>
<td>? Research a problem efficiently and effectively</td>
</tr>
<tr>
<td>Leverage technology to develop and enhance functional competencies</td>
<td>? Uses technology to perform research and develop documentation</td>
</tr>
<tr>
<td><strong>Personal competencies</strong></td>
<td></td>
</tr>
<tr>
<td>Professional demeanor</td>
<td>? Ability to adapt to changing work environment, including differing requirements of different supervisors and tasks</td>
</tr>
<tr>
<td></td>
<td>? Understand and follow office procedures</td>
</tr>
<tr>
<td></td>
<td>? Dress professionally and maintain a professional demeanor</td>
</tr>
<tr>
<td></td>
<td>? Demonstrate continuous improvement through a commitment to learning and learning from mistakes</td>
</tr>
<tr>
<td></td>
<td>? Produce a reasonable volume of quality work</td>
</tr>
<tr>
<td></td>
<td>? Respect confidentiality</td>
</tr>
<tr>
<td>Problem solving and decision making</td>
<td>? Balance working independently and seeking help</td>
</tr>
<tr>
<td></td>
<td>? Apply materiality concept</td>
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<tr>
<td></td>
<td>? Apply knowledge from one situation to the next</td>
</tr>
<tr>
<td></td>
<td>? Understand interrelationships of information and data</td>
</tr>
<tr>
<td>Interaction</td>
<td>? Respect alternative ways of doing things</td>
</tr>
<tr>
<td></td>
<td>? Work well with others</td>
</tr>
<tr>
<td>Communication</td>
<td>? Communicate clearly in expression and content</td>
</tr>
<tr>
<td></td>
<td>? Ask good questions</td>
</tr>
<tr>
<td>Project management</td>
<td>? Organize and plan work</td>
</tr>
<tr>
<td></td>
<td>? Prioritize work and meet deadlines</td>
</tr>
<tr>
<td>Leverage technology to develop and enhance personal competencies</td>
<td>? Use technology to improve efficiency, including spreadsheets, word processing, graphing, internet</td>
</tr>
<tr>
<td><strong>Broad Business Perspective Competencies</strong></td>
<td></td>
</tr>
<tr>
<td>Strategic/critical thinking</td>
<td>? Apply cross functional academic training to the job</td>
</tr>
<tr>
<td></td>
<td>? Develop a healthy skepticism</td>
</tr>
<tr>
<td></td>
<td>? Begin a project with the end in mind</td>
</tr>
<tr>
<td></td>
<td>? Understand the relationship of the task/project to the whole</td>
</tr>
<tr>
<td>Industry/sector analysis</td>
<td>? Apply cross functional academic training to the job</td>
</tr>
<tr>
<td>Legal/regulatory perspective</td>
<td>? Acquire knowledge of SEC reporting guidelines or statutory provisions of the Internal Revenue Code</td>
</tr>
<tr>
<td>Leverage technology to develop and enhance personal competencies</td>
<td>? Understand the interrelationship of systems</td>
</tr>
</tbody>
</table>
Perdue School of Business Internships

In the Salisbury University Perdue School of Business, faculty educate and mentor students both in and out of the classroom. We believe that out-of-class learning experiences are so important that we require every student in the Perdue School to successfully complete some type of Applied Business Learning Experience (ABLE) before they graduate. Following is an excerpt from the Salisbury University Undergraduate Catalogue:

“A unique feature of the Perdue School of Business is the Applied Business Learning Experience program, successful completion of which is a graduation requirement for all students majoring in accounting, business, or management information systems. Students must demonstrate that they can translate and effectively use classroom learning in business, government, and non-profit organizations. ABLE provides a variety of experiential learning options: a work-study cooperative program, full and partial immersion internships, community projects and student consulting.”

Experiences take a wide range of shapes and forms and center on out-of-class learning experiences that have real-world application value and earn academic credit for the student. For an internship to satisfy the ABLE requirement, it must be completed as part of enrollment in ACCT 490, Accounting Internship (3 credits), and must involve the student in working with an organization in a planned, progressive-development program for a minimum of 120 hours over a 10-week period.

Emphasis is on a quality experience for students through direct faculty review or supervision. Faculty supervised internships include:
- Volunteer Income Tax Assistance (VITA)
- Non-Profit Audit and Consulting
- Perdue School Endowment Management
- Info Management Consulting

Having addressed the importance that colleges and professional organizations give to experiential learning, we now narrow our discussion to a specific example of an experiential learning internship, the goal of which is the creation and operation of a student managed co-op book store.

UNIVERSITY TEXTBOOK CO-OPS

The idea of developing a student book co-op is not new. The Yale Co-op has been in business (in a number of locations) since it opened in Connecticut Hall at Yale in 1885 with the purpose of sharing its profits among its members. The co-op at the University of Texas was founded in 1896 as the result of disappointment with the services and high book prices charged by a privately owned bookstore on campus, and was “owned by students, faculty, and staff to furnish books, supplies, and clothing at discounted prices to its members.” Other universities with student textbook co-ops include the University of Connecticut, and the Indiana University of Pennsylvania (University of Texas 2003; University of Connecticut 2003 Internet Sites).

Beta Alpha Psi (BAP) Textbook Co-op

The BAP Student TextBook Co-op Service Learning Project began in the Fall of 2002 as a result of 1) long-standing student and faculty dissatisfaction with the performance - or lack thereof - of the university operated bookstore, 2) high textbook prices and rapidly escalating tuition, and 3) the opportunity for the Beta Alpha Psi Fraternity for Accounting, Finance, and Information Professionals to fulfill its service mission, in this case to the campus student and faculty communities.

The BAP Textbook Co-op's first venture was to provide new edition texts for two accounting courses at the publisher's wholesale price. Subsequently the Co-op has expanded sales to include all business school majors, as well as limited sales of non-business textbooks. It has also tested buying and selling used textbooks and
developed a business plan to guide its operations and future expansion.

University Reaction
The co-ops initial operations were successful, so much so that the university's VP for Administration, responsible for the university operated bookstore, demanded that the BAP Co-op, or the business school itself, give the university bookstore the approximately $10,000 mark-up it would have charged had it sold these textbooks.

The issue was brought to the university Provost and resulted in a meeting of the Provost, VP for Administration, VP for Student affairs, Chief Information Officer, Dean of the Business School, and the Beta Alpha Psi faculty Advisor. Several of the administrators insisted that any campus activity, involving a university student group or university faculty, which was in "competition" with products or services otherwise available through the university, must cease. Indeed, the VP for Administration at one point labeled the BAP Textbook Co-op Service Learning Project "illegal", demanded full access to records and financial information relating to it.

The university's Chief Information Officer he had reviewed the BAP use of its university e-mail account to communicate with students and faculty regarding the TextBook co-op and that he had recommended that the BAP e-mail account be terminated (this has not occurred).

The business school Dean and the VP for Student Affairs provided some measure of support for the value and objectives of the Co-op.

The university Provost insisted that the business school in no way support or otherwise be associated with the BAP Textbook Co-op Service Learning Project and, most significantly, that no student should be allowed to fulfill their ABLE internship graduation requirement by participating in the Co-op's Service Learning Project. The BAP Advisor insisted that any decision regarding the academic value and suitability was solely the responsibility of the faculty members who mentor and supervise student internships. Further, the advisor explained that the BAP Textbook Co-op Service Learning Project was an entrepreneurial venture which required and made use of skills integral to the full range of the academic disciplines and courses offered in the business school. In short, an internship with the BAP Textbook Co-op Service Learning Project is unsurpassed by any other available internship experiences and was superior to most others in meeting the stated objectives of the internship program.

Education Value and Non-Discrimination
The most troubling aspects of the opposition to the BAP Textbook Co-op Service Learning Project by several university officials are:

1) Ignoring - even denigrating - the academic/professional development value of an academic and practical internship demonstrably better than most and,
2) Discrimination against this national professional and educational fraternity by attempting to forbid its use of campus facilities and services which are commonly used by other campus student organizations.

Conclusion
The BAP Textbook Co-op Service Learning Project continues its operations, serves the campus student and faculty communities, plans continuous improvements and innovations, and furthers the academic and professional development of its members though not in the supportive environment that would be expected, given its strong contribution to the educational mission of the university.
REFERENCES


2. The University of Baltimore, 2003 (http://www.ubalt.edu/careercenter/students/internships.html)


4. Towson University, 2003 (http://www.towson.edu/absel/People/abselconstitution.html)

5. George Mason University, 2003 (http://ncc.gmu.edu/exlearn.html)


7. Radford University, 2003 (http://www.radford.edu/~celcd/students.htm)


Abstract

Recently, Forbes (2002) listed the top 25 securities irregularities among upper management executives, and little later, Fortune (2002) featured another list of the 25 largest corporate irregularities involving corporate accounting frauds and security scandals. The list of securities irregularities involved a total haul of over $23 billion dollars, averaging $923 million per company. The list named 55 top executives who laundered over $14 billion, in excess of $257 million dollars each. This paper provides an ethical analysis of corporate accounting irregularities. Whether such corporate frauds are described as insider trading practices, overselling shares to depress stock
prices, overstating financial worth to boost stock prices, overstating revenues by “round-trip” sales, understating debts, or just, “cooking” the books, they are all corporate failures of public trust. They are failures of corporate accountability. In the wake of these escalating corporate accounting scandals, several ethical and moral questions arise that we address in this paper.

The authors first address the methods employed by a number of firms that resulted in accounting irregularities, including round trip sales and various revenue inflation techniques. The ethical theory of distributive justice is delineated along with the principles of non-malfeasance, the canons of beneficent justice, and Rawls’ theory of fair opportunism. Finally, the authors evaluate the accounting irregularities that have plagued the news in the recent periods, and discuss the implications of their findings.

A BRIEFING ON CORPORATE ACCOUNTING IRREGULARITIES

We can generally classify most of the corporate accounting irregularities under two heads: a) fake transactions like “round-Trip” sales, and b) manipulation of debts and assets to overstate the value of the company. The U.S. Federal Energy Regulatory Commission (FERC) defines wash trading, also known as "round trip" or "sell/buyback" trading, as the sale of a product, e.g. electricity, to another company with a simultaneous purchase of the same product at the same price.

Essentially, the wash trading is false trading because it boosts the companies’ trading volume, or even sets benchmark prices, but shows no gains or losses on the balance sheets. While this kind of trading may not be illegal, it can manipulate the power market, which is illegal. An inflated balance sheet from round-trip trading misleads investors about the true nature and volume of the company’s business. Large volumes of "wash" trades raise the revenues but have no effect on earnings.

Round-trip Sales:

1. Enron and Qwest Communications: Denver-based Qwest Communications used bandwidth to manufacture illusory revenue streams in its recent deal with Enron. According to investigators, Qwest agreed to pay Enron $308 million for the use of “dark fiber” (or unused fiber optic) capacity. In exchange, Enron agreed to pay Qwest between $86-195 million for access to active sections of Qwest’s network. Both deals turned out to be fake allowing both companies to record fat revenues for the period, and particularly helped Enron avoid reporting a loss for that period (Pizzo 2002). Qwest admitted that an internal review found that it incorrectly accounted for $1.6 billion in sales. It will restate results for 2000, 2001, and 2002. It is planning to sell its phone director unity for $7.05 billion in order to raise funds.

2. CMS Energy (May, 2002): It executed several “round-trip” trades with Reliant Energy to artificially boost energy trading volume. Thomas Webb, former CFO of Kellogg, has been appointed as its new CFO since August 2002. These companies have admitted that they have wash traded close to $6 Billion in sales revenues, either between these two companies, or involving other energy companies involved in the fraud.

3. Dynegy (May, 2002): Also executed “round-trip” trades to artificially boost energy trading volume. S&P cut Dynegy’s rating to “junk,” even though the company is conducting a re-audit.

4. El Paso (May, 2002): Also executed “round-trip” trades to artificially boost energy trading volume. Oscar Wyatt, a major shareholder and renowned wildcatter, may be engineering a management shake-up.

round trip trades had no “material” impact on current or prior financial periods.

6. **Global Crossing** (February, 2002): The company engaged in network capacity “swaps” with other carriers to inflate revenue and shredded documents related to securities practices. Company filed Chapter 11 bankruptcy protection. The Congress is investigating the role of its securities firms in its bankruptcy.

7. **Homestore.com** (January, 2002): Inflated sales by booking barter transactions as revenue. The California State Teachers’ pension fund, which lost $9 million on a Homestore investment, has filed suit against the company.

8. **Merck** (July, 2002): Recorded $12.4 billion in consumer-to-pharmacy co-payments that Merck never collected. Even though SEC approved Medco’s IPO registration that would raise $1 billion, the company has withdrawn from it.

So far, the FERC has demanded disclosure on wash trading from almost 150 energy companies from all over the United States. Only when the investigation is complete and other wash trading information is uncovered will we be able to assess how widespread this trading actually was.

**Inflating or Restating Revenues:**

9. **Halliburton** (May, 2002): Improperly booked $100 million in annual cost overruns before customers agreed to pay for them. Legal watchdog group Judicial Watch filed a securities fraud against Halliburton.

10. **Enron** (October, 2001): Boosted profits and hid debts totaling over $1 billion by improperly using off-the-books partnerships; manipulated the Texas poser market; bribed foreign governments to win contracts abroad; manipulated California energy market. Ex-Enron executive, Michael Kopper, pled guilty to two felony charges; acting CEO Stephen Cooper said Enron might face $100 billion in claims and liabilities; company filed Chapter 11; its auditor, Arthur Anderson, was convicted of obstruction of justice for destroying Enron’s documents.

11. **WorldCom** (March, 2002): It overstated cash flow by booking $3.8 billion in operating expenses as capital expenses; gave founder, Bernard Ebbers, $400 million in off-the-book loans. Currently, the WorldCom scam totals $16 billion. The company found another $3.3 billion in bogus securities, and may have to take a goodwill charge of $50 billion to write-off its debts. Former CFO Scott Sullivan and ex-controller David Myers have been arrested and criminally charged. David Myers agreed being guilty on September 26, 2002.

12. **Peregrine Systems** (May, 2002): It overstated $100 million in sales by improperly recognizing revenue from third-party resellers. It slashed nearly 50% of its workforce to cut costs. Is on its 3rd auditor in 3 months and has yet to file its 10K for 2001; hence may be soon de-listed from the NASDAQ. Currently, it is restating revenues from April 1999 to December 2001, during which John Moores, Chairman, dumped $530 million of stock *(Fortune 2002).*

13. **Adelphia Communications**, the nation’s 6th largest cable TV company (April, 2002): The founding Rigas family collected $3.1 billion in off-balance sheet loans backed by Adelphia; overstated results by inflating capital expenses and hiding debt. The company filed for Chapter 11 bankruptcy on June 25. Three Rigas family members and two other ex-executives were arrested for fraud on July 24. The company is suing the entire Rigas family for $1 billion for breach of fiduciary duties, among other things *(Forbes 2002).*

14. **AOL Time Warner**: As the media market faltered and AOL’s purchase of Time Warner loomed, AOL inflated sales by booking barter deals and advertisements it sold on behalf of others as revenue to keep its growth rate up and seal the deal. AOL also boosted sales via “round-trip” deals with advertisers and suppliers. The Department of Justice (DOJ) has ordered AOL to preserve it documents. AOL confessed that it might have overstated revenue by $49 million. New concerns are that AOL may take another goodwill write down, after it took a $54 billion charge in April *(Forbes 2002).* The scandal went public in July 2002.
15. **Bristol-Myers Squibb**: Inflated its 2001 revenue by $1.5 billion by “channel stuffing” (i.e., forcing wholesalers to accept more inventory than they can sell to get it off manufacturer’s books). Efforts to get inventory back to acceptable size will reduce Squibb’s earnings by 61 cents per share through 2003 (Forbes 2002). The scandal was disclosed in July 2002.

16. **K-Mart (January, 2002)**: Allegedly, its securities practices intended to mislead investors about its financial health. The company is in bankruptcy situation; is undertaking a “stewardship” review to be completed by the end of 2002. February 26, 2003, two Kmart executives were indicted by a Detroit grand jury on federal charges of fraud, conspiracy and making false statements over their recording of a $42 million payment that resulted in an overstatement of Kmart’s results.

**ETHICAL ANALYSIS OF CORPORATE ACCOUNTING IRREGULARITIES**

Ethical scholars distinguish at least three primary positions when evaluating moral rectitude of decisions, actions, and institutions (Beauchamp and Bowie 1993; Frankena 1973): 1) **TELEOLOGY**: This position maintains that the moral correctness of all actions and institutions is determined **exclusively** by their **consequences**. 2) **DEONTOLOGY**: This position holds that the moral appropriateness of all actions is **always also, but not always only**, determined by their consequences; it is also determined by certain principles, rules, rights and duties of the subjects involved. 3) **DISTRIBUTIVE JUSTICE**: This position affirms that the morality of **at least some** actions is dependent upon how the costs and benefits, rights and duties of these actions are distributed among all its stakeholders. Thus, teleologically a managerial strategy or institution may have positive net benefits and deontologically it may not violate any known moral principles, rights or duties. But in the distribution of these rights and duties, and costs and benefits, there may be some injustice. **The strategy or institution could generate several negative social consequences to various consumer publics not foreseen by the marketing teleologist or deontologist.** Given the predominantly distributive justice nature of insider trading frauds we only invoke the ethical theory of distributive justice for our ethical assessment. **Table 1** summarizes our rule distributive justice assessment of corporate accounting irregularities.

It is conventional to distinguish between an **act** and the **rule** application of ethical theories. An act application judges the morality of a strategy or an institution by applying a given moral principle directly to the strategy or institution without any intermediary rules, while the rule application judges morality only after verifying if the strategy or institution conforms to firm and publicly advocated moral rules derived from moral principles. The ethical framework presented in this article uses normative ethical theories, moral principles and moral rules derived from these ethical theories, to arrive at considered moral judgments regarding corporate irregularities. That is, we will justify our moral judgments on corporate securities irregularities by moral rules that are in turn justified by moral principles, which themselves are justified by normative moral theories. We use **rule** applications of distributive justice.
<table>
<thead>
<tr>
<th>Normative Sub-Theory</th>
<th>Moral Principles from Set A</th>
<th>Moral Rules derived from Set B</th>
<th>Moral Judgments derived from Set C: (Set D)</th>
<th>Does this Distributive Justice Rule justify Corporate Securities Frauds?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malfeasance or Strict Liability Justice</td>
<td>Do not inflict evil or harm on any one by any action.</td>
<td>No corporate strategy should directly or indirectly cause harm to one’s stakeholders.</td>
<td>Corporate securities frauds economically harmed several constituencies such as shareholders, employees and customers.</td>
<td>No.</td>
</tr>
<tr>
<td>Protective Justice</td>
<td>Protect people from harm.</td>
<td>Corporate strategies should at least protect stakeholders from harm.</td>
<td>Corporate securities frauds did not protect stakeholders from economic harm.</td>
<td>No.</td>
</tr>
<tr>
<td>Preventive Justice</td>
<td>Prevent people from harm.</td>
<td>Corporate strategies should at least prevent stakeholders from harm.</td>
<td>Corporate securities frauds did not prevent stakeholders from economic harm.</td>
<td>No.</td>
</tr>
<tr>
<td>Procedural Justice</td>
<td>Set up just procedures to prevent and protect people from harm.</td>
<td>Corporate strategies should set up just procedures to avoid all harm.</td>
<td>Corporate securities strategies did not set up just procedures to prevent or protect stakeholders from economic harm.</td>
<td>No.</td>
</tr>
<tr>
<td>Beneficent Justice</td>
<td>Promote or do good to all stakeholders.</td>
<td>Corporate strategies should promote good to their stakeholders.</td>
<td>Corporate securities frauds did not promote good to the stakeholders.</td>
<td>No.</td>
</tr>
<tr>
<td>Aristotle’s (1984) Minimum Principle of Distributive Justice</td>
<td>Treat all equals equally, and unequals unequally.</td>
<td>Corporate strategies should treat all one’s shareholders, employees, and customers, within given classes, equally.</td>
<td>Corporate securities frauds did not treat all one’s shareholders, employees, and customers, within given classes, equally.</td>
<td>No.</td>
</tr>
<tr>
<td>Socialist Justice</td>
<td>Treat all stakeholders according to each one’s need.</td>
<td>Corporate strategies should treat all one’s stakeholders according to each one’s need.</td>
<td>Corporate securities frauds did not treat one’s stakeholders according to each one’s need.</td>
<td>No.</td>
</tr>
<tr>
<td>Retributive Justice</td>
<td>Treat all stakeholders according to each one’s efforts.</td>
<td>Corporate strategies should treat all one’s stakeholders according to each one’s efforts.</td>
<td>Corporate securities frauds did not treat all one’s stakeholders according to each one’s efforts.</td>
<td>No.</td>
</tr>
<tr>
<td>Capitalist Justice</td>
<td>Treat all stakeholders according to each one’s productivity.</td>
<td>Corporate strategies should treat all one’s stakeholders according to each one’s productivity.</td>
<td>Corporate securities frauds did not treat all one’s stakeholders according to each one’s productive contribution.</td>
<td>No.</td>
</tr>
<tr>
<td><strong>Social Libertarian Justice</strong></td>
<td>Treat all stakeholders according to each one's contribution to the common good.</td>
<td>Corporate strategies should treat all one's stakeholders according to each one's contribution to the common good.</td>
<td>Corporate securities frauds did not treat all one's stakeholders according to each one's contribution to the common good.</td>
<td>No.</td>
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<tr>
<td><strong>Individual Libertarian Justice</strong></td>
<td>Treat all stakeholders according to each one's market-exchange value determined by supply and demand.</td>
<td>Corporate strategies should treat all one's stakeholders according to each one's market-supply-demand exchange value.</td>
<td>Corporate securities frauds did not treat all one's stakeholders according to each one's market determined exchange value.</td>
<td>No.</td>
</tr>
<tr>
<td><strong>Rescher's (1966) Canon of Legitimate Claims</strong></td>
<td>Treat all stakeholders according to each one's legitimate claims</td>
<td>Corporate strategies should treat all one's stakeholders according to each one's legitimate claims.</td>
<td>Corporate securities frauds did not treat all one's stakeholders according to each one's legitimate claims for legitimate claims.</td>
<td>No.</td>
</tr>
<tr>
<td><strong>Rawls' (1971) Libertarian Fair Opportunism (Equality Principle).</strong></td>
<td>Offer all stakeholders fair opportunity for benefits</td>
<td>Corporate strategies should offer all one's stakeholders fair opportunity for earned benefits.</td>
<td>Corporate securities frauds did not offer all one's stakeholders fair opportunity for earned benefits.</td>
<td>No.</td>
</tr>
<tr>
<td><strong>Rawls' (1971) Libertarian Fair Opportunism (Difference Principle).</strong></td>
<td>Nullify differences that arise from natural disadvantages</td>
<td>Corporate strategies should nullify all differences that arise from natural disadvantages of all one's stakeholders.</td>
<td>Corporate securities frauds did not nullify all differences that arise from natural disadvantages of all one's stakeholders.</td>
<td>No.</td>
</tr>
<tr>
<td><strong>Compensatory Justice</strong></td>
<td>Compensate the wronged person for the wrong done by restoring the person to his or her original position.</td>
<td>Corporate Strategy should compensate all stakeholders for the injustice done to them by the violation of all the above rules.</td>
<td>Corporate securities frauds have not yet compensated all stakeholders for all the wrong accrued to them through frauds.</td>
<td>No.</td>
</tr>
</tbody>
</table>

**The Ethical Theory of Distributive Justice**

Justice is giving to others what rightfully belongs to them (Rawls 1971). Justice, therefore, has both deontological (rights and duties) and teleological (costs and benefits) aspects. The theory of distributive justice is particularly relevant when different people put forth conflicting claims on society's rights and duties, benefits and burdens, and when all claims cannot be satisfied. In such cases, ethics scholars generally take the standards of justice more seriously than utilitarian considerations (Hare 1978; Rawls 1958). The moral right to be treated as free and equal persons is the foundation of distributive justice (Vlastos 1962). For instance, wash trading or understating one's debts to inflate company revenues may be productive and profitable to shareholders (hence,
possibly justifiable on utilitarian grounds), may not explicitly violate consumer or employee rights (hence, presumably justifiable on deontological grounds), but in as much as they unevenly distribute costs and burdens, rights and duties across various stakeholders such as consumers, competitors, suppliers, employees, and channel members, they violate distributive justice. Since corporate accounting irregularities imply an unjust distribution of costs and benefits between executives and relevant stakeholders, we first invoke the most relevant rule distributive justice in this regard, the principle of non-malfeasance.

The Principle of Non-malfeasance

The principle of non-malfeasance states that an act should do no harm to anyone at any cost and at any time. Ross (1930: 21-32) regards "not injuring others" as synonymous with the principle of non-malfeasance. Hart (1961:190) invokes the principle of non-malfeasance as a rule-utilitarian maxim, while others consider it as a rule-deontological theory of duty-ethics that obliges all to beneficence (Frankena 1973; Rawls 1971:114; Ross 1930: 21-36). Since the principle of non-malfeasance has both teleological and deontological attributes, we prefer to classify it under the ethic of rule distributive justice, since the latter combines both teleological and ontological considerations. The principle of non-malfeasance as applied to any act can imply four elements (Frankena 1973: 47):

1. The act should not inflict evil or harm (strict liability justice).
2. The act should prevent evil or harm (preventive justice).
3. The act should remove evil or harm (protective justice).
4. The act should do or promote good (beneficent justice).

According to Frankena (1973), the fourth element may not amount to a moral obligation, and constitutes the principle of beneficence. Also, the principle of non-malfeasance is primarily incorporated in the first element. The remaining three elements are more principles of beneficence than of non-malfeasance. Preventing harm and removing harm are alternate forms of promoting good (Frankena 1973). Applying the principle of non-malfeasance several important distributive justice rules follow. For brevity and space limitations, we just state these rules:

Rule 1: An executive accounting strategy is ethical as long as it does not inflict evil or harm on any one by that action (Principle of Strict Liability).

Rule 2: An executive accounting strategy is more ethical if, besides refraining from harm (Rule 1), the action also removes all evil or harm from any one who may be affected by that action (Principle of Protective Justice).

Rule 3: An executive accounting strategy is even more ethical if, besides refraining from inflicting harm or evil (Rule 1), and protecting people from harm (Rule 2), it also prevents evil or harm on any one affected by that action (Principle of Pre-emptive Justice).

Rule 4: An executive accounting action is ethical if it at least sets up just procedures to treat all people fairly (Procedural Justice).

Rule 5: An executive accounting strategy is moral if, besides observing Rules 1-4, it strives to serve the well being of customers and employees by actively striving to promote good among them (Beneficent Justice).

Duties of non-malfeasance include not only the duty of not inflicting actual harm, but also the duty of not imposing "risks of harm". By strict liability laws, it is not necessary to act maliciously or be even aware of or intending the harm or risk of harm. The harm can be legally "recovered" when the duty of non-malfeasance is violated. Such violation may involve commission or omission. Negligence is a failure to guard against risks of harm to others; it falls below the "standards of due care", established by law and morality, for the protection of others from the careless or unreasonable imposition of risks (Prosser 1971). The actual "standards of due care" should be determined by the principle of protective justice (Jonsen 1977).

Protective and pre-emptive justices are really subsets of procedural justice. The latter demands that structures and procedures be set up in a society such that the structures are just and produce just outcomes. Structures and procedures are often relative to each group,
society, state or country. Hence procedural justice is another instance of comparative distributive justice. One should distinguish 'just procedures' (procedural justice) from 'just results' (consequential justice). In some cases just procedures are solely sufficient to ensure just results (e.g., state lottery).

**Canons of Beneficent Justice**

Distributive justice looks at two important factors (Ryan 1942): what is distributed, and how it is distributed. What is distributed (e.g., products, services, profits, dividends, product information, market information, information on accounting procedures) "must itself be generated by production, whether one produces agricultural products, manufactured goods and commodities, or services" (Ryan 1942: 181). One's share of what is distributed may depend upon various modes, canons or subsets of distributive justice:

a) Canon of equality based on egalitarian justice;
b) Canon of need (socialist justice);
c) Canon of merit (naturalist justice);
d) Canon of effort (retributive justice);
e) Canon of productivity (capitalist justice);
f) Canon of common good (social libertarianism), and
g) Canon of supply demand (individual libertarianism).

The following seven rules for promoting good are based on these traditional canons of distributive justice (Rescher 1966; Ryan 1942). A corporate accounting or revenue reporting strategy is ethical if:

**Rule 6:** It at least treats all equals equally, and un-equals unequally.

**Rule 7:** It at least treats all stakeholders according to each one’s need.

**Rule 8:** It at least treats all stakeholders according to each one’s efforts.

**Rule 9:** It at least treats all stakeholders according to each one’s contribution.

**Rule 10:** It at least treats all stakeholders according to each one’s contribution to the common good.

**Rawls' Theory of Fair Opportunism**

A just society is not necessarily one in which all are equal, but one in which inequalities are justifiable. Rawls (1971) proposed two principles of distributive justice to defend equality and inequality: 1) the **Equality Principle** (Libertarian Fair Opportunism): each person engaged in an institution or affected by it has an equal right to the most extensive liberty compatible with a like liberty for all; equality is the impartial and equitable administration and application of rules which define a practice. 2) The **Difference Principle** (Libertarian Egalitarianism): inequalities as defined by the institutional structure or fostered by it are arbitrary unless they work out to everyone’s advantage, and provided that the positions and offices are open to all. The first principle requires basic equal liberty for all. The second principle admits existing inequalities and differences, if a) they work to the advantage of all, and b) if the social system offers equal opportunity for all to combat or compensate for these differences.

**Rule 13:** A corporate accounting strategy or institution is **ethical** if it offers each stakeholder an equal right to the most extensive benefits available to all its stakeholders. [Equality Principle]

**Rule 14:** A corporate accounting strategy or institution is **ethical** if it seeks to nullify among its stakeholders the advantages stemming from the accidents of biology, geography and history. [Difference Principle]

**DISCUSSION AND IMPLICATIONS**

The Enron bankruptcy raised questions about the validity of the independent audits and of the business practices of the accounting industry itself. It is clear that the auditors failed to pinpoint the accounting irregularity problems with companies involved in corporate scams. Given the fact that the accounting practices are relatively
simple it is hard to believe how easily the accounting firms disguised the truth, presumably in collusion with the audit and accounting branches of the implicated firms. It is just hard to accept that the accountants did not assess the magnitude of these frauds.

There were systems level failures at several points that allowed many corporate frauds and scams to remain undetected until they were so large that they bankrupted large companies, with billions of dollars of loss in shareholder equity. Some of the biggest and most prestigious U. S. accounting firms (e.g., Arthur Anderson, Deloitte & Touche, Ernst & Young, KPMG, and PricewaterhouseCoopers) offered consulting services to the same companies they also audited. These firms clearly compromised their credibility and independence when they had to audit their own work. The Securities and Exchange Commission (SEC) failed to bar accountants from also being consultants for the same company due to extensive pressure from the accounting lobbying groups. The same groups have contributed millions of dollars to individuals, PAC's, and soft money contributions to fight any SEC rules change. Some of the largest scams recently uncovered were in the utility business.

Several wholesale power traders revealed that they participated in so called "round trip" or "wash trading".

**CONCLUDING REMARKS**

There are several issues that make it difficult to predict, uncover or control corporate corruption and fraud. When the top-level business executives are corrupt it is difficult for the mid-level managers to detect or uncover the deceptive acts and the problems underlying them. Moreover, the mid-managers would be worried about their jobs, especially if whistle blowing is punished in corporations. Additionally, corporate executives involved in fraudulent activities that could launder billions of unearned personal profit to them would not hesitate in pressuring and bribing subordinates into silence even if the latter detected something irregular. Some subordinates could be could be easily seduced to keep quiet "for the good of the company" or "only until the mess is straightened out." A sense of personal loyalty may deter some from resigning their jobs under such strenuous situations.
REFERENCES


THE ABSOLUTE NECESSITY TO REFORM PENSION ACCOUNTING

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ABSTRACT

Daniel Kieso, Jerry Weygandt, and Terry Warfield wrote the tenth edition of Intermediate Accounting published by Wiley. With respect to accounting for pensions, they wrote, “Accounting for pensions, outlined in Statement No. 87, and demonstrated in the balance of this chapter, is not perfectly logical, totally complete, or conceptually sound.” This paper will explore the illogical, incomplete, and unsound accounting for pensions in light of the recent decision by the FASB to issue an exposure draft some time late in 2003 to explore the possible need to change the way pensions are recorded. Suggestions and comments with respect to what must be done to make accounting for pensions logical, complete, and sound are an integral part of the paper.

INTRODUCTION

Every semester, hundreds of accounting educators teach thousands of accounting students how to account for pension transactions. In the case of accounting for pensions, accounting educators teach students to understate assets, understate liabilities, overstate net income and earnings per share, use estimated amounts when actual amounts are readily available, and ultimately bury the truth in what may be voluminous pages of notes the financial statements.

The reason we do this is because accounting for pensions is “not perfectly logical, totally incomplete, and conceptually unsound”. [Kieso, Weygandt, and Warfield, 2001, P. 1125].

Accounting educators begin the topic of pension accounting by telling students’ accounting for pensions is illogical, incomplete, and conceptually unsound. Students will often ask about the necessity of studying something that is illogical, incomplete, and conceptually unsound.

Accounting educators must then spend some time explaining we do this because the FASB, big business, preparers of financial statements, and users of financial statements could not agree on how best to account for pensions. When groups and individuals are unable to agree, very often a compromise must be reached.

The compromise reached was to account for pensions in a way that partly satisfies all interested parties but at the same time runs contrary to the conceptual framework of accounting. The conceptual framework of accounting must be relied on to generate GAAP that is logical, complete, and sound. With respect to accounting for pensions, the conceptual framework has been largely ignored in favor of what is considered politically correct. This places the accounting profession and accounting
educators charged with educating future accountants on a very slippery slope.

The important question to answer is “why compromise logic, completeness, and conceptual integrity?” The answer is hard to fathom by many involved in the process. The answer is we compromise logic, completeness, and conceptual integrity because this is what big business wants. Big business wants to be able to understate liabilities and overstate net income. In the case of pension accounting, big business got what they wanted. Accounting for pension plans is best summed up by just three words: “politically acceptable approach” [Spiceland, Sepe, and Tomassini, 2003, p.851].

HISTORICAL PERSPECTIVE

A pension plan is “any plan, fund, or program committed to or its benefits described in writing to the employees of a company or corporation by an employer for the purpose of setting aside funds for the time of retirement of the employee. [Wirtz, 1962, p. xvi].

The first pension plan established in America was for the benefit of widows and children of Presbyterian ministers. This plan was established in 1759. American Express was the first American corporation to establish an employee pension plan. This initial corporate pension plan was adopted in 1875.

Pension plans emerged primarily from “an attempt at social reform in order to replace the poor relief system, and, in the early years of establishment were more commonly referred to as ‘working man’s insurance’ ” [Orloff, 1993, p. 9].

Many believed the passage of the Social Security act of 1935 would replace private pension plans. The replacement of private plans with Social Security did not happen. Private plans were still needed to supplement Social Security in order to satisfy the original goal of establishment of a pension plan which was “to enable the employer to retire a worker after he has passed his period of usefulness”. [Schultz, 1983, p.19].

Corporate pension plans have grown astronomically since the inception of pension plans by American Express in 1875. Hundreds of thousands of private plans with millions of active participants now exits. The value of private pension plans is in the trillions of dollars.

The accounting profession has experienced some difficulty formulating generally accepted accounting principles (GAAP) for the accounting of pensions. Numerous pronouncements have been issued in an attempt to establish the required procedures for the reporting and disclosures of pension plans.

The pronouncements include:

- September 1956, Number 47—Accounting for costs of pension plans (superceded)
- November 1966, Number. 08—Accounting for the costs of Pension Plans
- March, 1980, Number 35—Accounting and reporting by defined benefit pension plans (amended)
- November, 1983, Number 75—Deferral of the effective date of certain accounting requirements for pension plans of state and local governmental units (superceded)
- December, 1985, Number 87—Employers' Accounting for pensions (amended)
- August, 1992, Number 110—Reporting by defined benefit plans of investment contracts
- February, 1998, Number 132—Employers' disclosure

When focusing on the questions of what amount of employers’ liability and pension obligation should be reported and what is the pension expense for the period, statements 87, 110, and 132 represent current GAAP. Though the Financial Accounting Standards Board (FASB) issued an exposure draft in the fall of 2003 dealing with pension plan disclosure, the draft and subsequent events have not yet generated a new standard.

The most recent statement (statement number 132) was issued to improve the effectiveness of pension plan disclosure, provide some information not previously required, and delete eliminate some disclosure requirements no longer considered useful and relevant.

Some of the primary elements of Statement number 132 included:
• Added disclosure of the components of obligation and asset value changes
• Allows aggregation of a company’s disclosure of over/under funded plans
• Eliminate disclosure of plan provisions
• Added disclosure of comprehensive income
• Permit non-public entities to reduce disclosures

The essence of the change in pension plan accounting from the past to the present revolves around the change from the cash basis to the accrual basis and the change from non-capitalization to a hybrid capitalization.

The FASB considered a move from the non-capitalization approach to an approach requiring capitalization. However, after much debate, a compromise was reached and statement number 87 was issued. Statement number 87 provides a middle ground in accounting for pension plans. Statement number 87 required a bit more than non-capitalization and a bit less than full capitalization.

From an historical perspective, it is important to note the diverse roles the employer and the government play in the process of accounting for pension plans. The employer controls the expense side of the ledger. Employers follow GAAP in order to determine the amount of liability and pension expense to be reported on the financial statements. The government controls the contribution side of the ledger. Employers must follow government regulations in regard to the amount of yearly contributions to the plan.

**NEED TO REFORM**

The marketplace has focused much attention on the way companies are allowed to report estimated earnings as opposed to actual earnings. Under current GAAP, companies are allowed to report a gain of 10% or more even if actual gains were only 2%.

This is because the FASB wanted to supply big business with a mechanism to reduce volatility of earnings and allow for the spreading of earnings and losses over a period of years rather than just a single year. The problem is very often expectations fall short of reality.

Eric J. Fry [2002, p.1] wrote, “For example, during the fiscal year ending October 31, 2001, Deere & Co., the tractor company, expected its pension plan and post-retirement benefit plans to produce investment gains of $657 million. In actuality, however, these plans had losses of $1.419 billion. That is a difference of more than $2 billion

Jacqueline Doherty of Barron’s was quoted by Eric Fry [2002] in his article Pension Plan Poison. Doherty stated “We have over $300 billion of pension fund deficits in 2002 for S&P companies. This is $300 billion cash these companies have to come up with over the next few years, and $300 billion that comes out of corporate cash flow. Incredibly, through the magic of GAAP accounting, these towering liabilities do not necessarily penalize reported profits, at least not immediately. This is because companies include expected pension plan returns on the income statements instead of their actual returns. Although pension fund assets lost $90 billion in 2001, an accounting sleight-of-hand allowed companies to show that income of $104 had been generated.” [Fry, 2002, p.4].

The need to reform pension accounting is demonstrated by considering what the balance sheet and income statement would look like if the procedures for accounting for pensions were applied to preparation of the financial statements.

The balance sheet would offset assets and liabilities, report one account and one amount, and disclose the details in the notes. The income statement would
also be a single line statement. This would be possible because all revenues/gains and all expenses/losses would be offset and the details would be disclosed in the notes. Somewhere in the notes would be a disclosure that revenues were determined based on expected sales and not actual sales, even though actual sales were know.

The FASB response to the need for reform was to issue an exposure draft about possibly changing the disclosure requirements. The draft was issued in the fall of 2003. The draft provides for no significant changes to accounting for pensions. Even if the draft eventually results in a new statement, accounting for pensions will still be illogical, incomplete, and conceptually unsound.

For all intents and purposes, accounting for pension plans has virtually rendered moot the conceptual framework of accounting. The profession has certain fundamental rules guiding the preparation and communication of financial statements. Accounting for pension plans lacks due consideration for these fundamental guidelines.

**RESTORING LOGIC, COMPLETENESS, AND CONCEPTUAL INTEGRITY**

Accounting for pensions must be logical, complete, and conceptually sound. The essential elements necessary to make accounting for pensions logical, complete, and conceptually sound are:

- Report pension liabilities on the face of the balance sheet
- Report pension plan assets on the face of the balance sheet
- Report actual return on plan assets on the income statement
- Rely far less on note disclosure and far more on reporting all elements of pension expense on the face of the financial statements
- Stop calling future amounts to be paid retirees an obligation. Call the obligation what it really is: a liability.

**SUMMARY**

The private sector establishes GAAP. In the case of accounting for pensions, the FASB and all those who support current GAAP for pension plans have sacrificed the conceptual framework in favor of pacifying big business and political correctness. In light of this, the days of private sector establishment of accounting rules and guidelines may give way to governmental regulation. Once this happens, accounting will no longer be guided by a code of ethics. The code of ethics will be replaced with laws.

Governments exit to protect the public. If the accounting profession does not restore logic, completeness, and conceptual integrity to accounting for pensions, the government must act to protect the citizenship. We need protection so recent events involving companies such as Enron, WorldCom, and Adelphi will never again happen.

When will accounting for pensions become logical, complete, and conceptually sound? In a word: never, as long as big business controls accounting for pensions.
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Abstract
The paper conducts an empirical investigation of the economic impact of external debt on the performance of the Nigerian economy. The study combines survey and investigative research methods, and uses descriptive statistical tools and correlation analysis on available data. Results show, among others, that there is a poor contribution of externally generated funds in boosting relevant economic indicators such as investments, aggregate output, and the manufacturing sector; only import activities are moderately affected. An obvious implication is that borrowing is not necessarily bad, but if the money borrowed is not appropriately utilized as may be true with the Nigerian experience, the resultant overhang becomes very burdensome. Thus the level of external financing fails to ginger desired level of economic growth in the country over the period of investigation.

INTRODUCTION
It is a truth, universally acknowledged, that many developing economies are being plagued by the acute problem of external debt overhang. Nigeria, an emerging African economy is a case in point. What is more compounding, that provides serious cause for analysis, is that controversy, ambiguity, complexity still surround the country's experiences despite the analytical attempts by many to explain the phenomenon. A school of thought argues that external borrowing is a key vector of economic development of any nation. Nigeria is not an exception. The center pin of the argument is that no country whether developed or developing is able to grow and develop to the ultimate with out one form of external capital or the other. This is the IMF school. Another school believes that "as the love for credit is the root of all bankruptcy, external indebtedness is only a sure way of reducing a borrower nation to the position of economic slavery, dependence and underdevelopment. This anti-IMF stance sees external debt as a monster that frustrates development (Fletcher, 1978; Onah, 1994; Odesanmi, 1990; Anyafo, 1996). This controversy is yet to be empirically resolved using the Nigerian experience. In order to do this, the relationships subsisting between external debt indicators and aggregate economic indicators must be examined.

In another development, the actual volume and magnitude of the country's debt has remained a shroud in mystery. Until early 2001, when the World Bank assisted the country to determine the actual amount owed to all creditors (including the Paris and
London clubs), the country did not know how much it owed. One begins to wonder the practical basis for both debt servicing and rescheduling arrangements previously undertaken by the country. The current figure posted the magnitude of the debt to $28.4 billion, which was less than what was earlier ‘assumed’ by the country’s highest monetary authority (the CBN). That apart, the ‘mystery’ underlying the statistical trends needs be unraveled. This is all the more important in view of the fact that the magnitude of the debt and its associated effects has become of great concern to the Nigerian Government and populace. Notable also, is that the government, in its continuing effort to manage the debt situation has not been greeted with success. The measures adopted range from debt conversion, debt rescheduling to debt servicing. Despite these and other strategies, the situation tends to worsen. An examination of the measures becomes an imperative in a bid to help proffer strategies that would prove workable.

The Nigerian external debt is complex and the overhang draws from the nature of its causal vectors. Certain commentaries have outlined a plethora of endogenous and exogenous factors as the major classifications of the causes of the country’s external debt overhang. Olukole (1991), for instance, accused such endogenous factors as low propensity to save and high consumption pattern tenor on the part of Nigerian, tenor mismatched financing, unrealistic exchange rates, bad management of borrowed funds, and over-dependence on imports. Some exogenous factors identified include declining foreign exchange earnings and capitalization due to market forces. The theoretical plausibility of these explanations notwithstanding, expert opinions of key players and knowledgeable professionals, who also suffer the incidence of external indebtedness, would constitute active ingredients lending support to secondary evidence obtained for this study.

It is the critical objective of this paper to analyze the impact of the burden of external indebtedness on the economic performance of Nigeria. It also behooves the paper to identify and analyze the causes of the perennial debt burden plaguing the country. In order to accomplish the foregone, the paper is divided into five parts. The first part is the introduction. The next part dwells on methodology, while part three focuses on the trends in the external debt positions of Nigeria from 1970 to date. The fourth section dwells on analysis of results obtained during the study, while the last part deals with the summary and recommendation.

II. METHODOLOGY
This study combines the survey and the investigative research methods, with the former playing a major supportive role. The research instrument for the survey is a set of structured questionnaire comprising closed,- and open-ended questions. The sampling formula follows that suggested by Kazmir (1976): and stated as:

\[ n = \left( \frac{Z}{2E} \right)^2 \]

Where \( n \) = sample size, \( Z \) = the value applied for specified confidence limit, \( \alpha = .05 \) and \( E \) = size of tolerable limit (assumed 10%). Thus the sample size is computed to be 96.04 under these assumptions. Rounding off the computed \( n \) to 100 we thus set out to
distribute 100 sets of questionnaire to the selected respondents. The sampling procedure is the judgmental approach, with distributions made to professionals in the educational, health, public service, business and industrial sectors of the economy following the example suggested by Anyafo (1996). The secondary data for this study are sourced from the publication of the Central Bank of Nigeria (CBN), namely the statistical Bulletin, and the Major Economic, Financial and Banking indicators of Nigeria for various years, among others. The data points cover the 1970 through 1997 period; however, current developments up to year 2000 are also covered in the analysis.

Two levels of analysis are done. The first concerns itself with the presentation and analysis of primary and secondary data using such descriptive statistical tools as frequency and percentage distributions and measures of central tendencies. The second level involves the correlation analysis with associated t-test statistic, which assists in testing three hypotheses nominated for the study. The appropriateness of this tools cannot be overemphasized since the paper seek in part, to examine the relationship between the level of external indebtedness or debt service and the aggregate economic indicators of the Nigerian economy. These relationships are captured in three major null hypotheses:

- There is no significant relationship between the aggregate output performance (GDP) of the country and her external indebtedness.
- There is no significant relationship between the gross national product (GNP) of the country and her external debt service.
- There is no significant relationship between the investment performance and the external debt burden.

The rationale for these general statements are as follows: First, since the general outcry is that the ‘mountain’ of external debt has been paralyzing the country’s productive activities and base, then there ought to be identifiable relationships existing between the level of external debt and the levels of investment and aggregate output. Secondly, it is argued that the amounts spent on debt servicing constitute significant leakage’s over the years that would have been channeled to better the lot and welfare of the country’s teeming citizenry. This so assumed, the amounts of debt service must have significant relationship with the gross national product or income. The authors think, in line with Winker and Hays (1975), that “the correlation analysis which measures the strength of the statistical relationships between two variables,” is suitable to test the above hypothesis.

III. EXTERNAL DEBT AND THE NIGERIAN ECONOMY

The experience of the county shows that Nigeria’s external debt dates back to 1958 when a loan of $28m was contracted for railway construction. Until 1977, Nigeria did not borrow much from external sources. As observed by Uniamikogbo (1994) the oil boom of the mid-seventies brought the country sufficient foreign exchange earnings to meet its obligations. However, with the advent of an oil glut in 1978, revenue from the oil sector declined and the occasion warranted looking out for external sources to support the financing of the country’s balance of payment and projects. Thus external debt increases astronomically in 1978 and continued to increase ever since. The external indebtedness of the country increased from $28m in 1958 to $567m in 1970; and to $34, 557m in 1990 (Ajayi, 1991). The present level submitted by the World Bank Report as at year 2000 is $28.4 billion. The secondary data generated mainly from the statistical Bulletin of the Central Bank of Nigeria are presented in Table 1, which
summarizes the external debt statistics and some economic indicators such as the GNP, GDP, total domestic investment, growth in GDP, debt service ratio, and debt-GDP ratio, respectively.

From the Table, the total external debt stock of Nigeria stood at N488.8m while the debt service was N31m in 1970. The debt stock was N349.7m in 1975. This means a reduction in debt stock by 28.40% and an increase in debt service by 5.48%. The debt ratio (defined as the proportion of total external debt ratio to GDP) for 1970 was 9.39 while the debt service ratio was 0.59% by 1975, the debt ratio reduced to 1.67% while the debt service ratio was 0.16%. It was not until 1978 that the total external debt of the country reached the one–billion-naira mark. Specifically, the figure stood at N1.266 billion, an increase of over 155% from the 1977 figure of N0.4969 billion. In this year, 1978, the debt/GDP ratio was 3.66% while the debt service ratio became 0.85%. This jump shows that the genesis of the heavy debt burden on the shoulders of Nigeria can be traced to 1978. This is in line with the observation of Uniamikogbo (1994) and


<table>
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<th>Year</th>
<th>Total External Debt Stock N 'b</th>
<th>Total External Debt Service N 'b</th>
<th>GNP Current F.C. N 'b</th>
<th>GDP Current F.C. N 'b</th>
<th>Invest -ment Total N 'b</th>
<th>GDP Growth Rate</th>
<th>Debt Service Ratio %</th>
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<td>1.3</td>
<td>4.4</td>
<td>71.2</td>
</tr>
<tr>
<td>1995</td>
<td>716.8</td>
<td>35.7</td>
<td>102.29</td>
<td>1,960.7</td>
<td>50.12</td>
<td>2.2</td>
<td>1.8</td>
<td>36.6</td>
</tr>
<tr>
<td>1996</td>
<td>617.8</td>
<td>41.3</td>
<td>106.15</td>
<td>2,740.5</td>
<td>55.13</td>
<td>3.4</td>
<td>1.5</td>
<td>22.5</td>
</tr>
<tr>
<td>1997</td>
<td>595.9</td>
<td>32.9</td>
<td>108.99</td>
<td>2,834.8</td>
<td>60.64</td>
<td>3.2</td>
<td>1.2</td>
<td>21.0</td>
</tr>
</tbody>
</table>

Source: CBN Statistical Bulletin, Various Years.

* Investment follows a growth rate of 10% from 1991 to 1997.

Ajayi (1991), ever since 1978, the external debt situation has been a source of worry to economic watchers and the situation has worsened in the process of time.
The first year that witnessed a double-digit-billion-naira debt stock was 1983 when it stood at N10.58b. The year also recorded a debt ratio of 18.7% and debt service ratio of 2.35%. The debt burden rose to a three-digit situation in 1987 with a figure of N100.7899b; a service ratio of 3.34% and a debt ratio of 93.9%. Three years were particularly remarkable in that the total external debt rose to heights beyond the level of aggregate output and aggregate income. They are 1989, 1990, and 1991. Their debt/GDP ratios were 107.9%, 115.5%, and 102.5% while the service ratios were 5.9%, 11.1%, and 11.0% - respectively. These can be regarded as the years of the worst kind of debt overhang, resulting from excessive borrowings of the governments, their parastatals, and such the like. From 1992, the trend started reducing. The debt ratio moved from 102.5% in 1991 to 99.9% in 1992, to 71.2% in 1994, 36.6% in 1995 and 23.3% in 1998. The service ratio followed similar trend from 11.0% in 1991 to 7.49% in 1992, 5.26% in 1993, 1.8% in 1995, and 1.0% in 1998. This shows a decreasing trend of the use of external debt to finance aggregate output. It is noteworthy that in these years, the aggregate figures of debt were still increasing from N328.1b in 1991 to N716.8b in 1995, but reduced slightly to N633.0b in 1998. Thus, though the volumes of debt borrowed externally were increasing, the proportion channeled to productive activities was reducing over time. The question becomes, where are these monies channeled to? These are answers that are better inferred from results obtained empirically using appropriate statistical tools.

IV. ANALYSIS INVOLVING PRIMARY EVIDENCE

Among the 100 questionnaires distributed (20 sets to each of the five categories of professionals selected for study) and collected by the authors, only 96 was found adequate for our analysis due to their somewhat consistency of supply of all the relevant information needed and their following the instructions carefully. This is a success rate of 96%. Three out of the four wrongly completed questionnaires are from businessmen and industrialists while one (1) is from a health personnel. All the respondents (96) are graduates who have been in their various fields for five years and above. None of the respondents is below the age of 30. They all claimed to be aware of the external debt condition of Nigeria and problems associated with it. Some important observations from their responses are summarized on Tables 2.

Table 2: Respondents’ Impression of the Areas of the Economy Affected by External Debt and the Extent of Effects.

<table>
<thead>
<tr>
<th>Areas of Effects on the Economy</th>
<th>Extent of Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>% to max. 5 4 3 2 1 0</td>
</tr>
<tr>
<td>A The Aggregate Output (GDP)</td>
<td>47.5 6 8 30 25 26 1</td>
</tr>
<tr>
<td>B Investment Activities</td>
<td>46.7 7 9 23 27 29 10</td>
</tr>
<tr>
<td>C The Manufacturing sector</td>
<td>39.6 - 7 26 33 18 12</td>
</tr>
<tr>
<td>D National Income (GNP)</td>
<td>49.4 2 9 28 19 23 15</td>
</tr>
<tr>
<td>E Export Activities</td>
<td>41.7 5 6 35 10 26 14</td>
</tr>
<tr>
<td>F Import Activities</td>
<td>50.8 14 16 32 2 10 22</td>
</tr>
</tbody>
</table>

Source: From the Research Questionnaire.

Table 2 shows the areas of the economy or relevant economic indicators, which are, affected by the external debt conditions of the country. The identified areas / indicators are the GDP, domestic investment, manufacturing sector, national income (GNP), exports and import activities. The distribution shows that the observed percentage-to-maximum for the GDP is 47.5%, which represents a mean value of 2.38 on a 5-point scale. This implies that the external capital from overseas have been seen to contribute poorly to the growth of aggregate economic
activity represented by the GDP. The next related economic indicator to GDP is the GNP or the national income. This recorded a percentage-to-maximum of 49.4% or a mean value of 2.47 on a 5-points scale. This also shows a weak or poor contribution of external borrowing to the gross national product or national income. The agreement existing between the GDP and GNP is natural and expected if the respondents are well informed as they claimed. The consistency is very remarkable and lends credence to the fact that the use of foreign funds in the country has not affected the living standards or per capita income of the citizenry as expected.

The contribution of external borrowing on domestic investments is seen to record a percentage of 46.7% when compared with the maximum score of 100%. This represents a mean score of 2.34 on a 5-point scale. This tends to suggest that external borrowing has, at best, contributed poorly to aggregate domestic investment activities. The manufacturing sector is worst hit with a recorded percentage to maximum of 39.6% or a mean score of 1.98 on a 5-point scale. This reflects a poor contribution of external borrowings to the growth of the manufacturing sector. Export activities recorded a percentage to maximum of 41.7% or a mean value of 2.09 approximately. On a 5-point scale, this also shows a poor contribution of externally generated capital to export activities of the country. To the contrary, import activities are observed to have been moderately affected or boosted by external borrowings of the country. This is in view of the percentage-to-maximum score of 50.8% or a mean score of 2.54. The implication of these results is that the bulk of external borrowings of the country have not been channeled to the key productive sectors or activities of the economy, which include the manufacturing sector, agricultural (exports of primary products) and general investment activities. As a result, the aggregate economic activity represented by the GDP and the standard of living of the citizens (represented by the GNP per capital) has not been boosted to reach desired levels.

The questions that should bother any economic analyst seeing these results are: why is it that the economic indicators of the country such as the GDP, GNP or the national income still remain so poor despite the level of foreign capital “injected” to boost productive and investment activities? Why are we still talking of inability to pay the foreign debts despite the fact that they ought to have been invested in economic activities that would guarantee their repayment? Put succinctly, why is the country still plagued by the perennial burden of external debt? The reasons identified by the respondents are summarized on Table 3 below.

Table 3: Respondents Impression on the Causes of the Perennial Debt Burden of Nigeria

<table>
<thead>
<tr>
<th>Causes / Reasons</th>
<th>Mean Scores</th>
<th>% to Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Improper utilization of Borrowed Funds</td>
<td>3.96</td>
<td>79.2</td>
</tr>
<tr>
<td>2. Financial Indiscipline and Funds Diversion</td>
<td>4.51</td>
<td>90.2</td>
</tr>
<tr>
<td>3. Bad Implementation Culture</td>
<td>4.02</td>
<td>80.4</td>
</tr>
<tr>
<td>4. Bad feasibility and Viability Studies</td>
<td>3.89</td>
<td>77.8</td>
</tr>
<tr>
<td>5. Cost-Over-Run due to Inflationary Conditions</td>
<td>3.01</td>
<td>60.2</td>
</tr>
<tr>
<td>6. Bad Managers of the Economy</td>
<td>4.32</td>
<td>86.4</td>
</tr>
<tr>
<td>7. Corrupt Activities of Government Functionaries</td>
<td>4.81</td>
<td>96.2</td>
</tr>
<tr>
<td>8. Non-matching of debt with specific projects that would guarantee repayment</td>
<td>3.68</td>
<td>73.6</td>
</tr>
</tbody>
</table>

Source: Computed from the Research Questionnaire

Table 3 reveals that the most heinous problem giving impetus to the present external debt quagmire of Nigeria, in the opinion of the respondents, is the corrupt activities of government
functionaries. This claimed a percentage distribution of 96.2% or a mean score of 4.81 on a 5-point scale. Corrupt practices of government functionaries range from self aggrandizement to self enrichment, from self amative tendencies to illegal transfer of public funds (even borrowed funds) to personal accounts overseas. The respondents believe that this is the first reason why our debt burden has remained so great. Financial indiscipline and funds diversions are very important factors considered as being major reasons for Nigeria’s external debt overhang. These factors scored a percentage-to-maximum score of 90.2% or mean score of 4.51. This is followed by the preponderance of bad economic managers (86.4% or 4.32) and thereafter by bad implementation culture (80.4% or 4.03 mean score). Bad implementation, it must be noted, is the result of bad management. The situation is such that it is heard in some quarters that the problem with the Nigerian economy cannot be said to be planning or formulation, but bad implementation and management of the policy so designed. Good planning without good implementation is only a paradox and the duo would constitute strange bedfellows.

A major inference that can be drawn at this point is that the most serious problems causing our debt situation to deteriorate are either personal aggrandizement or managerial bankruptcy. These and allied factors claimed the 1st, 2nd, 3rd, 4th, 5th, and 6th and even the seventh positions in the distribution with mean scores ranging from 3.68 to 4.81. The allied factors include improper utilization of borrowed funds (3.96 or 79.2%), non-matching of debt with specific projects that would guarantee its repayment (3.68 or 73.6%), and bad feasible or viability studies (3.89 or 77.8%). The least factor in the order of ranking of the respondents is the incidence of cost-over run due to inflationary conditions (3.01 or 60.2% See; Table 3.1).

TEST OF HYPOTHESES
Relationship Between the Aggregate Output (GDP) Performance External Debt.

The first hypothesis is postulated to examine the relationship between the aggregate output (GDP) performance of the country and its external debt burden. Using the correlation and associated t-test statistics and applied to Secondary data in Table 1 we obtained the following results as in Table 4 below:

Table 4: Correlation Test Results Showing the Relationship between Total External Debt Stock and GDP

<table>
<thead>
<tr>
<th>STATISTICS</th>
<th>HYPO – 1</th>
<th>HYPO – 2</th>
<th>HYPO – 3</th>
<th>INERENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coefficient of correlation (r)</td>
<td>0.82</td>
<td>0.80</td>
<td>0.758</td>
<td>Relatively High Degree of Relationship</td>
</tr>
<tr>
<td>Coefficient of Determination (r²)</td>
<td>0.67</td>
<td>0.67</td>
<td>0.575</td>
<td>Relatively high proportion of explanation of variation</td>
</tr>
<tr>
<td>Calculated T – Value</td>
<td>7.444</td>
<td>6.928</td>
<td>7.559</td>
<td>Significant at 5% level</td>
</tr>
<tr>
<td>Critical T-value (5% level of significance)</td>
<td>1.703</td>
<td>1.703</td>
<td>1.734</td>
<td>Reject H₀</td>
</tr>
</tbody>
</table>

Source: Computed from Table 1 using Excel Program.

From the results in Table 4, the coefficient of correlation (r) is 0.82. This means that there is a relatively high degree of relationship existing between the GDP of the country and the external debt stock (about 82%). The coefficient of determination (r²) of 0.67 shows that about 67% of the variations in GDP can be explained by the level of external borrowing by the country. This is a relatively high proportion of explanation. The calculated t-value is 7.444 while the critical t-value is 1.703. Since the former is greater than the latter, we reject the null hypothesis, and conclude that there is a significant relationship between the level of economic activity in Nigeria and the level of external indebtedness.
Relationship Between the Gross National Product (GNP) and External Debt Service.
The second hypothesis attempts to determine the strength of the relationship between the gross national product (GNP) of the country and the external debt service. The results obtained from the statistical computations to enable us test the above hypothesis are summarized in Table 4 above. The Table 4 reveals a coefficient of correlation ($r$) of 0.80, which implies that there is a relatively high degree of relationship between the GNP and External debt service of the country. This degree is about 80%. The coefficient of determination ($r^2$) of 0.64 shows that 64% of the variations in GNP is accounted for by the external debt service of the country. This means that the external debt service highly explains the level of GNP in Nigeria. The calculated t-value is 6.928 which when compared with the critical t-value of 1.703, shows that the relationship is significant at 5% level. We thus reject the null hypothesis, and conclude that there is a significant relationship between the aggregate income of the country (GNP) and the level of external debt service the country incurs.

Relationship Between the Total Investments and Total External Debt Stock
The third hypothesis is formulated in a bid to examine the strength of the relationship between the total investments of the country and the total external debt stock. The results of the correlation analysis computed for the purpose of testing the hypothesis are summarized in Table 4 above. From the Table above, the degree of relationship between aggregate investment activity and level of external indebtedness is fairly high (75.8%) judging by the coefficient of correlation ($r$) of 0.758. Also the coefficient of determination ($r^2$) of 0.575 shows that 57.5% of the variations in the aggregate investment activity in the country can be explained by the level of external debt stock. The calculated T-value is 7.559, which is greater than the critical T-value of 1.734 at 5% level of significance and 18 degrees of freedom. This subscribes to our rejecting the null hypothesis and concludes that there is a significant relationship between aggregate investment activity in Nigeria and the level of external indebtedness of the country.

V. MAJOR FINDINGS, DISCUSSION, AND RECOMMENDATIONS
Some major findings in the course of our data analysis are summarized below as:
The trend in the external debt statistics compared with the GDP over the years showed that even though the volume of debt borrowed externally were increasing, the proportion actually channeled to productive activities (as expressed by the debt / GDP ratio) was reducing. This tends to explain in part why the economy refuses to grow as desired.
The years of the worst kind of debt overhang, resulting from excessive borrowings of the government and their organs, were 1989, 1990 and 1991 having debt/GDP ratios of 107.9%, 115.5%, and 102.5% respectively.
There exist a significant relationship between the level of economic activity in Nigeria represented by the GDP and the level of external indebtedness of the country.
A significant relationship exists between the aggregate income of the country (GNP) and the level of external debt service the country makes over time.
That there is a significant relationship between the aggregate domestic investment activity and the level of external indebtedness of the country is also confirmed by the analysis.
The analysis of the primary data generated through the use of questionnaire reveals that except for import activities, which are only moderately affected, there is a poor contribution of externally generated funds in boosting other economic indicators / activities such as the aggregate output (GDP), investment activities, the manufacturing sector of the economy, the gross national product (GNP), and export activities.
The primary data analysis also reveals that the most serious problems causing our worsening external debt burden relate to either inherent personal aggrandizement tendencies or managerial problems. The mean scores of factors related to these problems are observed to
range from 3.68 to 4.81 on a 5-point maximum scale or a percentage to maximum distribution ranging from 73.6% to 96.2%.

**Discussion of Findings**

This research work set out to analyze the relationship existing between the external debt burden on the Nigerian economy using relevant indicators. It was also cardinal in the mind of the researchers to identify and analyze the causes of perennial debt overhang on the country. A very important discovery of this study relates to the trends in the external debt statistics compared with the GDP over the years. The developments reveal that only a very infinitesimal volume of externally generated funds is channeled to productive activities in the country over time. This is particularly made clear by the trends in the ratio of external debt employed to finance GDP. This index was found to witness a declining trend. With this situation, the externally borrowed funds cannot be said to have been gainfully utilized in the country. This is a worrisome development since the crucial reason for its sourcing is to boost growth and development of the economy. Where the proportion employed to finance productive activities (and by that aggregate output) is low or declines consistently, then the effect on the economy would not be encouraging. This tends to partly explain why the Nigerian economy has not grown as expected or desired over time.

Another implication of this trend is that borrowed funds would either have been inefficiently utilized or channeled to other sources that are not consistent with growth and development; or never touched the shores of the country. In some cases the money may have been transferred to personal projects or foreign bank accounts, or both. Both the primary and secondary data analysis seems to confirm this position. For instance the primary data analysis also reveals that the most serious problems causing our worsening external debt burden relate to either inherently personal aggrandizement or managerial problems. The mean scores of factors related to these problems are observed to range from 3.68 to 4.81 on a 5 point maximum scale or a percentage to maximum distribution ranging from 73.6% to 96.2%. Personal factors range from corrupt activities of government functionaries to financial indiscipline and funds diversion tendencies of these officials. The managerial factors / problems include the prevalence of bad political and economic managers, bad implementation culture, wrong-premised planning resulting from bad feasibility and viability studies, non-matching of debt with specific projects that would guarantee repayment, and improper utilization of borrowed funds.

The test of the three hypotheses reveal positive and significant relationships between external borrowing levels of the country over time and the GDP, on one hand, and aggregate investment on the other. There is also a significant and positive relationship between the GNP and the external debt service. These results tend to suggest that injection of externally generated funds would boost investment activities and aggregate output. This is as a priori expected and consistent with theoretical foundations. However, a regime where the GDP and investments are not growing as expected, would also suggest that the bulk of the funds from external sources are not properly injected into the country as the case should be. This is yet another indictment on economic management of the country.

On the other hand, that GNP relates positively with debt service (as outflow of funds) is not consistent with theory, since debt service constitutes leakage from the system. The reverse should have been the case. A possible way to explain this trend would relate to the fact that the amount of debt service has been very small in relation to the actual debt stock over time. Even at that it should have been negative and insignificant in its relationship with GNP. Another possible explanation would relate to the fact that the level of GNP of the country is generally low implying very low per capita income or growth rates over time. With low amounts of debt
service, then it is reasonable to expect a positive and significant relationship between the two variables. Though this appeals to reality but it is not in line with theoretical expectations especially when external debt services is treated as a leakage from the economy. Apart from these, further explanations may be obtained by the help of further research. Perhaps the need for a more sophisticated statistical tool may be implicated.

In conclusion, it is true that Nigeria, as a country is over-burdened with huge amounts of external indebtedness. The burden is however more in some years and less in others. One thing that complicates the burden is that the moneys so borrowed from external sources are not adequately utilized and in some cases sidetracked and/or stolen by corrupt public office holders, among many others. It is not that borrowing is bad or necessarily burdensome in itself, instead when the money borrowed is not adequately utilized the burden becomes more complex. That is a major problem with the Nigerian experience. Given this type of scenario, it is not surprising that the level of financing expected from foreign sources fails to achieve desired level of growth and development in the economy.

**Recommendations**

In the light of the findings of this study, the researcher recommends as follows:

Since the most serious cause of our debt burden is not that we ever borrowed but that the funds were either diverted or improperly utilized, then the government should consider the following actions:

- Rid the government departments, arms, and organs of every corrupt official. A cleansing program is suggested. This would mean that the government should better be more serious with the Oputa Commission. The Commission should be charged not to busy itself with civil trivialities but more important issues of financial indiscipline and misappropriation.
- Intensify efforts in recovering stolen funds from past and present officials. While using the present strategies to recover such funds as the government is currently employing, it should also consider using commission-based financial and legal consultants. This would facilitate the loot recovery process.
- Make concerted efforts to use good financial consultants to prepare its feasibility and viability reports for considered projects before borrowing arrangements are made to finance the projects. Borrowing from abroad should be tied or matched with specific projects in a bid to ensure that repayments are made. Project or policy implementation should be given priority instead of good planning alone.

**References**


ABSTRACT

In an era of business failures, corporate scandals and accounting irregularities, the importance of transparency in financial reporting and investor confidence in the financial reporting process has come to the forefront. In a move consistent with the all-inclusive income concept, the Financial Accounting Standards Board (FASB) officially released rules for reporting comprehensive income in 1997 in Statement of Financial Accounting Standards (SFAS) 130. This statement requires that all items that meet the definition of components of comprehensive income be reported in a financial statement for the period in which they are recognized.

Comprehensive income can be alternatively displayed using a one-statement approach, a two-statement approach or a statement of changes in equity approach. Reporting comprehensive income in the statement of changes in equity tends to hide comprehensive income and thus provides the least clarity and transparency. As the importance of transparency in financial reporting becomes more significant, it becomes imperative for organizations to closely examine their reporting practices and provide users with the clarity and transparency they desire.

To better understand how companies in the banking and insurance industries are reporting comprehensive income, the authors have collected data from the U.S. Securities and Exchange Commission’s Electronic Data Gathering, Analysis, and Retrieval system (EDGARS) on one hundred companies over the five year period
from 1998 to 2002. Relationships between company size, industry classification, economic climate, and the specific reporting method chosen have been investigated.

REPORTING COMPREHENSIVE INCOME IN THE BANKING AND INSURANCE INDUSTRIES

In an era of business failures, corporate scandals and accounting irregularities, the importance of transparency in financial reporting and investor confidence in the financial reporting process has come to the forefront. It is imperative that stakeholders understand an enterprise’s financial activities. Prior to the passage of Statement of Financial Accounting Standards (SFAS) No. 130, “Reporting Comprehensive Income,” an increasing number of items had been bypassing the statement of income and were being recorded directly in the equity section of the statement of financial position.

In a move toward the all-inclusive income concept, the Financial Accounting Standards Board (FASB) issued new rules for reporting comprehensive income late in the second quarter of 1997 becoming effective for organizations with fiscal years beginning after December 15, 1997. All organizations that provide a full set of financial statements (with the exception of not-for-profit organizations) are subject to SFAS 130.

The all-inclusive income concept requires that all revenues, expenses, gains, and losses recognized during the period be included in income, regardless of whether they are considered to be results of operations of the period. The FASB believes that comprehensive income is “comprehensive” to the extent that it includes all recognized changes in equity during a period from transactions and other events and circumstances from nonowner sources. [1]

The reporting practice that allowed certain items to bypass the statement of income to be reported instead as a cumulative balance in equity caused concern among various organizations and stakeholders. Many felt that the items bypassing the statement of income are relevant because they provide information on the economic results of real events and should therefore be reported on the statement of operations, not “hidden” in equity [3]. The Financial Accounting Standards Committee of the American Accounting Association also felt that comprehensive income reporting provides a better platform for international comparisons of financial performance [4]. In addition, the Association for Investment Management and Research and Robert Morris Associates supported the implementation of the concept of comprehensive income.

“SFAS 130 requires that all items that meet the definition of components of comprehensive income be reported in a financial statement for the period in which they are recognized” [5]. The objective of this statement was to display the items of comprehensive income as prominently as the other components of a full set of financial statements. The use of this additional information in conjunction with other information in the financial statements and related disclosures will allow users to better assess an organization’s activities and the timing and magnitude of future cash flows. It will also provide consistency in presentation and enhanced comparability between enterprises.

Comprehensive income is defined in FASB Concepts Statement 6 as “the change in equity (net assets) of a business enterprise during a period from transactions and other events and circumstances from nonowner sources. It includes all changes in equity during a period except those resulting from investments by owners and distributions to owners” (paragraph 70) [1]. Comprehensive income consists of two categories: net income and other comprehensive income. Other comprehensive income typically includes: foreign currency translation adjustments and gains and losses on foreign currency transactions under SFAS 52, unrealized holding gains and losses on available-for-sale securities under SFAS 115, minimum pension liability adjustments under SFAS 87, and gains and losses on cash flow hedging derivative instruments under SFAS 133 [4].

According to SFAS 130, comprehensive income can be displayed in a one-statement approach, a two-statement approach or a statement of changes in equity approach. In the one-statement
approach, as shown in Table 1, a combined Statement of Income and Comprehensive Income is reported. Net income is “buried” in the center of the statement, followed by the components of other comprehensive income. Comprehensive income becomes the bottom line in this disclosure approach. Investors and accountants are accustomed to seeing net income as the bottom line and may not favor this approach.

Table 1: One-Statement Approach

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revenues</td>
<td>$280,000</td>
</tr>
<tr>
<td>Operating Expenses</td>
<td>(50,000)</td>
</tr>
<tr>
<td>Other Gains &amp; Losses</td>
<td>20,000</td>
</tr>
<tr>
<td>Income From Operations</td>
<td>250,000</td>
</tr>
<tr>
<td>Income Tax</td>
<td>(62,500)</td>
</tr>
<tr>
<td>Income Before Extraordinary Items</td>
<td>187,500</td>
</tr>
<tr>
<td>Extraordinary Item, net of tax</td>
<td>(61,000)</td>
</tr>
<tr>
<td><strong>Net Income</strong></td>
<td><strong>126,500</strong></td>
</tr>
<tr>
<td>Other Comprehensive Income, net of tax:</td>
<td><strong>160,500</strong></td>
</tr>
<tr>
<td>Foreign Currency Translation Adjustments</td>
<td>16,000</td>
</tr>
<tr>
<td>Unrealized Gains on Securities</td>
<td>23,000</td>
</tr>
<tr>
<td>Minimum Pension Liability Adjustments</td>
<td>(5,000)</td>
</tr>
<tr>
<td>Other Comprehensive Income</td>
<td>34,000</td>
</tr>
<tr>
<td><strong>Comprehensive Income</strong></td>
<td><strong>160,500</strong></td>
</tr>
</tbody>
</table>

In a two-statement approach, as shown in Table 2, a typical Income Statement and an additional statement called the Statement of Comprehensive Income are prepared. The Statement of Comprehensive Income begins with net income and adds each component of other comprehensive income to determine comprehensive income. This approach leaves the Income Statement untouched and yet clearly provides the desired information on the items that bypassed the traditional income statement and were reported as a cumulative balance in equity.

The final approach, as illustrated in Tables 3 and 4, results in the least amount of change from current reporting methods. Net income, other comprehensive income, and comprehensive income are shown in the Statement of Changes in Equity. This method tends to conceal comprehensive income in the middle of the statement and thus provides the least clarity and transparency. This method is discouraged by the FASB [6].

Whether organizations have sufficiently recognized the importance of transparency in financial reporting and in the financial reporting process itself over the past few years is questionable. As this issue becomes more significant, it becomes imperative for organizations to closely examine their reporting practices and provide users with the clarity and transparency they desire. The resulting benefit to the reporting organization will be investor, creditor and other user confidence in the reporting process and perhaps greater market efficiency.

**Study Procedures**

To better understand the current reporting environment for comprehensive income, the
Table 2: Two-Statement Approach

ABC Co.
Statement of Income
For the Year Ended December 31, 200X

<table>
<thead>
<tr>
<th>Item</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revenues</td>
<td>$280,000</td>
</tr>
<tr>
<td>Operating Expenses</td>
<td>(50,000)</td>
</tr>
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<td>(61,000)</td>
</tr>
<tr>
<td><strong>Net Income</strong></td>
<td>$126,500</td>
</tr>
</tbody>
</table>

ABC Co.
Statement of Comprehensive Income
For the Year Ended December 31, 200X

<table>
<thead>
<tr>
<th>Item</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Net Income</strong></td>
<td>$126,500</td>
</tr>
<tr>
<td>Other Comprehensive Income, net of tax:</td>
<td></td>
</tr>
<tr>
<td>Foreign Currency Translation Adjustments</td>
<td>16,000</td>
</tr>
<tr>
<td>Unrealized Gains on Securities</td>
<td>23,000</td>
</tr>
<tr>
<td>Minimum Pension Liability Adjustments</td>
<td>(5,000)</td>
</tr>
<tr>
<td><strong>Other Comprehensive Income</strong></td>
<td>34,000</td>
</tr>
<tr>
<td><strong>Comprehensive Income</strong></td>
<td>$160,500</td>
</tr>
</tbody>
</table>

authors undertook a project to collect information from historical financial statements from fifty entities in the banking industry and fifty entities in the insurance industry. We chose these industries specifically, because of the likelihood that other comprehensive income items would exist and be reported. According to SFAS 130, the requirements of the statement do not apply to entities that do not have any items of other comprehensive income.

A random sample of entities in the banking and insurance industries was selected and financial information for the past five years was collected from the U.S. Securities and Exchange Commission’s Electronic Data Gathering, Analysis, and Retrieval system (EDGARS). The specific information collected for each entity included industry, reporting period, total assets, revenue, net income, other comprehensive income by category and in total, accumulated other comprehensive income, and reporting method. The information was analyzed to determine whether any of the following characteristics impact reporting method:

- company size;
- industry classification;
- economic climate.

Summary of Results

Consistent with the all-inclusive income concept, the FASB believes that the use of the
### Table 3: Statement-of-Changes-in-Equity Approach (Alternative #1)

**ABC Co.**

**Statement of Changes in Equity**

**For the Year Ended December 31, 200X**

<table>
<thead>
<tr>
<th></th>
<th>Accum. Other Compr. Income</th>
<th>Retained Earnings</th>
<th>Common Stock</th>
<th>Paid-In Capital</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Beginning Balance</strong></td>
<td>$1,127,000</td>
<td>$177,000</td>
<td>$300,000</td>
<td>$600,000</td>
</tr>
<tr>
<td><strong>Comprehensive Income:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Net Income</strong></td>
<td>126,500</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Other Comprehensive Income, net:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Foreign Currency Translation Adj.</td>
<td>16,000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unrealized Gains on Securities</td>
<td>23,000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimum Pension Liability Adj.</td>
<td>(5,000)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Other Comprehensive Income</strong></td>
<td>34,000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Comprehensive Income</strong></td>
<td>$160,500</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Common Stock Issued</strong></td>
<td>300,000</td>
<td></td>
<td>100,000</td>
<td>200,000</td>
</tr>
<tr>
<td><strong>Dividends Declared</strong></td>
<td>(20,000)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Ending Balance</strong></td>
<td>$1,567,500</td>
<td>$283,500</td>
<td>$84,000</td>
<td>$800,000</td>
</tr>
</tbody>
</table>

The income-statement-type format (see Table 1) is more consistent with the Concepts Statements and a conceptually superior approach to report comprehensive income. [5] In addition, it provides the most transparency for the components of other comprehensive income. The authors chose to approach their analysis with this in mind.

The entities were divided into small, medium and large entities based on total assets. The analysis indicated that there were no statistically significant differences between the number of those that chose the income-statement-type format versus the other options.

A similar finding was indicated when comparing the insurance and banking industries. The number of entities that chose the income-statement-type format in the banking industry was not statistically different from those that chose it in the insurance industry.

The authors also separated the data into five reporting periods to determine whether economic conditions had any impact on reporting method. Our a priori suspicion was that firms may tend to choose a more “concealing” reporting method when faced with poor results. Again, the results indicated that poor economic conditions versus healthy economic conditions did not result in statistically significant differences in reporting method.

A significant finding that resulted from this study is that most entities in both the insurance and banking industries are choosing the Statement of Changes in Equity method of reporting other comprehensive income rather than the preferred method. Respectively, eighty and seventy seven percent of the entities in the insurance and banking industries are reporting the items of other comprehensive income in the Statement of Changes in Equity. Only eighteen percent in the insurance industry and six percent in the banking industry are reporting comprehensive income using the preferred income-statement-type format.
Table 4: Statement-of-Changes-in-Equity Approach (Alternative #2)

ABC Co.
Statement of Changes in Equity
For the Year Ended December 31, 200X

<table>
<thead>
<tr>
<th>Retained Earnings</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Balance at January 1</td>
<td>$177,000</td>
</tr>
<tr>
<td>Net Income</td>
<td>$126,500</td>
</tr>
<tr>
<td>Dividends Declared</td>
<td>(20,000)</td>
</tr>
<tr>
<td>Balance at December 31</td>
<td>$283,500</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Accumulated Other Comprehensive Income, net</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Balance at January 1</td>
<td>50,000</td>
</tr>
<tr>
<td>Foreign Currency Translation Adjustments</td>
<td>16,000</td>
</tr>
<tr>
<td>Unrealized Gains on Securities</td>
<td>23,000</td>
</tr>
<tr>
<td>Minimum Pension Liability Adjustments</td>
<td>(5,000)</td>
</tr>
<tr>
<td>Other Comprehensive Income</td>
<td>34,000</td>
</tr>
<tr>
<td>Comprehensive Income</td>
<td>$160,500</td>
</tr>
<tr>
<td>Balance at December 31</td>
<td>$84,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Common Stock</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Balance at January 1</td>
<td>300,000</td>
</tr>
<tr>
<td>Shares Issued</td>
<td>100,000</td>
</tr>
<tr>
<td>Balance at December 31</td>
<td>$400,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Paid-In Capital</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Balance at January 1</td>
<td>600,000</td>
</tr>
<tr>
<td>Common Stock Issued</td>
<td>200,000</td>
</tr>
<tr>
<td>Balance at December 31</td>
<td>$800,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Total Equity</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>$1,567,500</td>
<td></td>
</tr>
</tbody>
</table>

Summary

SFAS 130 was adopted with affirmative votes from five members of the FASB. The objective of SFAS 130 was to significantly enhance the visibility of the items of other comprehensive income. Two members dissenting and felt the items of other comprehensive income should be reported in a statement of financial performance. They also predicted that most enterprises would report the components of other comprehensive income in the statement of changes in equity thus diminishing their perceived importance.

More than five years have passed since adoption of SFAS 130 and this study indicates that the presumption of the two dissenting members of the FASB is correct within the banking and insurance industries. The majority of entities in these industries have not chosen to report other comprehensive income and total comprehensive income below the total for net income either in the statement of income or a separate statement that begins with net income even though the FASB has
encouraged this method of display.

In the current environment, it is imperative that stakeholders understand an enterprise’s financial activities. The primary purpose of financial reporting is to provide sufficient and quality information so that users can better evaluate an entity’s performance. It appears as though SFAS 130 has not accomplished that goal. A Board meeting was held October 15, 2003 and tentative conclusions were reached to report all items of comprehensive income in a single statement. In addition the Board tentatively decided that a statement of comprehensive income should be separated into at least three major categories: business activities, financing, and other gains and losses. It appears as though the needed changes are now on the Board’s agenda.

REFERENCES


Many firms outsource functions previously done inside organizations. If service organization activities materially affect a user organization’s financial statements, controls at the service organization must be viewed by the financial statement auditor (user auditor) as an extension of the user organization’s internal control system. The user auditor can directly obtain information about the control system at the service organization or the user auditor can utilize a report from a service auditor where the service auditor followed guidance contained in AU 324 and/or AT 201 of the AICPA Professional Standards. This research investigates the types of outsourced services firms acquire, and; (1) if the availability of service auditor’s reports influenced outsourcing hiring/retention decisions; (2) how service organizations responded to requests for service auditor’s reports; and (3) user organization satisfaction with the actions of their financial statement auditors regarding service auditor’s reports. The findings revealed that the availability of a proper service auditor’s report influenced service organization hiring and retention decisions in only half the responding user organizations. This inattention by user organizations could indicate problems leading to an inefficient and/or ineffective independent audit. About one third of the firms reported problems with the availability and/or type of service auditor’s report they received, which could result in higher user audit costs. While problems with service organizations were revealed, the analysis indicated that the respondents were very satisfied with the performance of their independent auditors.
AN EMPIRICAL INVESTIGATION OF GOODWILL ATTRIBUTES AND SUBSEQUENT IMPAIRMENT IN THE FRAME OF FASB STATEMENTS NO. 141 AND 142

Samir M. El-Gazzar, Rudy Jacob and Michael Dillon
Lubin School of Business, Pace University

ABSTRACT

This paper has a two-fold objective. First, we analyze the attributes of goodwill of the target company prior to the merger. We examine a set of hypotheses contributing to the realized goodwill, i.e., the premium paid to the acquired firm. Second, we test the validity of a set of clues (present at time of acquisition) as indicators of potential goodwill impairment subsequent to the merger. In the exposure drafts that preceded statements of financial accounting standards Nos. 141 and 142, the FASB introduced the following factors as indicators of potential impairment of goodwill subsequent to the acquisition: a) a significant premium was paid over the market capitalization of the acquired firm prior to the start of the acquisition discussion; b) the acquisition involved a clearly visible auction or bidding process; c) the amount of goodwill was significant relative to the cost of the acquired enterprise; and d) the purchase consideration was primary in the form of acquiring enterprise’s shares. The findings of this research have implications for accounting policy makers (FASB), company managements, financial analysts, and for the accounting firms planning to audit business combinations after mergers.

We use a sample of mergers and acquisitions that were completed in the period of 1995 to 1998. We also use the Tobin’s Q metric to estimate impairments in goodwill. Our first phase results show the presence of a significant association between goodwill (premium paid to acquired firm) and target firm’s attributes such as research and development spending, advertising, brand names, and recorded intangibles (such as trade marks and rights). The results from the second phase confirm some of the hypotheses. For instance, results show significant relationship between goodwill impairment and the form of payment as well as the amount of goodwill relative to the purchase price. If acquirer’s shares are used as all or part of the consideration for the acquisition, the likelihood of goodwill impairment tends to increase. Similarly, if goodwill is large relative to the price paid for the acquisition, the likelihood of goodwill impairment tends to increase. The results do not support the expected effect of the excess premium paid over market capitalization of acquired firm or the effect of the visible bidding process. One reason may be the shortage of hard information regarding “market capitalization” or “bidding wars” when the target firms are not stand-alone entities.

The results lead to the inference that goodwill resulting from costly and competitive mergers may not be fully recoverable in the future. Therefore, acquiring firms should exercise prudent accounting through continuous examination of goodwill recoverability and write down of the impairment to enhance reliability of reported information. Similarly, auditors should devote attention to the valuation of goodwill for clients, especially for those resulting from seemingly costly business combinations.
INCIVILITY IN THE ACCOUNTING CLASSROOM-
PERCEPTIONS OF FACULTY AND ADMINISTRATORS

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ABSTRACT

Classroom incivility (CI) is any action that interferes with a harmonious and cooperative learning atmosphere in the classroom (Feldman 2001). DeLucia & Iasenze (1995) classify CI into three categories. First, CI includes inappropriate and annoying student behaviors such as arriving late to class, chatting in class, or even sleeping in class. Second, CI includes irresponsible student behaviors such as dominating discussions, failure to do homework, and cheating on exams. Finally, CI includes aggressive student behaviors such as physical fights between students, verbal attacks on faculty in the classroom, and physical attacks on faculty outside the classroom.

Although ideally, one would expect lower levels of CI in the accounting classroom than in a general education classroom, realistically CI occurs there as well. This paper considers the level of incivility in the accounting classroom. We compared the perceptions of faculty by rank/age to determine if levels of CI differ according to the accounting faculty member’s level of experience. Since prior research indicates that most CI is not reported, we also compared faculty perceptions to administrator perceptions to determine the level of administrator awareness of the issue of incivility in the accounting classroom.

Our results indicate significant differences in importance of incivility according to a faculty member’s rank, and that faculty perceptions of incivility are significantly higher than administrator perceptions of incivility.
ABSTRACT

Incivility in the workplace has been defined as “the subtle, rude, or disrespectful behavior that demonstrates lack of regard for other employees” (Envisionworks 2003). Pearson (2003) found that 89% of workers surveyed had experienced some type of incivility on the job. Pearson states that the effects of incivility include, but are not limited to, reduced productivity, poor customer service, tardiness, absenteeism, and even violence. While workplace incivility is traditionally defined in terms of an individual’s relation with coworkers, incivility in a profession can be defined in much broader terms. The Preamble to the AICPA’s Code of Conduct recognizes the profession’s responsibilities to the public, to clients, and to colleagues. The legal profession also recognizes its responsibilities to these same three groups.

This paper examines incivility in these two professions by addressing the following questions. First, have the professions recognized the problem of incivility? A professional civility task force stated that “incivility debases the profession as a whole. The public cannot be expected to show respect for lawyers (accountants) when so many lawyers (accountants) fail to show respect among themselves.” Second, have the professions considered the source of the problem? Professional incivility may derive from factors outside the profession, such as increased levels of incivility in society generally, as well as factors within the profession, such as lack of collegiality and fraternization and increased competitiveness. Finally, what strategies has each profession implemented to address the problem? Such strategies could include educational measures but should also recognize the importance of example with individual professionals treating others as they would expect to be treated.
ABSTRACT

The spate of corporate scandals and accounting irregularities exposed at Enron Corp., WorldCom Inc. and other prominent firms created a “crisis of confidence” concerning the transparency and integrity of published financial information. To promote corporate accountability, the Sarbanes-Oxley Act of 2002 (S-O Act) now requires chief executive and financial officers to certify the financial information contained in SEC filings and report on the effectiveness of internal controls. For over 25 years prior to the S-O Act, senior management at many public companies voluntarily published a “Report of Management’s Responsibility” (RMR) in annual shareholder reports. We discuss the content of RMRs and explore the factors that influenced senior management to voluntarily present such disclosures during the five-year period prior to this legislation. We hypothesize that confidence in internal controls at larger firms, corporate profitability, leverage, ownership structure, and corporate governance are critical factors in management’s decision to issue a report on its responsibilities. Exploring these influences: (1) promotes an understanding of the firm-specific environment under which the new legislation can better achieve its objectives; (2) highlights considerations for the external auditor in planning the audit and assessing audit risk; and (3) provides users of financial statements with additional information helpful in assessing the reliability of accounting information. Univariate tests reveal that senior management at larger firms were more likely to voluntarily disclose their responsibilities, ostensibly to maintain credibility with third parties and mitigate sensitivity to political costs. Management presiding over more-profitable firms were forthcoming with such disclosures, signaling their successful stewardship and organizational success. Moreover, we find significant differences between firms that issued RMRs and non-issuers with respect to capital structure, ownership concentration, and audit committee independence and effectiveness. Logistic regression confirms several of these factors as important influences on management’s behavior. Lastly, we posit additional research questions in an effort to explore and better understand the critical issues concerning management’s disclosure decisions.
ABSTRACT

Problems with revenue recognition have received a great deal of attention recently. The Securities and Exchange Commission (SEC) reports that revenue recognition is the largest category requiring financial statement restatements. This is true in spite of the fact that numerous pronouncements by standard setting bodies and authoritative groups exist (i.e., Financial Accounting Standards Board, Accounting Principles Board, American Institute of Certified Public Accountants). To address the issue the SEC issued SAB 101 to provide comprehensive guidance on revenue recognition. As with other SABs, it is not a rule or interpretation of the SEC, but rather the interpretations and practices followed by the staff of the Office of the Chief Accountant and the Division of Corporation Finance when they administer provisions of the federal securities laws. SAB 101 does not change any of the existing rules on revenue recognition, but explains through a number of examples how the staff would apply existing rules by analogy to situations that are not directly addressed by those rules.

This study examines the issues defined by the SEC and provides information on what types of accounting changes companies made, and their impact, as they reviewed their revenue recognition methods in the wake of SAB 101. We identified 113 companies that ranged widely in age, number of employees, size, and industry. The impact of the change in accounting principle reduced Earnings per Share between $0 to -$4.37.

In SAB 101 no insight is evident that suggests which of the revenue recognition criteria had been most troublesome to the SEC. Thus, another goal of this research was to identify whether the four criteria were equally responsible for the changes in accounting principle. Each company’s Management Discussion and Analysis (MD&A) and financial footnote relating to revenue recognition were read to identify the reason for the accounting change. Of the 113 companies in the sample, only 9 did not report an accounting change related to the second criterion “delivery has occurred or services have been rendered”. Several companies disclosed more than one source for their change in revenue recognition methods.
INTRODUCING AND REINFORCING LEARNING STRATEGIES
WITH ACCOUNTING STUDENTS

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INTRODUCING AND REINFORCING LEARNING STRATEGIES WITH ACCOUNTING STUDENTS

ABSTRACT: Professional accounting organizations continue to challenge accounting programs to prepare students for a lifetime of independent learning. They encourage accounting educators to direct students’ attention to the learning process and to help them become strategic learners. Leaders in the fields of accounting and education agree that learning strategies are essential tools in learning how to learn and becoming a strategic learner. The current study, using a nonequivalent-groups pretest-posttest design, integrated learning strategy instruction in two upper level accounting courses to investigate the impact of such instruction on students’ conscious use of various learning strategies. Students completed the Motivated Strategies for Learning Questionnaire (MSLQ) both at the beginning and end of the semesters. Results indicated that the instruction had no significant impact on students’ responses. Feedback from focus groups suggested a potential benefit from learning strategy instruction if presented earlier in the students’ college career.
ABSTRACT

This research examines the extent to which a firm’s downsizing strategy impacts its long-term financial performance within the framework of the stakeholder-agency theory of the firm. Previous empirical research exhibits mixed results in defining the impact of a downsizing strategy on long-term performance. I find that downsizing negatively impacts the long-term financial performance of the firm. In addition, the presence of excess cash prior to the reduction in the workforce and the use of multiple downsizings result in lower financial performance over both the two-year and five-year sample periods after the downsizing. In contrast, the permanence of the downsizing action is found to positively impact long-term financial performance.

INTRODUCTION

The removal of trade barriers over the past two decades has resulted in the significant growth of the global markets. These expanded markets only allow the more efficient producers of goods and services to increase their market share. As a result, firms that are less efficient must undertake a strategic activity to respond to these competitive pressures.

Many firms respond by downsizing, which is defined as the planned elimination of positions or jobs through the reduction of work, either in a functional area, a hierarchical level, or a unit (Cascio, 1993). This managerial action is expected to improve the efficiency of the firm and, subsequently, to enhance its competitiveness. However, corporations differ significantly in their nature and structure, and also in the motivation, methods, timing, and conditions under which they implement downsizing. Therefore, the question is if, and under what circumstances, labor should be viewed as a cost to be minimized or a valuable asset to be nurtured and developed.

Most of the empirical research on the financial implications of a downsizing strategy has focused on the question of whether shareholders, as important stakeholders in the firm, agree with the management’s premise that the firm will increase its efficiency and enhance its global competitiveness with fewer employees. Overall, the results of these studies imply that the stock price reaction is primarily dependent on the reason stated for the downsizing action. Most recently, Gombola and Tsetsekos (1992) and Palmon, Sun, and Tang (1997) find that declining demand announcements are met with lower stock prices while Palmon, Sun, and Tang (1997), Ballester, Livnat, and Sinha (1999), and Chalos and Chen (2002) find that efficiency improvement announcements are met with higher stock prices.

Additional studies attempting to link a firm’s downsizing strategy with its long-term financial
performance two to three years after the downsizing announcement, experience mixed results. Positive long-term effects are found by Wayhan and Werner (2000), Espahbodi, John, and Vasudevan (2000), and Chalos and Chen (2002). Negative long-term effects are found by Palmon, Sun, and Tang (1997), and Capelli (2000). Studies by DeMeuse, Vanderheiden, and Bergmann (1994, 1999) and Cascio, Young, and Morris (1997) do not find a conclusive link between downsizing and long-term financial performance.

This research provides an enhanced theoretical and empirical understanding of the relationship between a firm’s downsizing strategy and its long-term financial performance by examining the relationship between downsizing strategies and the value of the firm within a stakeholder-agency framework. Cornell and Shapiro (1987) view the firm as “a contractual coalition that includes both investor and non-investor stakeholders” (5). These stakeholders establish contractual claims with management that are either explicit, such as wage contracts, or implicit, such as job security. These implicit contracts are not legally binding and, hence, carry the risk of default. This risk causes the payoffs to be uncertain, thereby impacting the value of the firm.

Organizational theory surrounding downsizing actions is used to attempt to identify these implicit claims. Freeman and Cameron (1993) and Cameron, Freeman, and Mishra (1991, 1993) suggest that downsizing undertaken as part of a larger organizational redesign is much more effective than downsizing implemented as a reactive response to declining demand. Williamson (1975), Hubiak and O’Donnell (1997), and Rayburn and Rayburn (1999), concur and note that although the reduction in labor costs is immediate, measurable, and predictable, downsizing alone does not necessarily raise efficiency, improve operations, or heighten customer satisfaction. They contend that the increase in short-term profits is more than offset by the long-term penalties of this action.

Therefore, in addition to attempting to define the relationship between a reduction in the workforce and the long-term financial performance of the firm, this study attempts to identify the implicit claims of the stakeholders that ultimately impact the success of the downsizing action. I will also address methodological weaknesses of previous studies by spanning a longer time period of evaluation (ten years) and by utilizing the process recommended by Barber and Lyon (1996) to select the control group to maximize the power of the statistical tests.

I find that firms which employ downsizing, no matter what the motivation, experience lower long-term financial performance than those firms which do not downsize. In addition, the presence of excess cash prior to the reduction in the workforce and the use of multiple downsizings result in lower long-term financial performance for the downsizing firm. In contrast, the permanence of the downsizing action is found to positively impact long-term financial performance.

The remainder of the paper is organized as follows: The details about the sample and methodology are in section 2. The empirical findings are presented in section 3, and conclusions are drawn in section 4.

**DATA AND METHODOLOGY**

This research analyzes the impact of the implementation of a downsizing strategy on the financial performance of the firm for the ten-year time period, 1986 to 1995. The majority of the data for this study will be obtained from the Compustat database. Companies to be included in this study must employ more than 500 workers in the base year of evaluation, be registered in the United States, utilize a fiscal year ending December 31, and have the essential financial and employment information for the sample period 1983 through 2000. Downsizing is defined as a decrease in employment of one percent or more. Any firm that engaged in downsizing in the two years prior to the base year of evaluation is excluded from the analysis. In addition, each downsizing firm is only included in the first-year that downsizing is reported for the time period under evaluation. Utilities firms (SIC 4900-4999) and financial firms (SIC 6000-6799) are excluded from the analysis.
The details of this data sample are presented in Table 1.

<table>
<thead>
<tr>
<th>Year</th>
<th>Median % Change</th>
<th>Total Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>1986</td>
<td>-8.07%</td>
<td>40</td>
</tr>
<tr>
<td>1987</td>
<td>-5.51</td>
<td>30</td>
</tr>
<tr>
<td>1988</td>
<td>-4.31</td>
<td>35</td>
</tr>
<tr>
<td>1989</td>
<td>-5.20</td>
<td>38</td>
</tr>
<tr>
<td>1990</td>
<td>-3.84</td>
<td>57</td>
</tr>
<tr>
<td>1991</td>
<td>-6.98</td>
<td>58</td>
</tr>
<tr>
<td>1992</td>
<td>-5.16</td>
<td>24</td>
</tr>
<tr>
<td>1993</td>
<td>-6.00</td>
<td>25</td>
</tr>
<tr>
<td>1994</td>
<td>-5.53</td>
<td>20</td>
</tr>
<tr>
<td>1995</td>
<td>-8.78</td>
<td>31</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>358</td>
</tr>
</tbody>
</table>

A control group of firms is established using the methodology outlined by Barber and Lyon (1996). They find that in studies of abnormal operating performance, as measured by accounting-based data, test statistics are well specified when sample firms are matched to control firms of similar pre-event performance. In addition, they find that matching sample firms to control firms on both industry and pre-event performance is more important than matching on industry and size. Similar pre-event performance is evaluated in the year prior to the base year and is defined as the return on assets (ROA) within 90% - 110% of the downsizing firm’s ROA.

The data for the first-year downsizing firms is pooled across the ten-year time period, using as the base year (year = 0), the year in which the reduction in employment occurred. The control group of firms, which have not downsized over the time period under evaluation, is included in the analysis to determine the abnormal financial performance of the downsizing firm. Student t Tests and Wilcoxon Signed Rank Tests are used to test for the significance of the abnormal financial performance measures over the two-year sample period.

Multiple regression analysis is used to further analyze the data based upon organizational and stakeholder-agency theory. The abnormal performance measure from the year prior to the base year (year = -1) to the year of evaluation (year = +2) is regressed on the variables representing the size of the downsizing, the motivation for the downsizing, the downsizing strategy of the firm, and control variables.

The measures of abnormal financial performance include three accounting measures of productivity: sales per employee (ABNSPE), costs per employee (ABNCSTPE), and total asset turnover (ABNTAT); three accounting measures of profitability: profit margin (ABNPM), return on assets (ABNROA), and return on equity (ABNROE); and two additional financial measures: excess value (ABNEVCHG) and cash flow (ABNCASH). The independent variables used to proxy the downsizing include: a continuous variable representing the size of the reduction in workforce relative to the median (CHGEMP), a dummy variable representing the presence of a reactive response to declining demand (REACTIVE), a dummy variable representing the permanence of the downsizing strategy (PERM), a dummy variable representing the presence of multiple downsizings after the base year (MULT), and a continuous variable defining the average amount of excess cash on hand prior to the base year (XSCASH). The control variables used in the research are three firm-specific factors: size (FMSIZE), book-to-market ratio (BOOK), and earnings growth rate (GROWTH); and one economic factor: nonfarm labor productivity (PROD).
EMPIRICAL EVIDENCE

Table 2 presents the descriptive statistics for each of the measures of abnormal financial performance, along with the t and S statistics of the parametric and non-parametric tests of the null hypothesis, i.e. that the abnormal financial performance is equal to zero. Both the student t and Wilcoxon Signed Rank tests conclude that six of the eight measures of abnormal financial performance are significantly negative at the 1 percent level. These consistent results imply that downsizing firms within the sample experience lower long-term financial performance than firms which do not downsize, supporting the previous work of Palmon, Sun, and Tang (1997) and Capelli (2000).

TABLE 2
Abnormal Financial Performance

The sample of 358 firms which downsized employees (decrease in employment of one percent or more) over the ten-year time period from 1986 to 1995 are matched to firms of similar pre-vent performance and industry classification. The abnormal financial performance measure is determined by comparing the firm performance over the two years following the downsizing to the median control group performance over the same time period. The student t-test (parametric) and the Signed Rank test (non-parametric) are used to test the null hypothesis that the abnormal financial performance is equal to zero.

<table>
<thead>
<tr>
<th>Variable (Description)</th>
<th>Mean</th>
<th>Median</th>
<th>Std. Deviation</th>
<th>student's t Statistic (p value)</th>
<th>Signed Rank S Statistic (p value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABNSPE (Sales per Employee)</td>
<td>4.891</td>
<td>1.237</td>
<td>63.408</td>
<td>1.460 (0.1453)</td>
<td>1,417.5 (0.4702)</td>
</tr>
<tr>
<td>ABNCSTPE (Cost per Employee)</td>
<td>8.617</td>
<td>4.257</td>
<td>52.337</td>
<td>3.115 a (0.0020)</td>
<td>5,699.5 a (0.0035)</td>
</tr>
<tr>
<td>ABNTAT (Total Asset Turnover)</td>
<td>0.022</td>
<td>0.014</td>
<td>0.306</td>
<td>1.383 (0.1674)</td>
<td>3,192.5 (0.1033)</td>
</tr>
<tr>
<td>ABNPM (Profit Margin)</td>
<td>-2.373</td>
<td>-1.766</td>
<td>6.414</td>
<td>-7.002 a (&lt;0.0001)</td>
<td>-14,082.5 a (&lt;0.0001)</td>
</tr>
<tr>
<td>ABNROA (Return on Assets)</td>
<td>-2.503</td>
<td>-2.118</td>
<td>7.467</td>
<td>-6.342 a (&lt;0.0001)</td>
<td>-12,466.5 a (&lt;0.0001)</td>
</tr>
<tr>
<td>ABNROE (Return on Equity)</td>
<td>-7.687</td>
<td>-4.372</td>
<td>53.369</td>
<td>-2.725 a (0.0067)</td>
<td>-10,106.5 a (&lt;0.0001)</td>
</tr>
<tr>
<td>ABNEVCHG (Excess Value)</td>
<td>-0.251</td>
<td>-0.252</td>
<td>1.098</td>
<td>-4.332 a (&lt;0.0001)</td>
<td>-11,775.5 a (&lt;0.0001)</td>
</tr>
<tr>
<td>ABNCASH (Cash Flow)</td>
<td>-0.042</td>
<td>-0.028</td>
<td>0.198</td>
<td>-3.979 a (&lt;0.0001)</td>
<td>-12,540.5 a (&lt;0.0001)</td>
</tr>
</tbody>
</table>

a, b, and c represent significance at the 1%, 5%, and 10% levels respectively
TABLE 3
Abnormal Financial Performance

The abnormal financial performance measure is regressed against variables representing the size of the downsizing (CHGEMP), the motivation for the downsizing (REACTIVE), the downsizing strategy of the firm (PERM, MULT, XSCASH), and control variables (FMSIZE, BOOK, GROWTH, GDP, and PROD). The abnormal total asset turnover (ABNTAT) is excluded from this table due to lack of statistical significance in Table 2. The abnormal excess value (ABNEVCHG) and cash flow (ABNCASH) are excluded as the independent variables do not explain the changes in these measures. The abnormal sales per employee (ABNSPE) is included to illustrate the combined productivity effect with the abnormal cost per employee (ABNCSTPE).

Panel A: Productivity Measures

<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>ABNSPE Coefficient (t-statistic)</th>
<th>ABNCSTPE Coefficient (t-statistic)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-46.710 a (-3.06)</td>
<td>31.247 b (-2.45)</td>
</tr>
<tr>
<td>CHGEMP</td>
<td>0.583 (0.64)</td>
<td>0.413 (0.54)</td>
</tr>
<tr>
<td>REACTIVE</td>
<td>2.211 (0.30)</td>
<td>0.954 (0.16)</td>
</tr>
<tr>
<td>PERM</td>
<td>29.007 a (3.19)</td>
<td>21.579 a (2.84)</td>
</tr>
<tr>
<td>MULT</td>
<td>5.118 (0.69)</td>
<td>2.838 (0.46)</td>
</tr>
<tr>
<td>XSCASH</td>
<td>-4.623 a (-2.70)</td>
<td>-2.660 c (-1.86)</td>
</tr>
<tr>
<td>FMSIZE</td>
<td>4.114 b (2.47)</td>
<td>3.372 b (2.43)</td>
</tr>
<tr>
<td>BOOK</td>
<td>-0.036 (-0.03)</td>
<td>-0.100 (-0.12)</td>
</tr>
<tr>
<td>GROWTH</td>
<td>0.014 (1.11)</td>
<td>0.009 (0.89)</td>
</tr>
<tr>
<td>PROD</td>
<td>181.518 (0.68)</td>
<td>104.945 (1.47)</td>
</tr>
<tr>
<td>Adjusted R²</td>
<td>0.086</td>
<td>0.065</td>
</tr>
</tbody>
</table>

a, b, and c represent significance at the 1%, 5%, and 10% levels respectively
## Panel B: Profitability Measures

<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>ABNPM Coefficient (t-statistic)</th>
<th>ABNROA Coefficient (t-statistic)</th>
<th>ABNROE Coefficient (t-statistic)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-3.240(^b) (-2.08)</td>
<td>3.022(^c) (-1.73)</td>
<td>-28.680(^b) (-2.11)</td>
</tr>
<tr>
<td>CHGEMP</td>
<td>-0.089 (-0.96)</td>
<td>-0.105 (-1.00)</td>
<td>-0.392 (-0.68)</td>
</tr>
<tr>
<td>REACTIVE</td>
<td>-0.355 (-0.48)</td>
<td>-0.472 (-0.57)</td>
<td>0.099 (0.02)</td>
</tr>
<tr>
<td>PERM</td>
<td>2.076(^b) (2.24)</td>
<td>4.898(^a) (4.71)</td>
<td>2.526 (0.28)</td>
</tr>
<tr>
<td>MULT</td>
<td>-1.431(^c) (-1.89)</td>
<td>-2.780(^a) (-3.26)</td>
<td>-0.627 (-0.10)</td>
</tr>
<tr>
<td>XSCASH</td>
<td>-0.564(^a) (-3.23)</td>
<td>-0.829(^a) (-4.22)</td>
<td>0.692 (0.31)</td>
</tr>
<tr>
<td>FMSIZE</td>
<td>0.113 (0.67)</td>
<td>-0.134 (-0.70)</td>
<td>3.678(^b) (2.39)</td>
</tr>
<tr>
<td>BOOK</td>
<td>-0.017 (-0.16)</td>
<td>0.047 (0.39)</td>
<td>1.684 (1.24)</td>
</tr>
<tr>
<td>GROWTH</td>
<td>0.003(^b) (2.06)</td>
<td>0.003(^b) (2.03)</td>
<td>0.011 (1.03)</td>
</tr>
<tr>
<td>PROD</td>
<td>22.300 (0.82)</td>
<td>31.583 (1.04)</td>
<td>-168.582 (-0.68)</td>
</tr>
<tr>
<td>Adjusted R(^2)</td>
<td>0.074</td>
<td>0.137</td>
<td>0.039</td>
</tr>
</tbody>
</table>

\(\text{a, b, and c represent significance at the 1%, 5%, and 10% levels respectively}\)

Table 3, Panels A and B, show the results when the abnormal financial performance measure is regressed against variables representing the size of, motivation for, and strategy of the downsizing. The abnormal total asset turnover is excluded from the analysis due to lack of statistical significance in Table 2. Although regressions were run for both the abnormal excess value and the abnormal cash flow, the independent variables do not significantly explain the changes in these measures and therefore the results are not presented in this table. The abnormal measure of sales per employee is included to illustrate the combined productivity effect with the abnormal cost per employee.

In examining the two measures of productivity in Panel A, abnormal sales per employee and abnormal cost per employee, it can be seen the permanence of the downsizing action (PERM) has a positive impact on productivity. Although costs per employee do increase, the increase in sales per employee is greater, therefore improving the overall productivity of the firm. This result is consistent with prior organizational theory findings of Freeman et al (1993) and Cameron et al. (1991, 1993). These authors suggest that a firm utilizing a
downsizing strategy within the context of an overall organizational redesign will realize gains in long-term financial performance.

A second outcome of Panel A, is the negative impact of excess cash (XSCASH) on productivity. As surmised by Jensen (1993), there is an agency cost associated with excess cash. A manager will postpone difficult decisions, such as a reduction in the workforce, as long as he has the cash flow available to subsidize the inefficiency. This delay of the required organizational change beyond the optimal time can have negative ramifications on the long-term financial performance of the firm, as witnessed in these results.

From the analysis shown in Panel B of Table 3, it can be seen that both the profit margin and return on assets are impacted by the permanence of the downsizing and the availability of excess cash in a manner similar to the productivity measures above. In addition, these two profitability measures are also significantly negatively influenced by the presence of multiple downsizings within the two years following the initial reduction in the workforce (MULT). Again, this result is consistent with organizational theory. Firms which do not fully comprehend the implications of a reduction in the workforce on the surviving employees will get caught in a downsizing spiral as the agency costs of the strategy outweigh its potential gains (Hubiak and O'Donnell, 1997).

Neither the relative size of the downsizing (CHGEMP) nor the motive for the downsizing (REACTIVE) significantly effect the long-term financial performance of the downsizing firms.

CONCLUSIONS

The purpose of this research was two-fold: 1) to conclusively determine if a reduction in the workforce positively or negatively impacts the long-term financial performance of the firm, and 2) to investigate, through an enhanced understanding of the stakeholder-agency costs associated with downsizing, whether a relationship exists between a firm's downsizing strategy and its long-term financial performance. Within the framework of economic analysis, the firm's approach to downsizing should attempt to minimize total costs by encompassing both the reduction in labor costs realized by the firm and the addition of agency costs incurred as a direct or indirect result of its employment strategy.

Based upon the sample, it is conclusively shown that a reduction in the workforce has negative implications on the long-term financial performance of the firm. In addition, some of the agency costs associated with this action are specifically tied to this the firm's financial performance as measured in terms of productivity and profitability. The availability of excess cash and the presence of multiple downsizing actions and their increased agency costs, negatively impact the firm's long-term financial performance. A decline in agency costs occurs when the firm enters into the downsizing as a long-term restructuring commitment. Therefore, permanent reductions in the workforce may lead to an improved financial position.

REFERENCES


INTERNAL AUDITING IN THE MANUFACTURING SECTOR

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Jimie Kusel, University of Arkansas at Little Rock
Thomas H. Oxner, University of Central Arkansas

ABSTRACT

This research examines the role and characteristics of the internal audit function in the manufacturing sector of the economy. The purpose of the research was to secure information about to whom the auditor reports, the type of work done, expected changes in internal audit staff sizes, projected turnover rates, compensation levels, and the degree to which the suggestions of the Committee of Sponsoring Organizations of the Treadway Commission (COSO) are being implemented. Findings indicate that reporting channels, while improving, could be better improved. In line with the internal audit objective of evaluating and improving the effectiveness of risk management and control, more focus has been placed on operational audits. Staff turnover rates in the manufacturing sector are about the same as those found in all other industries, while compensation levels average above those found in other industries. The percentage of organizations that have implemented the COSO suggestions is low. The Sarbanes-Oxley Act has placed renewed emphasis on the need for internal audit and will likely have a future impact on the number of internal auditors employed.
EVOLUTION IN THE ROLL OF INTERNAL CONTROL

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ABSTRACT

Accountants who were auditing in the late fifties and early sixties knew without question that the study and associated evaluation of internal controls served as a basis for planning and documentation of the type, amount, and timing of detailed audit work to be performed in an engagement. The purpose of focusing on internal control in traditional financial statement audits appeared relatively clear—risk assessment related to fair financial reporting. The Treadway Commission’s 1987 report included a specific recommendation to require reporting on internal control as a means of emphasizing management’s responsibility for establishing and maintaining the internal control structure. The FDIC Improvement Act of 1991 included internal control reporting requirements for larger banking institutions. One of the most publicized AICPA pronouncements in recent auditing history was SAS 82. It clearly identified the auditor’s responsibility for risk assessment regarding both asset misappropriation and fraudulent financial reporting. And then came the Sarbanes-Oxley Act of 2002! Although the act particularly deals with public companies, including their internal control reporting, there is an expected “trickle down” effect for audits in general.

Discussions with a number of accounting professors and accountants in varied industries and positions suggest that there is not a common understanding of the differences between assessing control risk as part of a financial statement audit and reporting on internal control. The objective of this paper is to look at the changing role of management and auditors relating to internal control and to compare and contrast the study and evaluation of internal control in a financial statement audit with that required for expression of an opinion on management's assertion about internal control.

INTRODUCTION

The roll that internal control was to play in traditional financial statement audits was given official recognition with the approval of the 10

“generally accepted auditing standards” by membership of the AICPA (then the American Institute of Accountants) in September 1948. The second standard of fieldwork specifically dealt with the “study and evaluation of the
existing internal control.” (Committee on Auditing Procedure, 1951) It is noteworthy that, to date, the standards have remained relatively unchanged. This paper will discuss selected key developments in the role of internal control and associated reporting.

BEFORE SARBANES-OXLEY

The AICPA's Special Report on Internal Control recognized that the responsibility for establishing and maintaining the internal control system fell squarely upon management's shoulders. It further acknowledged that internal control included elements beyond financial and accounting matters. (Committee on Auditing Procedure, 1949) Traditional financial statement audits have focused primarily on accounting controls that relate specifically to asset protection and reliable financial data, with limited concern about administrative controls relating to management policies and operating efficiencies.

Since both internal and external accountants have been continual reminders of the importance of internal control, some managers have mistakenly attributed ownership and the associated responsibility to the accountant. Considering the fact that financial statements represent, in part, management's report card, it seems obvious that the system underlying such reporting must likewise be considered management's responsibility.

With changes in technology and increasing regulatory, social, and economic pressures, evolution to a greater reliance on the entity's internal control by all stakeholders was inevitable. The 1987 report of the National Commission on Fraudulent Financial Reporting (Treadway Commission) included specific recommendation to require internal control reporting by management. Management's report was to clearly acknowledge management's "responsibility for the company's financial reporting process" and "include management's opinion on the effectiveness of the company's internal controls."

The attestation standards regarding internal control came about largely as a result of the internal control reporting requirements of legislative bodies and regulatory agencies and related to examination of the design and/or operating efficiency of the control systems. One such example was the Federal Deposit Insurance Corporation Improvement Act of 1991 that required management of certain banks and thrifts to report on the effectiveness of their internal control and subject their reports to the scrutiny of CPA attestation. (Arens, Elder & Beasley, 2003)

The 1992 study by the Committee of Sponsoring Organizations of the Treadway Commission (COSO) became the authoritative internal control framework. It defined internal control and established its components. The components identified by the Committee were "control environment, risk assessment, control activities, information and communication, and monitoring." Auditing standards were revised to make the standards consistent with the COSO study.

Highly publicized, SAS 82: Consideration of Fraud in a Financial Statement Audit, was issued in February 1997. The Statement required auditors to assess the risk of materially misstated financial statements due to either fraudulent reporting or asset misappropriation. It reemphasized the idea that fraud risk was directly related to the strength of existing internal control, operating environment, and management attitude and motivation. (Mancino, 1997)

Control risk, the risk that an internal control will not prevent or detect errors, is still considered one of the key determinants of overall audit risk. The nature, timing and extent of substantive tests required for expression of an opinion on financial statements is clearly based on the auditor's assessment of control risk. The default position for high control risk—focus on additional substantive procedures.

If in the course of a financial statement audit, a significant weakness in either the design or operation of the internal control system is discovered, such condition must be reported to the audit committee or equivalent authority. Auditors are not required to plan their procedures to identify reportable conditions. The auditors' communications should clearly specify that assurances are not being made relative to the internal control but rather the financial statements. (Auditing Standards Board, 1988) If
the auditor is able to obtain satisfaction as to fair financial reporting by alternative means, an unqualified opinion on the financial statements may be rendered despite the existence of material weakness in internal control.

**SARBANES-OXLEY AND BEYOND**

The Sarbanes-Oxley Act of 2002 was precipitated largely by the loss of investor confidence in the credibility of management's financial reporting and the integrity of the independent audit process related to public companies.

One of the most significant elements in the Act was the creation of the Public Company Accounting Oversight Board (PCAOB). The Board was charged with the responsibility for establishing professional standards for auditing, attestation, quality control, independence, and ethics related to public company auditors. (Sarbanes-Oxley Act, 2002) The aim—restore confidence in the accounting profession and public financial reporting. The initial standards adopted on an interim basis represented a continuation of the existing professional standards.

According to the Chairman of the SEC,

“for many companies, the new rules on internal control reports will represent the most significant single requirement associated with the Sarbanes-Oxley Act.” (Implementation of the Sarbanes-Oxley Act, 2003)

Section 404 of the Act deals with internal control assessment by management. It specifically requires management to include in its annual reporting a report on internal control in which management acknowledges its responsibility for the establishment and maintenance of an adequate system of internal control. The report must also provide management's “assessment ... of the effectiveness of the internal control structure and procedures.” The Act further requires the independent auditor, as part of the audit engagement, to attest to the fairness of management's assertion regarding internal control, in accordance with criteria acceptable to the PCAOB. (Sarbanes-Oxley Act, 2002)

In response to Sarbanes-Oxley, the Auditing Standards Board issued two exposure drafts on March 18, 2003. The sample separate report on internal control included in Appendix B of the proposed Statement on Auditing Standards follows:

“In our opinion, management's assertion that W Company, Inc. maintained effective internal control over financial reporting as of December 31, 20X3, is fairly stated, in all material respects, based on [identify criteria].”

The exposure draft identifies the necessary changes in the magnitude and focus of auditing procedures that make an internal control opinion possible. Under the proposed standard, an auditor who discovers a material internal control weakness must issue a qualified report and express the opinion on the internal control effectiveness rather than on management's assertion. (Auditing Standards Board, 2003)

Increased emphasis on the reliability of financial reporting has heightened the auditors' concerns over the appropriateness of and operating effectiveness of both preventive and detective controls. When expressing an internal control opinion, auditors must obtain “an understanding of and perform tests of controls for all significant account balances, classes of transactions, and disclosures and related assertions in the financial statements.” (Arens, Elder & Beasley, 2004) Key tests of controls must address fraud and unusual and period-end transactions, with significant attention to the control environment.

**SUMMARY-THE REAL DIFFERENCES**

When comparing and contrasting engagements dealing with assessment of control risk with those designed for reporting on internal control, the following significant factors should be considered:

**Similarities**

- Definition of internal control
- Components of internal control
• Methods for documentation of internal control design and determination that the design has been placed in operation

• Tests to determine operational effectiveness of internal control

Differences

• Objective:

The objective of auditor assessment of control risk is the determination of the nature, timing and extent of substantive tests. There are no assurances given to the public or management on the adequacy of the internal control structure. There is also no requirement to search for material weakness or find satisfaction of operational effectiveness of internal control. The objective of reporting on internal control is to have management state to the public that they are responsible for the internal control structure, that they have assessed the controls and believe they are adequate to achieve the financial reporting objective. In order to achieve the objective of reporting on internal control, the operational effectiveness of controls must be determined and a search for material weaknesses made.

• Assessor:

The auditor assesses control risk, while management must make the assessment of internal controls to report on such controls.

• Test of controls:

For the assessment of control risk there is a requirement to perform test of controls only if reliance on internal controls is planned. Performance of test of controls and determination of the operational effectiveness of such controls are required when reporting on internal control.

• Level of controls:

While assessing control risk, the controls tested are directly related to controls that would impact specific substantive procedures. When reporting on internal control, the combined controls related to achieve a control objective are tested rather than a specific control related to substantive test.

• Timing of evaluation:

Procedures for control risk assessment are often performed at an interim date. Substantive tests are usually performed subsequently rather than confirming that controls are still in effect at year-end. Reporting on internal controls is based on controls in effect at year-end. If management performs interim assessment, procedures will have to be performed by both management and the auditors to determine that the controls are still in effect at year-end.

CONCLUSION

As stated above, there are many differences in assessing control risk and reporting on internal controls. To prevent major increases in cost there must be efficiencies in auditing the internal control structure that will carry over to auditing the financial statements. Some of the difficulties in obtaining these efficiencies have been previously discussed. An additional problem is that firms which audit financial statements are not allowed to perform consulting services for the same public company client. Therefore, many of the efficiencies that might otherwise be possible are lost if the financial statement auditor can not consult in management's assessment of internal control.

According to the July 2003 study by the GAO, the largest four public accounting firms “currently audit over 78 percent of all U. S. public companies and 99 percent of all public company sales.” (U. S. General Accounting Office, 2003) With the focus of the audit market on the “Big 4”
and increasing regulations that effectively prohibit smaller firms from doing public company audits, the pressure on the large audit firm management to retain public company clients and the associated increased fees is unprecedented in accounting history. It is long recognized that even a sound structure of internal control effectively operated has inherent limitations regarding asset protection and financial reporting.

The Sarbanes-Oxley Act of 2002 has been publicized as a significant measure of protection against corporate fraud for public company investors and lenders. It is logical to assume that those dealing with nonpublic entities will also be attracted to such safeguards. Currently, auditing standards are established by two different bodies: PCAOB—public companies and the Auditing Standards Board—nonpublic entities. Considering the various classes of financial statement users, the existence of two different sets of auditing standards does not appear to represent a real solution to the need for improved reporting and audit integrity.

Credibility in financial reporting and the related auditing process relies substantially upon the basic character of the individuals involved in the process. Recent history has shown that despite laws, internal control, etc. the best trained, most highly educated and experienced management and accounting leaders may falter when confronted by such elements as success, greed and survival.

REFERENCES


THE NONLINEAR RELATIONSHIP BETWEEN INSIDER OWNERSHIP AND FIRM PERFORMANCE

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ABSTRACT

Studies of agency theory dating back to the early 1930’s suggest that the value of a corporation is related to the percentage of the common shares owned by insiders. However, two popular hypotheses lead one to different conclusions. The convergence of interest hypothesis of Jensen and Meckling (1976) suggests a positive relationship while the entrenchment hypothesis of Shleifer and Vishny (1989), suggests a negative one. Each hypothesis is plausible so the conflict must ultimately be resolved empirically.

Most early work treats the relationship between insider ownership and firm performance as exogenous while more recently, endogenous relationships have been examined. Previous studies have modeled the relationship using contemporaneous data in piecewise regressions, ordinary least squares, as well as both linear and nonlinear simultaneous systems. Conflicting results have ranged from no relationship to quadratic and cubic relationships and most studies appear to agree only that the relationship is nonmonotonic.

This paper examines existence and direction of nonlinear Granger causality between Tobin's $q$, a measure of firm performance, and the percentage of insider ownership using quarterly time series data for fifty IPO firms. The relationship is examined with the modified Baek and Brock test (1992) using lagged data. No extant research examines nonlinear causality directly despite numerous conclusions that a nonmonotonic relationship exists nor does other research consider a lagged relationship and time series analysis.

This study concludes that, at best, only a weak case can be made for nonlinear Granger causality between the two variables. Only seven of the fifty companies (14%) exhibited significant causality in both directions compared to twelve (24%) showing significant causality from insider ownership to Tobin's $q$ and four firms (2%) with causality from insider ownership to Tobin's $q$. Twenty-seven firms (64%) showed no significant nonlinear causality in either direction. These results in general fail to support nonlinear causality in any direction. At best, they weakly suggest that nonlinear causality may run from insider ownership to Tobin's $q$. 
AN IN-CLASS EXERCISE TO ILLUSTRATE THE ECONOMICS AND ETHICS OF EARNINGS MANAGEMENT

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ABSTRACT

This paper describes and presents the details of an in-class exercise that was used in a graduate level class in accounting theory to illustrate the trade-offs and consequences associated with earnings management. The exercise parallels the environment created in many experimental economics settings, but takes place in an open and lively format. Student teams are endowed with a given level of income to begin the exercise. The teams are then presented with a series of scenarios in which they must decide whether to engage in earnings management. There is a probability of detection (which varies depending on the type of behavior) and consequences associated with the decision to engage in earnings management, if detected. After each scenario, the team standings are updated. At the end of the "game," the team with the highest amount of income is the "winner."

The exercise provides participants with an opportunity to examine earnings management from a financial manager’s perspective and to experience some of the conditions under which earnings management occurs. It then guides students through a discussion of both ethical and economic considerations related to earnings management. The exercise requires approximately one hour of class time and has been very well received by the students.
The combined effects of managerial ability and risk-shifting on debt and equity signaling.

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ABSTRACT
When informational asymmetries exist, financing choices may have signaling properties. Ross (1977) demonstrates that if debt carries a threat of financial distress, it may be used as a positive signal of managerial ability. Myers and Majluf (1984) demonstrate that, due to mis-pricing problems, equity may provide a negative signal of firm value. In contrast, Stiglitz and Weiss (1981) demonstrate that debt may signal risky (possibly low-valued) firms, while equity may signal safe (possibly high-valued) firms. This result arises because riskier projects transfer wealth from debt-holders to equity holders (the risk-shifting problem). We take features from all of these models to develop a security signaling model that combines adverse selection and moral hazard. Debt may be used to signal high managerial ability. However, debt provides risk-shifting incentives. Therefore, a manager faces a trade-off between issuing debt to signal ability and issuing equity to commit not to risk-shift. We examine the impact of financial distress costs on the equilibrium security issue by a good and bad manager.

Our main results are as follows; a) If financial distress costs are very high, the good manager issues debt, and the bad manager issues equity, b) If financial distress costs are high, both managers issue debt, c) If financial distress costs are at a medium level, the good manager issues debt and the bad manager issues equity, d) If financial distress costs are at a low level, both managers issue equity, e) If financial distress costs are at a very low level, the good manager issues debt, and the bad manager issues equity.

INTRODUCTION
When informational asymmetries exist between firm insiders (such as managers) and outside investors, financing choices may have signaling properties. This has been modeled extensively by Ross (1977), Leland and Pyle (1977), Myers and Majluf (1984), Stein (1992), Heider (2001 and 2002), among others.

For example, Myers and Majluf (MM) (1984) examine the negative signals provided by equity issuance. They develop an adverse selection model in which a manager has inside information regarding the firm's future prospects. He will only issue equity if it is currently overvalued in the market. Hence, an issue of equity signals bad news, and firm value falls. This problem may cause firms to pass up positive NPV projects. MM suggest a 'pecking order' for security issue, whereby firms prefer to finance projects using retained earnings first, followed by debt, and then equity as a last resort.

Similarly, Leland and Pyle (LP 1977) analyse the negative signals provided by a manager who is willing to reduce his own equity stake in the firm by issuing large amounts of outside equity.
On the other hand, Ross (1977) examines the positive signals provided by debt issuance. In his model, debt carries a bankruptcy threat. This threat ensures that only a high quality manager will issue debt. Therefore, firm value rises.

Hence, these models argue that debt and equity signal high and low valued firms respectively. However, Stiglitz and Weiss (1981) consider the ‘risk-shifting’ signals involved in debt issuance. Managers with riskier projects have an incentive to issue debt. Since equity-holders have limited liability, and debt-holders have the first fixed claim, riskier projects transfer wealth from debt holders to equity holders. Therefore, debt may signal risky (possibly low-valued) firms, while equity may signal safe (possibly high-valued) firms.

Heider (2001 and 2002) combines the Myers and Majluf (1984) and Stiglitz and Weiss (1981) models to analyse the conditions under which debt or equity finance dominates. His general conclusion is that firms with riskier projects issue more debt, while firms with safer projects issue more equity.

So far, the models we have discussed are purely asymmetric information (adverse selection) models. However, firms may not be characterized by a single risky project. They generally have a choice of projects, varying in degrees of risk. Now, rather than debt merely signaling an exogenously given risky project, debt may create a moral hazard problem, whereby managers have a risk-shifting incentive (that is, high debt induces them to take a high risk project). Jensen and Meckling (1976), and Barnea, Haugen and Senbet (1985), discuss this agency problem.

In this paper, we develop a security signaling model that combines adverse selection and moral hazard. Debt may be used to signal high managerial ability (as in Ross 1977). However, debt provides risk-shifting incentives (as in Jensen and Meckling 1976). Therefore, a high-ability manager faces a trade-off between issuing debt to signal ability and issuing equity to commit not to risk-shift. Now, in contrast to Heider (2001 and 2002), firms with riskier projects may not use debt, but may actually avoid debt, in order to commit to take safer projects. We examine the impact of financial distress costs on the equilibrium security issue by a good and bad manager. The interaction of financial distress costs and risk-shifting provides us with a novel result. That is, there is a type of ‘cyclical’ effect of distress costs on the equilibrium, as follows:

a) If financial distress costs are very high, the good manager issues debt, and the bad manager issues equity, b) If financial distress costs are high, both managers issue debt, c) If financial distress costs are at a medium level, the good manager issues debt and the bad manager issues equity, d) If financial distress costs are at a low level, both managers issue equity, e) If financial distress costs are at a very low level, the good manager issues debt, and the bad manager issues equity.

**The Model.**

Consider an economy consisting of 2 firms, each run by a single manager \( i \in \{g, b\} \), for ‘good’ and ‘bad’, respectively. All agents are risk-neutral, and the risk-free rate is zero.

At date 0, each firm has an investment opportunity (project 1), requiring initial investment \( I \), which the firms, having no internal funds, must obtain from the capital market, either through debt or equity. In addition, manager \( g \) has an alternative (mutually exclusive) investment opportunity (project 2), also requiring investment of \( I \).

At date 1, two possible states can occur; good or bad. In the good state, project 1 provides income of \( R > 0 \). In the bad state, project 1 provides income of 0. The probability of the project 1 good state occurring is \( P \). This is affected by managerial ability.
as follows; For the firm run by manager $g$, $P_g = 1$, while, for the firm run by manager $b$, $P_b = \frac{1}{2}$. 

For project 2, the good or bad states have equal probability of occurring. In the good state, project 2 provides an income of $R + \lambda$, with $R > \lambda \geq 0$. In the bad state, project 2 provides an income of 0.

Note that, since $P_g = 1$ for project 1, this is effectively a ‘safe’ project. Since $P_g = 1/2$ for project 2, this is effectively a ‘risky’ project.

At date 0, each manager can raise the necessary funds by issuing debt $D$ or equity $E$. Note that, since $R > \lambda$, a) risk-shifting (where the manager takes project 2 instead of project 1) is value-reducing, and b) the manager can commit not to risk-shift by issuing equity, since he shares the reduced value with outside equity-holders. The manager’s incentives to risk-shift under debt depends on the loan rate, since this affects the extent of the wealth transfer from debt-holders to equity-holders from taking the riskier project.

At date 0, managerial ability is private information. Each manager’s security issue may provide signals of this ability (issuing debt may signal that the manager is of type $g$ ). Furthermore, after receiving funds from the capital market, manager $g$ is free to decide whether to take project 1 or 2. We will analyse the possible moral hazard problem of risk-shifting associated with debt.

If the manager issues debt of face value $I$ at date 0, he is required to repay $I(1 + r)$ at date 1 (if he can), where $r$ is the loan rate. The manager effectively has an equity stake in the firm in excess of the required debt payment. If the debt-holders are not paid, the firm suffers financial distress, and the manager suffers a utility loss of $B$.

If the manager issues equity, he issues a fraction $(1-\alpha)$ to outside investors, retaining a proportion $\alpha$ for himself. In a competitive capital market, $(1-\alpha)$ must satisfy $(1-\alpha)V_0 = I$, where $V_0$ represents the date 0 value of the firm.

Case 1: No Risk-shifting Opportunities (Only project 1 exists).

We specify the following market beliefs;

a) In a pooling equilibrium, both managers issue the same security. This provides no new information to the market. The probability of each manager being of each type is 1/2.

b) In a separating equilibrium, each manager issues different securities. The market believes that the good and bad manager issues debt and equity respectively.

Manager $i$’s expected payoffs from issuing debt or equity are;

$$M_i(D) = P_i(R - I(1 + r)) - (1 - P_i)B,$$

$$M_i(E) = P_i(1 - \alpha)R + X_E,$$

where $X_E$ represents an excess transfer from equity holders (over and above the required funds $I$).

\footnote{The author is currently working on a more complex version of the model, with general good state probabilities $P_g = p \in (q,1]$, and $P_b = q$. The assumption that $P_g = 1$ and $P_b = 1/2$ greatly simplifies and sharpens the results.}
Let \( \overline{P} \) represent investors’ expectation of \( P \) given the observed security issuance. Then, under debt and equity,
\[
\overline{P}(1 + r) = I,
\]
\( X_E = \overline{P}(1 - \alpha)R - I = 0 \) respectively. This ensures that, ex ante, investors provide the required funds of \( I \), given their expectations of \( \overline{P} \).

Note that under debt and equity issuance, the loan rate \( r \) and the manager’s equity stake \( \alpha \) are derived endogenously, and are functions of \( \overline{P} \).

If both managers issue debt, the payoffs are;
\[
M_g = R - \frac{4}{3}I, \quad (1)
\]
\[
M_b = \frac{R - B}{2} - \frac{2}{3}I. \quad (2)
\]

If the good manager issues debt, and the bad manager issues equity, the payoffs are;
\[
M_g = R - I, \quad (3)
\]
\[
M_b = \frac{R}{2} - I. \quad (4)
\]

If the good manager issues equity, and the bad manager issues debt, the market is fooled. The payoffs are
\[
M_g = R - 2I, \quad (5)
\]
\[
M_b = \frac{R - I - B}{2}. \quad (6)
\]

If both managers issue equity, the payoffs are;
\[
M_g = R - \frac{4}{3}I, \quad (7)
\]
\[
M_b = \frac{R - \frac{2}{3}I}{2}. \quad (8)
\]

In order to derive the equilibria of the security issuance game, we solve the following normal form game. Note that + represents \( g' \)'s best responses.

<table>
<thead>
<tr>
<th>( g \backslash b )</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>D</td>
<td>1+, 2</td>
<td>3+, 4</td>
</tr>
<tr>
<td>E</td>
<td>5, 6</td>
<td>7, 8</td>
</tr>
</tbody>
</table>

Therefore, \( g' \)'s dominant strategy is to issue debt.

Hence, we only need to consider \( b' \)'s best response to debt issuance by \( g \). \( b' \)'s best response is to issue debt if \( (2) \geq (4) \), which is the case if \( \frac{I}{3} \geq \frac{B}{2} \).

Note that the left hand side of this condition is \( b' \)'s gain from mimicking \( g' \)'s debt issuance (\( b \) achieves this gain through the ‘pooled’ loan rate). The right hand side is \( b' \)'s expected financial distress costs from issuing debt.

Hence, we derive the following equilibria;

**Proposition 1:** (no risk-shifting opportunities):

i) If \( \frac{I}{3} \geq \frac{B}{2} \), the equilibrium is
\[
\{S_g = D, S_b = D\}.
\]

ii) If \( \frac{I}{3} < \frac{B}{2} \), the equilibrium is
\[
\{S_g = D, S_b = E\}.
\]
Therefore, the equilibria are affected by investment size $I$ (which affects manager $b$’s loan rate gain from mimicking) and financial distress costs $B$.

**Case 2: Risk-shifting opportunities exist (project 2 exists).**

In the previous case, debt provided a signal of high ability. Now we consider possible risk-shifting incentives following debt issuance. Manager $g$ may have an incentive to risk-shift (**moral hazard** problem). He may wish to issue equity to commit not to riskshift. However, he is then unable to separate from manager $b$ (**adverse selection** problem).

In this case, we examine manager $g$’s incentives to separate from manager $b$ by issuing debt, or to issue equity to commit not to riskshift, even though this entails pooling with manager $b$.

The manager’s risk-shifting incentives will be affected by the loan rate. If both the bad manager and the good manager issue debt, this pushes the loan rate up. The higher the loan rate, the more likely it is that the good manager will have an incentive to riskshift. If the market expects riskshifting, this pushes the loan rate up even further.

If both managers issue debt, and the market expects the good manager to take the safe project, the payoffs are as in (1) and (2).

If both managers issue debt, and manager $g$ is expected to riskshift, the payoffs are:

$$M_g = \frac{R + \lambda - B}{2} - I,$$

$$M_b = \frac{R - I(1 + r_c) - B}{2} = \frac{R - B}{2} - I.$$  \hspace{1cm} (9)

If manager $g$ issues debt, and manager $b$ issues equity, and the market expects the manager to take the safe project, the payoffs are as in (3) and (4).

If manager $g$ issues debt and manager $b$ issues equity, and manager $g$ risk-shifts, manager $g$’s payoff becomes:

$$M_g = \frac{R + \lambda - B}{2} - I.$$  \hspace{1cm} (10)

Manager $b$’s payoff is given by (4).

If manager $g$ issues equity and manager $b$ issues debt, the market expects risk-shifting,

$$M_b = \frac{R - B}{2} - I.$$  \hspace{1cm} (11)

Manager $g$’s payoff is given by (5).

Finally, if both managers issue equity, the payoffs are as in (7) and (8).

We can now solve for the equilibria of the security issuance game with risk-shifting opportunities.

**Proposition 2:** (Risk-shifting opportunities exist).

a) If $0 > \frac{\lambda - R - B}{2} + \frac{2}{3} I > \frac{\lambda - R - B + I}{2},$

manager $g$ does not riskshift upon issuing debt, regardless of manager $b$’s security issue. Therefore (from proposition 1),

i) if $\frac{2}{3} I < B,$ the equilibrium is

$$\{S_g = D, S_b = E\}.$$
ii) If $\frac{2}{3}I \geq B$, the equilibrium is 
\[ \{S_g = D, S_b = D\} . \]

b) If \( \frac{\lambda - R - B}{2} + \frac{2}{3}I > 0 > \frac{\lambda - R - B + I}{2} \),
If both managers issue debt, \( g \) risk-shifts.

If manager \( g \) issues debt, and manager \( b \) issues equity, \( g \) does not risk-shift. The equilibrium is \( \{S_g = D, S_b = E\} \).

c) If \( \frac{\lambda - R - B}{2} + \frac{2}{3}I > \frac{\lambda - R - B + I}{2} > 0 \),
manager \( g \) risk-shifts upon debt issuance, regardless of manager \( b \)'s security issuance.

i) If \( \frac{I}{2} > \frac{R - \lambda + B}{2} > \frac{I}{3} \), the equilibrium is
\[ \{S_g = E, S_b = E\} . \]

ii) If \( \frac{I}{2} > \frac{I}{3} > \frac{R - \lambda + B}{2} \). The equilibrium is
the equilibrium is \( \{S_g = D, S_b = E\} \).

We note the following. Manager \( g \)'s incentives
to separate from manager \( b \) by issuing debt, or
to pool with manager \( b \) by issuing equity depend on the risk-shifting incentives (which, in turn, depend on the pre-risk-shifting loan rate) and the level of financial distress costs.

The intuition behind the results in proposition 2 is as follows;

a) If financial distress costs are high, manager \( g \) never risk-shifts, regardless of manager \( b \)'s security issuance. Since risk-shifting is not a problem, \( g \) unambiguously prefers debt, in order to signal ability.

i) The financial distress costs are high enough to prevent manager \( b \) from mimicking manager \( g \).

ii) The financial distress costs are low enough to encourage manager \( b \) to mimic manager \( g \).

b) If financial distress costs are at a medium level, manager \( g \) only risk-shifts if manager \( b \) mimics by issuing debt. This will drive the loan rate up. This prevents manager \( b \) from mimicking. Since manager \( b \) will not mimic, risk-shifting is not a problem. Therefore, \( g \) unambiguously prefers to issue debt to signal ability.

c) If financial distress costs are at a low level, manager \( g \) always risk-shifts upon issuing debt, regardless of manager \( b \)'s security issuance. Now \( g \) trades off debt issuance to signal ability and equity issuance to commit not to risk-shift.

i) These costs are high enough to induce manager \( g \) to issue equity, in order to commit not to risk-shift.

ii) These costs are low enough for manager \( g \) to prefer to issue debt, and risk-shift.
An innovative result of our analysis is that separation occurs, \( S_g = D, S_h = E \), for both high and low financial distress costs, while pooling occurs, \( S_g = S_h = E \), for medium distress costs. This is due to the impact of risk-shifting.

**Conclusion.**

We have developed a security issuance model to investigate the signaling properties of debt and equity in the presence of risk-shifting incentives. The good manager may either wish to issue debt to signal ability (separating from the bad manager), or issue equity to commit not to risk-shift (pooling with the bad manager). The good manager's incentives to do so depend crucially on the level of financial distress costs. An innovative result of our analysis is that both high and low levels of financial distress cause the good manager to issue debt, while medium levels of financial distress cause the good manager to issue equity.

Furthermore, in Heider's adverse selection (2001 and 2002) model, firms with risky projects issue debt, while firms with safe projects issue equity. In contrast, in our adverse selection/moral hazard model, firms with riskier projects may not use debt, but may actually avoid debt, in order to commit to take safer projects.

Our model provides the basis for future research. Firstly, it should be developed to consider general good state probabilities (see footnote 1). Secondly, we should consider a distribution of managerial types (that is, a distribution of good state probabilities). Thirdly, we should consider the signaling effects of a combination of debt and equity instruments (as in Heider 2001 and 2002). Fourthly, we need to consider the impact of convertible debt. This may solve the problem for the manager of signaling ability while committing not to risk-shift. Finally, it is important that the results of the model are tested empirically, in particular, the cyclical effect of financial distress costs on the equilibrium security issue.

**References:**


The combined effects of bounded rationality and moral reasoning on cooperative and destructive equilibria in finitely repeated prisoners’ dilemma games.

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ABSTRACT
In the one-shot version of the Prisoners’ Dilemma (PD) game, individuals pursue mutually destructive strategies (they both defect). The repeated PD examines whether interactions over time can induce players to adopt cooperative strategies.

Cooperation is possible in the infinitely repeated PD. However, in the finitely repeated version, backward induction forces immediate mutual defection.

We develop a finitely repeated prisoners’ dilemma game that analyses the effect of players’ bounded rationality and moral reasoning on cooperative and destructive equilibria. Bounded rationality leads to cooperative behavior in early rounds of the game followed by destructive behavior in later rounds. Increasing moral reasoning results in destructive behavior in early rounds, followed by cooperative behavior in later rounds. Combining these two opposing effects results in possible cyclical behavior, with cooperation in early rounds (due to bounded rationality); defection in ‘middle’ rounds (either players are near enough the end of the game to use backward induction, or the punishment effect is weak), with a return to cooperation near the end of the game, as players begin to act ethically.

INTRODUCTION
Rau (AAAF conference 2002) considers the use of the Prisoners’ Dilemma (PD) to teach business ethics to students enrolled on a financial accounting course. His idea is to test whether playing the repeated PD can induce the players to cooperate, and whether increased cooperation is the result of increased moral reasoning (as in Kohlberg’s Stages of Moral Development Model (1981, 1984)), or merely due to self-interested fear of punishment (as in Axelrod’s (1984) tit-for-tat model).

Rau tests for ethical behavior by use of a Moral Reasoning Inventory (MRI) which had been developed by Rau and Weber (2002). The MRI involved presenting the students with identical case studies involving moral reasoning twice; once at the start and once at the end of the repeated PD game. Rau finds that cooperation in the repeated PD indeed increases over time. However, the results of the MRI support a reduction in moral reasoning during the course of the game. This suggests that the increase in cooperation is perhaps due to the self-interested fear factor as opposed to increasing ethical behavior.

In standard finitely repeated PD games with self-interested players, the tit-for-tat punishment strategy is unable to force cooperation. This is because the players know that mutual defection will occur in the final round. The ‘unravelling’ effects of
backward induction ensure that mutual defection occurs in every round. Designers of experimental PD games are concerned with such end-game effects. Rau, following many designers, eliminates effects by not revealing to the players the identity of the last round. This eliminates backward induction, and facilitates cooperation through the punishment strategy. However, the problem remains for Rau: is cooperation due to fear of punishment or due to ethical behavior.

In this paper, we develop a finitely repeated prisoners’ dilemma game that analyses the combined effects of players’ bounded rationality and moral reasoning on cooperative or destructive equilibria. We propose that bounded rationality leads to cooperative behavior in early rounds of the game (as bounded rationality eliminates backward induction), followed by destructive behavior in later rounds (as players begin to use backward induction). Increasing moral reasoning results in precisely the opposite behavior; destructive behavior in early rounds, followed by cooperative behavior in later rounds. Hence, combining these two opposing effects results in possible cyclical behavior, with cooperation in early rounds (due to bounded rationality); defection in the ‘middle’ rounds (either players are near enough to the end of the game to use backward induction, or the punishment effect is weak), with a return to cooperation near the end of the game, as players begin to act ethically.

Our model suggests an improvement in the design of Rau’s (2002) experiment. If players are informed of the identity of the last round at the beginning of the game, then it would be possible to test for bounded rationality and moral reasoning. Furthermore, this set-up would eliminate the ambiguities facing Rau (2002) on observing cooperation. Since players will be able to use backward induction (as they know when the last round will be), if cooperation is observed in later rounds, it should be due to moral reasoning, not fear of punishment.

The Benchmark Model: Finitely Repeated PD with Bounded Rationality, no moral reasoning.

Consider a game consisting of two players \( i \in \{1, 2\} \). Each player chooses independently between two strategies, \( C \) (for ‘cooperation’), and \( D \) (for ‘defection’). The game is represented as follows;

<table>
<thead>
<tr>
<th>1 ( i )</th>
<th>( C )</th>
<th>( D )</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 ( i )</td>
<td>( x, x )</td>
<td>( z, w )</td>
</tr>
<tr>
<td>( D )</td>
<td>( w, z )</td>
<td>( y, y )</td>
</tr>
</tbody>
</table>

where \( w > x > y > z \). Therefore, this is a prisoners’ dilemma game. That is, given player 2’s strategy, player 1’s optimal strategy is \( D \), and vice versa. In other words, \( D \) is the dominant strategy for either player. Hence, in a one-shot game, the unique equilibrium is \((D, D)\). Both players would prefer \((C, C)\). However, without the ability to communicate or make an agreement, this is not achievable.

In the infinitely repeated PD, cooperation is possible in every round if each player adopts the following punishment strategy; if player \( i \in \{1, 2\} \) observes that his partner has cooperated in the current round, then player \( i \) will cooperate in the next round. If player \( i \) observes that his partner has defected in this round, player \( i \) will defect forever (the ‘grim trigger’). Therefore, each player can ensure that the other cooperates forever (simply by playing ‘cooperate’ himself in every round.

In our model, we focus on the finitely repeated PD. In our benchmark case, players remain self-interested throughout the game, but suffer from bounded rationality. Both players have perfect knowledge regarding the number of rounds of play (\( n \) rounds), and perfect knowledge regarding the current round.
Both play the grim trigger strategy. We assume that the discount factor over time is \( \delta = 1 \) (players value future payoffs the same as current payoffs; there is no discounting to take account of the ‘time value of money’).

Since players have perfect knowledge regarding the number of rounds of play and the current round, the standard result, by backward induction, is mutual defection from the first round to the last. The novelty of our model is to consider the effect of bounded rationality (such that players may use forward or backward induction).

Assume that both players use forward induction at current round \( q \). First, let player \( \sim i \) have the strategy ‘cooperate in current round \( q \), and play the grim trigger strategy thereafter.’ What is player \( i \)’s best response?

Since player \( \sim i \) is cooperating in the current round \( q \), and playing the grim trigger strategy thereafter, player \( i \) can induce cooperation for all remaining rounds \( q \) to \( n \) by simply playing ‘cooperate’ in every round. However, if player \( i \) defects in the current round \( q \), this will result in player \( \sim i \) defecting forever. Player \( i \)’s best response from then on would be to defect also. Hence, in the current round, player \( \sim i \) compares two strategies, ‘cooperate forever’ and ‘defect immediately.’ Player \( i \) cooperates in the current round if

\[
(n - q)x > w + (n - q - 1)y, \quad (1)
\]

otherwise he defects.

Next, consider player \( i \)’s best response if player \( \sim i \) defects in the current round. If player \( i \) cooperates, he receives \( z \) in the current round. The grim trigger means that he will subsequently defect, receiving \( y \) per round for \( n - q - 1 \) rounds. Since \( y > z \), player \( i \) can maximize his payoff by defecting in the current round, receiving \( y \) per round for \( n - q \) rounds. Hence, his best response to defection by player \( \sim i \) is to defect himself.

Define a critical round \( q_f \), at which players, using forward induction, switch from cooperation to defection. Note that \( q_f \) satisfies

\[
(n - q)x = w + (n - q - 1)y \quad \text{(see equation 1)}.
\]

Therefore,

\[
q_f = n - \frac{w - y}{x - y}.
\]

In the following representations, + represents player 1’s best responses, and - represents player 2’s best responses.

<table>
<thead>
<tr>
<th>( q )</th>
<th>( 1 \leq q &lt; q_f )</th>
<th>( q = q_f )</th>
<th>( q &gt; q_f )</th>
</tr>
</thead>
<tbody>
<tr>
<td>( C )</td>
<td>( x^+, x^- )</td>
<td>( z, w )</td>
<td>( y^+, y^- )</td>
</tr>
<tr>
<td>( D )</td>
<td>( w, z )</td>
<td>( y^+, y^- )</td>
<td>( y^+, y^- )</td>
</tr>
</tbody>
</table>

If \( (n - q)x > w + (n - q - 1)y \), such that \( q \in [1, q_f) \),

If \( (n - q)x \leq w + (n - q - 1)y \), such that \( q \in [q_f, n] \),
<table>
<thead>
<tr>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>( x, x )</td>
<td>( z, w^- )</td>
</tr>
<tr>
<td>( w^+, z )</td>
<td>( y^+, y^- )</td>
</tr>
</tbody>
</table>

Defection is the dominant strategy here.

This provides the following result.

**Proposition 1:** In the finitely repeated PD with forward induction;

a) If \( q \in [1, q_f) \), two equilibria exist; mutual cooperation \((C, C)\), and mutual defection \((D, D)\).

b) If \( q \in [q_f, n] \), the unique equilibrium is mutual defection \((D, D)\).

The intuition behind this result is that, in the early stages of the game, players prefer many rounds of cooperation, compared with an immediate gain from defecting (while the other player is cooperating) followed by many rounds of mutual defection. However, after the critical round \( q_f \), players prefer the immediate gain from defection (while the other player is cooperating) since not many rounds of mutual defection remain. Since each player cannot commit not to defect at round \( q_f \), both players defect at round \( q_f \), and then for every round thereafter until the end of the game.

We have demonstrated that under forward induction, players switch from mutual cooperation to mutual defection at critical round \( q_f \). We now incorporate into the model the possibility that players switch from forward induction to backward induction at some point in the game. The idea is that, as the final round draws near, players have the processing capabilities to perform backward induction. Under backward induction, the players immediately defect, and then defect for the remainder of the game.

Denote round \( q_b \) as the round at which players switch from forward to backward induction. That is, players use forward induction for round \( q \in [1, q_b) \), and use backward induction for round \( q \in [q_b, n) \).

Note that the switch from mutual cooperation to mutual defection occurs at the earlier of round \( q_b \) and \( q_f \). Incorporating this analysis into proposition 1, we obtain the following result;

**Proposition 2:** In the finitely repeated PD with forward and backward induction;

a) If \( q \in [1, \min\{ q_b, q_f \}) \), two equilibria exist; mutual cooperation \((C, C)\), and mutual defection \((D, D)\).

b) If \( q \in [\min\{ q_b, q_f \}, n] \), the unique equilibrium is mutual defection \((D, D)\).

Therefore, in the finitely repeated PD with bounded rationality and no moral reasoning, the early rounds are characterized by mutual cooperation, as each player fears the punishment effects resulting from his defection. The later rounds are characterized by mutual defection, either because each player continues to use forward induction, but, since there are only a few rounds remaining, the punishment threat is weak, or because each player switches to backward induction.

We now introduce the effect of moral reasoning and ethical behavior into our model. Fehr and Schmidt (1999) develop a bargaining model of 'inequity aversion', where players care about relative as well as absolute payoffs. We employ their specification of players' utility functions. That is player $i$'s utility function is;

$$U_i = P_i - \alpha \max\{P_i - P_j, 0\} - \beta \max\{P_j - P_i, 0\},$$

where $P_i$ represents player $i$'s absolute payoff, and $\alpha \geq 0$, $\beta \geq 0$, are parameters representing the reduction in player $i$'s utility due to inequity. Note that, if $\alpha > 0$, $\beta > 0$, player $i$ suffers a utility loss from having a higher or lower payoff than his rival. Therefore, $\alpha$ represents 'jealousy', while $\beta$ represents 'guilt'.

The PD game can be reformulated as follows;

<table>
<thead>
<tr>
<th></th>
<th>$C$</th>
<th>$D$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$x, x$</td>
<td>$z - \alpha(w - z), w - \beta(w)$</td>
</tr>
<tr>
<td>2</td>
<td>$w - \beta(w - z), z - \alpha(w)$</td>
<td>$y, y$</td>
</tr>
</tbody>
</table>

We define a critical round $q_m$ such that players switch from self-interested to moral (or ethical) behavior. For $q \in (1, q_m)$, players are purely interested in their own payoffs (as in the previous section). This means that $\alpha = \beta = 0$. Hence, the standard PD game with self-interested players applies. In particular, if $q_m > n$, players remain self-interested for the whole game, and the results remain as in proposition 2.

For $q \in [q_m, n]$, players' utility functions are as in (3), with $\alpha > 0$, $\beta > 0$. Consider the case where we are at round $q_m$. In solving the game, we note that it is the case that $y > z - \alpha(w - z)$ \(\forall \alpha \geq 0\). Therefore, if player $i$ defects, player $i$'s best response is to defect also, regardless of the value of the jealousy parameter. If $w - \beta(w - z) \geq x$, then if player $i$ cooperates, player $i$'s best responses is to defect. If $w - \beta(w - z) < x$, then if player $i$ cooperates, player $i$'s best responses is to cooperate also. Consideration of this provides the results in lemma 1. Firstly, consider the one-shot game.

**Lemma 1**: In the one-shot game with moral reasoning;

a) If $w - \beta(w - z) \geq x$, the unique equilibrium is $(D, D)$.

b) If $w - \beta(w - z) < x$, the two equilibria are $(C, C)$ and $(D, D)$.

Firstly, note that the 'jealousy' parameter has no effect on the equilibrium, whereas the 'guilt' parameter does have an effect. However, neither parameter enters into the equilibrium payoffs. Secondly, if $w - \beta(w - z) \geq x$, then, even though players are thinking ethically, and have some feelings of guilt (represented by $\beta$), these feelings are not
strong enough for the players to act ethically. Effectively, the players' self-interest dominates, and the equilibrium is mutual defection.

Now consider the finitely repeated PD for \( q \in [q_m,n] \). From this point on, we restrict our attention to the case where \( w - \beta (w - z) < x \). This is the case where each player's feelings of guilt are strong enough for cooperation to be better than defection (given that the other player has cooperated) in every round. Furthermore, we assume that the players coordinate on the Pareto superior equilibrium \((C, C)\). Since the players coordinate on \((C, C)\) in the one-shot game, they will coordinate on \((C, C)\) in every round \( q \in [q_m,n] \). Furthermore, since they coordinate on \((C, C)\) up to and including the last round, the equilibrium \((C, C)\) will survive backward induction. Hence;

**Lemma 2:** In the finitely repeated PD with moral reasoning;

If \( w - \beta (w - z) < x \), and the players coordinate on the Pareto superior equilibrium \((C, C)\), the unique equilibrium in every round is \((C, C)\) This is supported by the players' ethical reasoning, and does not require any punishment strategy. Furthermore, it does not require bounded rationality.

Combining lemma 2 with proposition 2, we obtain a complete specification of equilibria in our bounded rationality-moral reasoning game.

**Proposition 3:** If \( w - \beta (w - z) < x \), and the players coordinate on the Pareto superior equilibrium,

a) If \( n > q_m > q_f > q_b \), or \( n > q_f > q_m > q_b \), the equilibria are \((C, C)\) for \( q \in [1,q_b) \), \((D,D)\) for \( q \in [q_b,q_m) \), and \((C,C)\) for \( q \in [q_m,n] \).

b) If \( n > q_m > q_b > q_f \), or \( n > q_b > q_m > q_f \), the equilibria are \((C,C)\) for \( q \in [1,q_f) \), \((D,D)\) for \( q \in [q_f,q_m) \), and \((C,C)\) for \( q \in [q_m,n] \).

c) If \( n > q_b > q_f > q_m \), or \( n > q_f > q_b > q_m \), the equilibria are \((C,C)\) for \( q \in [1,q_m) \), and \((C,C)\) for \( q \in [q_m,n] \).

d) If \( q_m \geq n \), the equilibria are as in proposition 2.

We analyse these equilibria as follows.

In 3a): The equilibrium is \((C, C)\) in the early rounds, due to bounded rationality and the punishment threat. The equilibrium is \((D,D)\) in the middle rounds, since the players are near enough to the end of the game to switch to backward induction. In the latter rounds, even though the players are using backward induction, we return to \((C, C)\) due to moral reasoning.

In 3b): The equilibrium is \((C, C)\) in the early rounds, due to bounded rationality and the punishment threat. The equilibrium is \((D,D)\) in the middle rounds. In contrast to 3a), the players still suffer from bounded
rationality (they are still using forward induction), but since they are near the end of the game, the punishment threat is weak (their immediate gain from defection exceeds the loss from mutual defection in the remaining rounds of the game). In the latter rounds, we return to \((C, C)\) due to moral reasoning.

In 3c), The equilibrium is \((C, C)\) throughout. In the early rounds, this is due to bounded rationality. In the latter rounds, this is due to moral reasoning.

In 3d), the game is so short, or the round at which the players switch to moral reasoning is so high, that the game is identical to our first case (without moral reasoning).

Note that 3c) provides an interesting ‘policy implication’. If the final round can be pushed back far enough, players can learn to be ethical before they defect under forward induction, or before they switch to backward induction, and defection can be completely eliminated.

**Conclusion.**

We have developed a finitely repeated prisoners’ dilemma game in which we analyse the combined effects of bounded rationality and moral reasoning. The general result is as follows; players cooperate in the early rounds of play, as they seek to avoid punishment (they are self-interested, and they use forward induction due to bounded rationality); in the middle rounds, they switch to mutual defection (they remain self-interested, with two strategic possibilities: either they continue to use forward induction, but since there are only a few rounds remaining, the punishment effect is too weak, or they switch to backward induction; in the final rounds, they switch back to cooperation, as they become ethical. Under certain conditions, the switch to mutual defection in the middle rounds is eliminated. In this case, the players cooperate in every round, but in the early rounds this is due to the fear of punishment, and in the later rounds this is due to ethical behavior.

Our model provides scope for future research. First, we have assumed that the players exhibit symmetric switching behavior (they switch from forward to backward induction simultaneously, and from self-interested to ethical behavior simultaneously), and that each player knows of this symmetry of behavior. Future development of this model will examine heterogeneous switching behavior.

Secondly, we have taken the switching round from self-interested to ethical behavior as exogenously given. It would be possible to develop a psychological game (see Sally (2001) for the methodology) in which moral reasoning is derived endogenously as a best response to the expectation of the other player's moral reasoning. For example, if player 1 expects player 2 to become more ethical, this might lead player 1 to become more ethical, affecting the switching round.

Thirdly, since we have only modeled one two-player game, we have distinct switching rounds. However, experiments consider many simultaneous PD games, and analyse the proportion of players cooperating or defecting in any round. This may be modeled by considering many simultaneous games with different switching rounds. The incorporation of endogenous ethical behavior in our model may prove useful for analyzing this.

**References.**


This paper analyzes the disciplinary actions taken by the Florida State Board of Accountancy against CPAs during the period of May, 1999 through August, 2002. The findings of this study were both interesting and unexpected. The results of this study were disturbing in that the most common violation requiring disciplinary action was the noncompliance with GAAP/GAAS by CPAs. This violation was number one by a large margin--almost twice the number of the second ranked violation. This could be reflective of the freewheeling, cook-the-books attitude of the ‘90s or it could indicate a basic failures in continuing education, ethics, education, or the values of society itself. The second most common violation requiring disciplinary action involved the failure of CPAs to return client records. This was most likely the result of nonpayment of fees. Two items came in at third. One was the practice of public accounting without a license and the other was committing an act of fraud or deceit. Both of these violations combined indicate the willingness of individuals to commit acts of fraud in the practice of public accounting. The remaining violations included practicing public accounting in an unlicensed firm, preparing a tax return not in compliance with professional standards, disciplinary actions in another state, failing to file a tax return, misleading/deceptive advertising, failure to comply with the Board’s reporting form audit, failure to disclose acceptance of a commission, and various criminal acts. Further analysis of the breakdown of these violations indicate an astonishing lack of adherence to professional standards and the code of ethics with regard to the practice of public accounting. This lack of adherence to professional standards indicates a definite need to address the problem at some level within the profession.

INTRODUCTION

In the wake of the accounting scandals rocking the financial world over the past five years, it is possible that a review of the disciplinary actions taken by the Florida State Board of Accountancy may reveal some insight into the problems surrounding the practice of public accounting.
Accountancy, Board of Accountancy located in Gainesville, FL. The disciplinary actions are public information and published in the *Quarterly Statement* that is published by the Division of Certified Public Accounting. The published disciplinary actions were examined for content, classified and enumerated.

**FINDINGS**

It was suspected that the primary cause for disciplinary action against practicing CPAs would be criminal acts or possibly the failure to return client records. However, the results of the analysis were both startling and distressing. EXHIBIT I summarizes the results of the content analysis. EXHIBIT II recaps the violations by category, simplifying the findings for the reader.

The number one cause of disciplinary actions in Florida were standards violations. Standards violations include violations of Generally Accepted Accounting Principles, Generally Accepted Auditing Standards, and regulatory standards prescribed by the Florida Auditor General (used in the course of certain audits by independent CPAs). A total of 27 (32.1%) of the disciplinary actions were the result of standards violations.

The second leading cause of disciplinary actions involved licensing violations. Licensing violations included both individual and firm violations. Individuals were guilty of practicing public accounting with an inactive, delinquent, null and void, or suspended license, failing to comply with the Board’s reporting form audit (verification of Continuing Professional Education hours), disciplinary actions taken by another state against the licensee, and the licensee failing to comply with a final order given by the State Board due to previous violations. The practicing of public accounting by an unlicensed firm was also included in this category. There was a total of 23 observations (27.4%) due to licensing violations.

The third leading cause of disciplinary actions involved ethical violations. (Technically all of the violations included in this study are violations of ethics laws in Florida.) Ethical violations included the failure to return client records in a timely manner, misleading and/or deceptive advertising, and the failure of a licensee to disclose the acceptance of a commission. There was a total of 14 (16.7%) ethical violations. The failure of CPAs to return client records in a timely manner accounted for 12 of the 14 violations and was the second single most common cause for disciplinary action (following the failure to follow GAAP/GAAS).

Criminal acts closely followed ethical violations as a major cause of disciplinary actions. The category entitled criminal acts included committing an act of fraud, mail fraud, deceit, negligence, or misconduct, the misappropriation of client funds, committing a crime directly related to the practice of public accounting, money laundering, and committing an act of lewd and lascivious behavior. There was a total of 13 (15.5%) observations in this category.

The area of tax return preparation results in the largest number of malpractice claims and the leading dollar amount of malpractice claims in Florida. But surprisingly, tax violations resulted in the lowest number of disciplinary actions. A total of 7 (8.3%) of the violations fell into this category. These violations included failing to prepare/file client tax returns, failing to prepare/file CPA’s tax return, preparing incorrect tax return resulting in fines and penalties, and preparing client tax returns not in accordance with the Statements of Responsibility on Tax Practice. The number of observations in this category may be slightly misleading. Based on the writer’s personal experience in public accounting it is suspected that the majority of the failure to return client records in a timely manner (12 and 14.3%) are most likely associated with tax matters. If tax violations and the failure to return client records were combined, the total number of observations in this area would be 19 or 22.5%, ranking tax matters third in the list of categories.

The four most common single causes for disciplinary action include 1) failing to follow GAAP/GAAS, 2) failing to return client records in a timely manner, 3) practicing with an invalid license, and 4) committing fraudulent acts. These four items accounted for almost two-thirds (55 or 65.5%) of the reasons for disciplinary action.
<table>
<thead>
<tr>
<th>Violation</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Standards Violations:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Audit did not comply with GAAP/GAAS</td>
<td>22</td>
<td>26.2</td>
</tr>
<tr>
<td>Expressed an opinion while lacking independence</td>
<td>2</td>
<td>2.4</td>
</tr>
<tr>
<td>Licensee undertook engagement that could not be completed with professional competence</td>
<td>1</td>
<td>1.2</td>
</tr>
<tr>
<td><strong>Regulatory Standards Violation:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Licensee failed to comply with rules of the auditor general</td>
<td>2</td>
<td>2.4</td>
</tr>
<tr>
<td><strong>Ethical Violations:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Failure to return client records in timely manner</td>
<td>12*#</td>
<td>14.3</td>
</tr>
<tr>
<td>Misleading/deceptive advertising</td>
<td>1</td>
<td>1.2</td>
</tr>
<tr>
<td>Licensee failed to disclose acceptance of commission</td>
<td>1</td>
<td>1.2</td>
</tr>
<tr>
<td><strong>Licensing Violations:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Practice of public accounting with inactive, delinquent, null and void, suspended license</td>
<td>9*</td>
<td>10.7</td>
</tr>
<tr>
<td>Practice of public accounting in an unlicensed firm</td>
<td>4</td>
<td>4.8</td>
</tr>
<tr>
<td>Failed to comply with Board’s reporting form audit</td>
<td>4</td>
<td>4.8</td>
</tr>
<tr>
<td>Disciplinary actions in another state</td>
<td>3</td>
<td>3.6</td>
</tr>
<tr>
<td>Licensee failed to comply with final order</td>
<td>3</td>
<td>3.6</td>
</tr>
<tr>
<td><strong>Tax Violations:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Failed to prepare/file client tax return</td>
<td>2#</td>
<td>2.4</td>
</tr>
<tr>
<td>Prepared incorrect tax return resulting in fines/penalties</td>
<td>1</td>
<td>1.2</td>
</tr>
<tr>
<td>Failure to prepare/file personal tax return</td>
<td>1</td>
<td>1.2</td>
</tr>
<tr>
<td>Prepared client tax return not in compliance with professional standards (including Statements of Responsibility on Tax Practice)</td>
<td>3</td>
<td>3.6</td>
</tr>
</tbody>
</table>
**Criminal Acts:**
Committing an act of fraud, deceit, negligence, or misconduct (including mail fraud) 9 10.7

Criminal acts other than above:
- Misappropriation of client funds for own use 1
- Committed crime directly related to the practice of public accounting or ability to practice accounting 1
- Conspiring to launder monetary instruments 1
- Convicted of lewd and lascivious behavior 1

* one observation appears in both categories
# two observations appear in both categories

**Note:** Amounts subject to rounding error

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**EXHIBIT II**
**RECAP OF DISCIPLINARY ACTIONS**

<table>
<thead>
<tr>
<th>Violation</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standards violations</td>
<td>27</td>
<td>32.1</td>
</tr>
<tr>
<td>Licensing violations</td>
<td>23</td>
<td>27.4</td>
</tr>
<tr>
<td>Ethical violations</td>
<td>14</td>
<td>16.7</td>
</tr>
<tr>
<td>Criminal acts</td>
<td>13</td>
<td>15.5</td>
</tr>
<tr>
<td>Tax violations</td>
<td>7</td>
<td>8.3</td>
</tr>
</tbody>
</table>

**ANALYSIS**

The results of this analysis were both surprising and distressing. This analysis does lead one to hypothesize as to the causes behind the activities leading to these disciplinary actions. Thus, there seems to be room for research that would define exactly what contributed to some of these violations.

The large number of disciplinary actions for failing to follow GAAAP/GAAS could be indicative of any number of problems, including, but not limited to the freewheeling cook-the-books attitude of the ‘90s, the failure of continuing professional education to accomplish the task of keeping CPAs up to date, the failure of the educational process itself, the relaxation of ethical standards over the past thirty years, or the changing values of society as a whole.

Licensing violations ranked second as a group. Although it may be possible that some of these violations may have been the result of oversight on
the part of the CPA or even a misunderstanding of state law, this large a number of violations again is indicative of a freewheeling attitude towards professional responsibility.

Ethical violations were the third most common group of causes for disciplinary action. In fact, the overwhelming majority of the violations in this group were for the failure to return client records in a timely manner (this was also the second most common individual violation). This is usually tied to the nonpayment of fees by the client.

Criminal acts were the next most common group of violations. The bulk of this group was comprised of fraudulent acts. This may be directly tied to the relaxation of ethical standards that has taken place over the past thirty years.

Surprisingly, tax violations were the smallest group of violations. This is surprising because the tax area has the largest number of malpractice claims and accounts for the largest dollar amount of malpractice settlements in the Florida. It would logically follow that this would be one of the leading causes of disciplinary actions taken by the State Board of Accountancy.

**CONCLUSION**

Although the total number of disciplinary actions in this analysis were few, the causes for disciplinary actions were cause for some alarm. This analysis raises questions that serve as a starting point for further research. But preliminary findings with respect to this data indicate that educators should emphasize accounting ethics early into the major coursework and continue such emphasis throughout the educational process. It also appears that continuing professional education may not be reaching the masses with respect to GAAP/GAAS. Last, it also appears that the relaxation of ethical standards over the past thirty years has had a negative impact on the profession.
ABSTRACT

The GAO has attributed the recent business failures to a number of factors. Although some of those factors may explain some of the problem, the GAO failed to consider other significant factors with respect to this issue. Today, the accounting continuum spans from GAAP to aggressive accounting to fraud. This shift can be explained by 1) the modern short-run attitude that tends to focus on immediate reward (meeting earnings projections for the capital markets or management compensation) instead of the long-run performance, 2) accounting standards that can be easily manipulated because such pronouncements fail to depict the economic essence of business transactions, and 3) the government’s attack on the ethical standards of the profession resulting in an erosion of quality work and professionalism among independent public accountants. The recommended solution is for educators to instill a long-run view into students during the educational process, have standard setting bodies focus on the economic substance of transactions, and for the profession to regain control of ethical standards.
PRIVATE VERSUS PUBLIC DEBT PLACEMENT: DOES FINANCIAL DISCLOSURE LEVEL AFFECT DEBT PLACEMENT?

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Abstract:

Researchers and practitioners have devoted considerable attention to firms’ policies regarding discretionary disclosures. Prior studies argue that firms increase demand for their debt and equity issues and, thus, lower their cost of capital, by providing more informative disclosures. However, empirical research has generally not been able to document significant benefits from increased disclosure.

Studies examining disclosure level have not distinguished between public and private debt issuances of debt. Thus, the effect that financial disclosure quality has on a firm’s placement of debt has not been considered. We argue that a company that provides lower levels of voluntary financial disclosure is less likely to issue debt by public sale and, consequently, more likely to place debt privately. Because yields on private debt generally exceed those of publicly-issued debt, our study provides indirect evidence that the level of firms’ disclosures is negatively related to the cost of debt capital.

Our results indicate a positive relation between the level of firms’ disclosures and their proportionate levels of public debt. These results are consistent with the hypothesis of this study and suggest that less informative disclosures reduce the firm’s ability to sell debt securities in the capital markets. Such firms, therefore, must resort to more costly
sources of debt financing, such as bank debt and private placements. Accordingly, our findings provide support for the notion that less informative disclosures are associated with a higher cost of capital.

**Key Words:** Debt placement, Disclosure quality, Discretionary disclosures, Financial disclosures, Private debt, Public debt
PRIVATE VERSUS PUBLIC DEBT PLACEMENT: DOES FINANCIAL DISCLOSURE LEVEL AFFECT DEBT PLACEMENT?

I. INTRODUCTION

The subject of discretionary disclosure has captured the attention of both academic researchers and practitioners. Prior studies argue that firms, by providing more informative disclosures, increase demand for their debt and equity issues and thereby lower their cost of capital.1 This belief is also widely held by practitioners. For example, the Special Committee on Financial Reporting of the American Institute of Certified Public Accountants (1994) asserts that by improving the quality of business reporting, firms ease their access to capital and/or lower their cost of capital. Prior empirical research (see Botosan, 1997; Richardson and Welker, 2001), however, has generally been unable to document significant benefits from more open and extensive disclosures.2

While prior research has investigated the effect of voluntary disclosure on the cost of capital, studies examining disclosure level have not distinguished between public and private debt issuances of debt. Thus, the effect of financial disclosure quality on the choice of debt placement (private versus public) has not been examined. However, the results of research on private debt placement (Smith and Warner, 1979; Leftwich, 1983; Blackwell and Kidwell, 1988) suggest that the quality of a firm’s general financial disclosure is not as meaningful in the private market as it is the public market because private debt agreements employ other methods to reduce default risk and agency cost. We argue that a company that provides lower levels of voluntary financial disclosure is less likely to issue debt by public sale and, consequently, more likely to place debt

1These studies include Verrecchia (1983), Dye (1985), Benston (1986) and Fishman and Hagerty (1989).

2A notable exception is a recent study (Sengupta, 1998) that reports a negative relationship between disclosure quality and cost of debt financing. Botosan (1997) and Richardson and Welker (2001) find a negative association between cost of equity capital and voluntary disclosures for firms with a low analyst following. They find no benefits from providing more informative disclosures for firms with a high analyst following.
privately. Because yields on private debt generally exceed those on publicly-issued debt, firms that depend on private issuances of debt are likely to incur a higher cost of debt capital.

Our results indicate a positive relation between the level of firms’ disclosures and their proportionate levels of public debt. These results are consistent with the hypothesis of this study and suggest that less informative disclosures reduce the firm’s ability to sell debt securities in the capital markets and, therefore, increase the firm’s borrowing cost.

The remainder of this paper is organized as follows. Section II presents the research hypothesis. Section III describes the empirical procedures used and reports the results. Section IV summarizes the research and its findings and presents our conclusions.

II. LITERATURE REVIEW AND DEVELOPMENT OF HYPOTHESIS

Accounting Disclosures and Cost of Capital

Verrecchia (1983) and Dye (1985) argue that firms use accounting disclosures to overcome adverse selection. Firms with above-average performance use disclosures to favorably distinguish themselves from other firms, thereby increasing demand for their securities and lowering their cost of capital. Using data from the AIMR Reports employed in this study, Lang and Lundholm (1993) present evidence consistent with this hypothesis. In a cross-sectional analysis of the disclosures policies of firms, they find that disclosure ratings are positively associated with earnings performance. These studies suggest that firms use accounting disclosures as a means of conveying favorable information to investors.

Other studies (cf. Diamond, 1985; Benston, 1986; and Fishman and Hagerty, 1989) argue that enhanced disclosures, by allowing investors to more effectively and efficiently monitor managers, increase demand for a firm’s securities and ultimately lower its cost of capital. Recent studies provide empirical support for this prediction.
Using the AIMR data employed in this study, Lang and Lundholm (1993) report that firms increase their disclosures prior to securities offerings. Welker (1995) finds a negative relationship between the AIMR rankings and firms’ bid-ask spreads.\(^3\) Similarly, Frankel, McNichols and Wilson (1995) report that firms that frequently access the capital markets are more likely to release earnings forecasts to investors.\(^4\)

Despite theoretical arguments relating the level of a firm’s disclosures to its cost of capital, there is limited empirical evidence in support of such a relationship (Botosan, 1997; Richardson and Welker, 2001). Prior studies have examined whether firms that provide more extensive disclosures benefit by achieving a lower cost of capital. Several studies provide at least some evidence that firms lower their cost of debt and equity capital by providing more extensive disclosures. These studies include Botosan (1997), Sengupta (1998), Lang and Lundholm (2000), Richardson and Welker (2001) and Botosan and Plumlee (2002). Botosan (1997) finds evidence that more extensive disclosures result in a lower cost of capital only for firms with low analyst following. Sengupta (1998), however, finds that firms with higher disclosure ratings have, on average, a lower cost of debt capital. Using a sample of Canadian firms, Richardson and Welker (2001) find that the quantity and quality of financial disclosure (but not social disclosure) is negatively related to the cost of equity capital for firms with low analyst following. Finally, a recent study by Evans and Sridhar (2002) models the effect of the interaction between product market competition, capital market effects, and shareholder litigation on firms’ disclosure policies.

Despite the number and variety of studies addressing disclosures and cost of capital, the evidence is far from conclusive. Given the relatively limited evidence of

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\(^3\) Lower bid-ask spreads, and the resulting increased market liquidity, are associated with lower information costs and a lower cost of capital (see Glosten and Milgrom, 1985 and Amihud and Mendelson, 1986).
benefits accruing to firms that provide more informative disclosures, existing literature
does not provide a sufficiently adequate explanation for discretionary disclosures.

**Private Versus Public Debt Placement**

While prior research has investigated the effect of voluntary disclosure on the cost
of capital, studies examining disclosure level have not distinguished between public and
private debt issuances of debt. Thus, the effect that financial disclosure quality has on a
firm’s placement of debt has not been examined. We argue that a company that provides
lower levels of voluntary financial disclosure is less likely to issue debt by public sale
and, consequently, more likely to place debt privately. Because yields on private debt
generally exceed those on publicly-issued debt (Zwick, 1980), firms that depend on
private issuances of debt are likely to incur a higher cost of debt capital.

The hypothesis that greater voluntary disclosure will result in lower debt cost can
be supported by a number of distinct explanations. As indicated earlier, some researchers
assert that enhanced disclosures reduce agency costs (Diamond, 1985; Benston, 1986;
and Fishman and Hagerty, 1989); others argue that greater financial disclosure is
associated with superior performance (Verecchia, 1983; Dye, 1985; Lang and Lundholm
1993) or with lower default risk (Sengupta, 1998).

However, because default risk and agency costs are managed differently in private
placements and public issues, the quality and extent of a firm’s financial disclosures are
likely to be less salient issues in a private debt placement. Smith and Warner (1979)
report that private debt agreements contain a greater number of more detailed restrictive
covenants. These researchers also observed that renegotiation provisions are more
frequently included and more likely to be exercised in private placements. Consistent
with these observations, Blackwell and Kidwell (1988) assert that debt-related agency

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4 Other incentives to voluntarily disclose information, such as the threat of litigation, are also cited in the
costs are less costly to resolve in a private placement than in a public issue. Thus, the quality of a firm’s general financial disclosures is likely to be less relevant in a private debt placement. Consequently, firms that are not inclined or not willing to provide extensive disclosures (e.g., firms that are reluctant to reveal proprietary information) may find it easier to issue debt in the private market.

Campbell (1979) argues that firms with proprietary information choose private placement of debt as a means of avoiding the greater levels of disclosure required by public issuance. The decision to market debt privately may also be explained as an attempt to signal firm value (James 1987; Lummer and McConnell 1989) by companies unwilling or unable to signal through enhanced financial disclosure.

Accordingly, we contend that companies that provide lower levels of financial disclosure will place debt by private issuance, as opposed to public sales. This leads to the following hypothesis (stated in the alternate form):

*Firms that provide more extensive discretionary disclosures are more likely to issue debt publicly (as opposed to privately).*

### III. EMPIRICAL PROCEDURES AND RESULTS

**The Data Set**

Data on the accounting disclosures of firms are taken from the annual Association for Investment Management and Research Corporate Information Committee Reports (AIMR Reports). These reports provide annual intra-industry rankings of firms’ disclosure practices. A committee of analysts with expertise in a particular industry ranks the firms that belong to that industry group. Three disclosure performance rankings are assigned to each firm, based on the level of disclosure provided by the firm’s: (1) annual reports and 10-

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literature (see Skinner, 1994).
Ks, (2) quarterly reports and other published materials, and (3) investor relations programs. An aggregate score, which is a weighted average of these three categories, is also provided.

Several factors are frequently cited in the AIMR Reports as affecting analysts’ ratings of a firm’s accounting disclosures. Among those factors affecting the scores assigned to published information (annual reports, 10-Ks, quarterly reports and other materials) are the inclusion of: (1) segment reports, (2) a thorough management discussion and analysis section, and (3) cash flow statements (in quarterly reports). Frequently cited determinants of the investor relations scores are the nature and extent of management’s responses to analysts’ queries and management’s general accessibility to investors and analysts.

The amount of publicly issued long-term debt for each sample firm was obtained from Moody’s Industrial Manual for the 1989, 1992 and 1993 fiscal years. The proportion of public debt was then calculated as the ratio of publicly issued long-term debt to total long-term debt. Information relating to control variables included in the analysis is taken from Compustat. Data on the sample firms’ stock returns are obtained from CRSP.

The sample consists of all non-banking firms in the AIMR rankings for 1989 and 1993 (1992 when 1993 data on disclosure or public debt could not be obtained) for which the data on public debt were available. Banks were excluded because their accounting and reporting practices differ significantly from those of other sectors. Industries that were assigned only aggregate AIMR scores (without a breakdown for each of the three categories) were also excluded. Finally, AIMR industry reports that did not rank firms, but only assigned a rating of either above average, average or below average to each firm were also excluded.

To make the AIMR disclosure scores comparable across industries, we use the firm’s percentile ranking in its AIMR industry grouping as a proxy for the level of its
The entire sample consists of 441 firms. Panels A and B of Table 1 provide a breakdown of the sample by industry and year, respectively.

It is important to note that there is an obvious bias by AIMR committees to rate the larger firms in each industry because these tend to be more closely followed by analysts. Hence, the results presented in this study may not necessarily generalize to smaller firms.

Univariate Statistics

To test our hypothesis, we identify firms that appear in the top (bottom) quartile of their AIMR industry ranking as firms that provide more (less) informative disclosures. Table 2 presents the results of the univariate tests of the relationship between firms’ disclosures and their level of public debt. (All results reported are based on two-tailed tests.) The results presented in Panel A of Table 2 indicate that there is evidence that firms that appear in the top quartile of their AIMR disclosure ratings are more likely to rely on public debt than the other sample firms. Firms that provide more informative disclosures appear to have greater proportionate levels of public debt relative to the other sample firms. The t-statistic and the non-parametric Wilcoxon Z statistic are significant at the 2% significance level. However, the results presented in Panel B indicate that firms that provide less informative disclosures do not appear to have significantly lower proportionate levels of public debt, relative to the other sample firms. The t-statistic and the non-parametric Wilcoxon Z statistic are not significant at conventional levels. The results presented in Panel A support our hypothesis that firms that provide more informative disclosures are more likely to rely on public debt instead of other, more costly, sources of debt financing, such as banks and private placements.

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5 This approach is employed by prior studies, including Lang and Lundholm (1993) and Sengupta (1998).
Multivariate Statistics

Prior studies have identified various attributes that would affect a firm’s financing decisions. Thus, our univariate results are not conclusive. Accordingly, we estimate a multivariate regression equation to examine how firms’ disclosure practices affect their debt financing sources, after controlling for relevant firm attributes. Following Easterwood and Kadapakkam (1991) we include the magnitude of existing long-term debt as a proxy for the size of debt issues. In addition, like Easterwood and Kadapakkam, we include variables to control for the relative magnitude of tangible and intangible assets, growth opportunities, profitability and volatility of past stock returns. We refer to Easterwood and Kadapakkam for a discussion of how these variables are expected to be associated with proportionate levels of public debt. The resulting regression equation becomes (firm subscripts are omitted):

\[
PUBLIC_t = \beta_0 + \beta_1 DISC_t + \beta_2 LLTD_t + \beta_3 FA_t + \beta_4 AD_t + \beta_5 RD_t + \beta_6 CEX_t + \beta_7 EBDIT_t + \beta_8 CEX_t + \beta_9 CEX_t
\]

where,

\( PUBLIC_t \) = the proportion of long-term debt from public sources.

\( DISC_t \) = a dummy variable used to indicate the firm’s AIMR industry disclosure ranking. In one regression, \( DISC \) is set to one if the firm is in the top quartile of its AIMR industry disclosure ranking, zero otherwise. In a second regression, \( DISC \) is set to one if the firm is in the bottom quartile of its AIMR industry disclosure ranking, zero otherwise.

\( LLTD_t \) = the log of the book value of long-term debt.

\( FA_t \) = the ratio of net fixed assets to total assets

\( AD_t \) = the ratio of advertising expense to sales.

\( RD_t \) = the ratio of research and development cost to sales.

\( CEX_t \) = the ratio of net capital expenditures to total assets
EBDIT<sub>t</sub> = the ratio of earnings before depreciation, interest and taxes to total assets

RISK<sub>t</sub> = the standard deviation of annual market-adjusted stock returns over the 10 years preceding the current fiscal year.

Descriptive statistics for these variables are presented in Table 3. Table 3 indicates that there is considerable variation of disclosure rankings and proportionate levels of public debt within the sample. This also appears to be true for the control variables as well. We use a dummy variable, HDISC (LDISC), set to one if the firm appears in the top (bottom) quartile of its annual AIMR industry disclosure ranking, zero otherwise. We estimate separate regressions using the HDISC and LDISC indicator variables.

We first estimate a reduced form of the above regression, reported in Table 4, including only one control variable, LLTD, because that is the only control variable that is consistently statistically significant in all the regressions reported by Easterwood and Kadapakkam. We then re-estimate the regressions using all the control variables and report those results in Table 5.

The OLS regression results, reported in Table 4, are consistent with (though somewhat weaker than) the univariate results. Table 4 indicates that in the regression using HDISC, which examines the effect of providing more informative disclosures on the firm’s proportionate level of public debt, the results are statistically significant ($p$-value < .10). In the second regression, using LDISC, the results, like the univariate results reported in Table 2 are not statistically significant. The coefficients of the control variables reported in Table 4 are consistent with the findings of Easterwood and Kadapakkam. The positive coefficient of LLTD indicates that firms with higher levels of debt are more likely to turn to public sources of financing ($p$-value < .001). Table 5 reports the results of the full regressions. A comparison of the observations reported in Tables 4 and 5 reveals that more than 75% of the observations were lost because of missing values for one or more of the control variables,
significantly reducing the degrees of freedom. The coefficients of the disclosure variables are not statistically significant. Consistent with Easterwood and Kadapakkam, the coefficients of the other control variables are not statistically significant.

Multicollinearity does not appear to affect the reported results. The variance inflation factor (VIF) in all the regression tests is lower than 3 for all of the independent variables. However, as Lang and Lundholm (1993) note, the exact nature of relationship between firm disclosures and the independent variables is not known and may be nonlinear. Accordingly, following Lang and Lundholm, we also estimate multivariate rank regressions, using percentile ranks computed within each AIMR industry group for each year for all of the non-qualitative variables. Rank regression is robust as to the exact nature of the relationship and assumes only monotonicity. The rank regression results are presented in Tables 6 and 7. The results of the reduced form rank regressions, reported in Table 6, are consistent (and stronger) than the OLS regression results reported in Table 4. As indicated in Table 6, firms with more informative disclosures are more likely to rely on public debt financing. The coefficient of HDISC is positive and highly significant ($p$-value $< .04$). The results of the full rank regressions, reported in Table 7 are not significant.

**IV. CONCLUSIONS**

Our results indicate a positive relation between the level of firms’ disclosures and their proportionate levels of public debt. These results are consistent with the hypothesis of this study and suggest that more informative disclosures increase the firm’s ability to sell debt securities in the capital markets. Such firms, therefore, are less likely to resort to more costly sources of debt financing, such as bank debt and private placements. These findings also provide support for the notion that more informative disclosures are associated with a lower cost of capital. Because private financing is generally more
expensive than the cost of publicly issued corporate bonds, our study provides indirect
evidence that the cost of debt capital is negatively associated with the quality of a firm’s
disclosures.
Table 1

Sample Composition

Panel A: Composition of Sample by Industry N=441

<table>
<thead>
<tr>
<th>Industry</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aerospace</td>
<td>11</td>
</tr>
<tr>
<td>Apparel</td>
<td>14</td>
</tr>
<tr>
<td>Textiles</td>
<td>7</td>
</tr>
<tr>
<td>Chemical</td>
<td>35</td>
</tr>
<tr>
<td>Construction</td>
<td>42</td>
</tr>
<tr>
<td>Container</td>
<td>10</td>
</tr>
<tr>
<td>Diversified Companies</td>
<td>18</td>
</tr>
<tr>
<td>Electrical Equipment</td>
<td>23</td>
</tr>
<tr>
<td>Financial Services</td>
<td>4</td>
</tr>
<tr>
<td>Food</td>
<td>48</td>
</tr>
<tr>
<td>Health Care and Services</td>
<td>21</td>
</tr>
<tr>
<td>Machinery</td>
<td>26</td>
</tr>
<tr>
<td>Natural Gas</td>
<td>8</td>
</tr>
<tr>
<td>Metals</td>
<td>16</td>
</tr>
<tr>
<td>Petroleum</td>
<td>44</td>
</tr>
<tr>
<td>Paper</td>
<td>30</td>
</tr>
<tr>
<td>Publishing / Media</td>
<td>24</td>
</tr>
<tr>
<td>Retail</td>
<td>39</td>
</tr>
<tr>
<td>Specialty Chemicals</td>
<td>18</td>
</tr>
<tr>
<td>Telecommunications</td>
<td>3</td>
</tr>
</tbody>
</table>

Panel B: Composition of Sample by Year N=441

<table>
<thead>
<tr>
<th>Year</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>1989</td>
<td>245</td>
</tr>
<tr>
<td>1992</td>
<td>90</td>
</tr>
<tr>
<td>1993</td>
<td>106</td>
</tr>
</tbody>
</table>
### Table 2

*Comparison of Proportionate Level of Public Debt For Sample Firms Stratified By Disclosure Ratings*

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Quartile One</th>
<th>Median</th>
<th>Quartile Three</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Panel A: Tests for differences in the proportionate level of public debt between firms in the top quartile of their AIMR disclosure ranking and the other firms in the sample.</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Firms in the top quartile of their AIMR industry rankings (N = 113)</td>
<td>.463</td>
<td>.216</td>
<td>.509</td>
<td>.712</td>
</tr>
<tr>
<td>Other sample firms (N = 328)</td>
<td>.380</td>
<td>.001</td>
<td>.389</td>
<td>.661</td>
</tr>
<tr>
<td>T-statistic</td>
<td>2.38</td>
<td>(0.02)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wilcoxon Rank Sum statistic</td>
<td>2.43</td>
<td>(0.02)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Median test statistic</td>
<td>2.32</td>
<td>(0.02)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Panel B: Tests for differences in the proportionate level of public debt between firms in the bottom quartile of their AIMR disclosure ranking and the other firms in the sample.</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Firms in the bottom quartile of their AIMR industry rankings (N = 101)</td>
<td>.381</td>
<td>.001</td>
<td>.383</td>
<td>.647</td>
</tr>
<tr>
<td>Other sample firms (N = 340)</td>
<td>.407</td>
<td>.054</td>
<td>.438</td>
<td>.682</td>
</tr>
<tr>
<td>T-statistic</td>
<td>-.71</td>
<td>(.48)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wilcoxon Rank Sum statistic</td>
<td>-1.07</td>
<td>(.29)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Median test statistic</td>
<td>-.54</td>
<td>(.59)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The AIMR disclosure ranking is the firm’s percentile ranking in its AIMR industry grouping for the current fiscal year. The p-values appear in parentheses.
### Table 3

*Descriptive Statistics for Sample Firms*

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Quartile One</th>
<th>Median</th>
<th>Quartile Three</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sample Firms (N=441)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MVAL ($ millions)¹</td>
<td>5763</td>
<td>875</td>
<td>2326</td>
<td>5136</td>
</tr>
<tr>
<td>PUBLIC DEBT²</td>
<td>.401</td>
<td>.012</td>
<td>.43</td>
<td>.68</td>
</tr>
<tr>
<td>PROFIT³</td>
<td>.157</td>
<td>.114</td>
<td>.152</td>
<td>.189</td>
</tr>
<tr>
<td>STDDEV⁴</td>
<td>.278</td>
<td>.18</td>
<td>.245</td>
<td>.317</td>
</tr>
<tr>
<td>TOTAL LONG-TERM DEBT</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>($ millions)⁵</td>
<td>1650</td>
<td>245</td>
<td>644</td>
<td>1690</td>
</tr>
<tr>
<td>CAPITAL INTENSITY⁶</td>
<td>.403</td>
<td>.253</td>
<td>.369</td>
<td>.544</td>
</tr>
<tr>
<td>ADVERTISING INTENSITY⁷</td>
<td>.042</td>
<td>.013</td>
<td>.026</td>
<td>.048</td>
</tr>
<tr>
<td>R &amp; D INTENSITY⁸</td>
<td>.025</td>
<td>.006</td>
<td>.017</td>
<td>.035</td>
</tr>
<tr>
<td>CAPEX⁹</td>
<td>.069</td>
<td>.04</td>
<td>.063</td>
<td>.089</td>
</tr>
<tr>
<td>AGGREGATE DISCLOSURE RANKING¹⁰</td>
<td>.52</td>
<td>.28</td>
<td>.55</td>
<td>.77</td>
</tr>
</tbody>
</table>

¹ Total market capitalization measured as of the beginning of the current fiscal year.

² Proportion of long-term debt from public sources.

³ Current year operating income before depreciation and taxes, scaled by total assets.

⁴ The standard deviation of market-adjusted annual returns over the preceding ten fiscal years.

⁵ Total long-term debt is the book value of long-term debt.

⁶ Capital intensity is the ratio of fixed assets to total assets.

⁷ Advertising intensity is the expenditure on advertising as a percentage of sales.

⁸ R & D intensity is the expenditure on research and development as a percentage of sales.

⁹ CAPEX is capital expenditures as a percentage of total assets.

¹⁰ The firm’s percentile ranking in its AIMR industry ranking.
Table 4

*Results of OLS Regression Tests of the Effect of Firm’s Disclosures on their Method of Financing.*

<table>
<thead>
<tr>
<th>Independent Variables&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Dependent Variable: Proportionate Level of Public Debt</th>
<th>Effect of more open disclosure policies on proportionate levels of public debt</th>
<th>Effect of less open disclosure policies on proportionate levels of public debt</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTERCEPT</td>
<td>.099</td>
<td>.10</td>
<td>(.071) (.082)</td>
</tr>
<tr>
<td>HDISC&lt;sup&gt;1&lt;/sup&gt;</td>
<td>.058</td>
<td></td>
<td>(.092)</td>
</tr>
<tr>
<td>LDISC&lt;sup&gt;2&lt;/sup&gt;</td>
<td></td>
<td>.004</td>
<td>(.916)</td>
</tr>
<tr>
<td>L-T Total Debt&lt;sup&gt;3&lt;/sup&gt;</td>
<td>.045</td>
<td>.047</td>
<td>(.001) (.001)</td>
</tr>
</tbody>
</table>

| Observations | 441 | 441 |
| F-statistic  | 17.47 | 15.94 |
| Adjusted R²  | .070 | .064 |

<sup>a</sup> The estimated coefficients and two-tailed p-values (reported in the parenthesis).

<sup>1</sup> A dummy variable set to one if the firm is in the top quartile of its AIMR industry disclosure ranking, zero otherwise.

<sup>2</sup> A dummy variable set to one if the firm is in the bottom quartile of its AIMR industry disclosure ranking, zero otherwise.

<sup>3</sup> Total long-term debt is the book value of long-term debt.
Table 5

Results of OLS Regression Tests of the Effect of Firm’s Disclosures on their Method of Financing.

<table>
<thead>
<tr>
<th>Independent Variables(^a)</th>
<th>Dependent Variable: Proportionate Level of Public Debt</th>
<th>Effect of more open disclosure policies on proportionate levels of public debt</th>
<th>Effect of less open disclosure policies on proportionate levels of public debt</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Effect of more open disclosure policies on proportionate levels of public debt</td>
<td>Effect of less open disclosure policies on proportionate levels of public debt</td>
<td></td>
</tr>
<tr>
<td>INTERCEPT</td>
<td>-.082</td>
<td>-.076</td>
<td>(.716)</td>
</tr>
<tr>
<td>HDISC(^1)</td>
<td>-.032</td>
<td></td>
<td>(.666)</td>
</tr>
<tr>
<td>LDISC(^2)</td>
<td></td>
<td>-.075</td>
<td></td>
</tr>
<tr>
<td>L-T TOTAL DEBT(^3)</td>
<td>.043</td>
<td>.041</td>
<td>(.036)</td>
</tr>
<tr>
<td>CAPITAL INTENSITY(^4)</td>
<td>.325</td>
<td>.334</td>
<td>(.375)</td>
</tr>
<tr>
<td>ADVERTISING INTENSITY(^5)</td>
<td>.708</td>
<td>.760</td>
<td>(.35)</td>
</tr>
<tr>
<td>R &amp; D INTENSITY(^6)</td>
<td>.130</td>
<td>.098</td>
<td>(.90)</td>
</tr>
<tr>
<td>CAPEX(^7)</td>
<td>.988</td>
<td>.724</td>
<td>(.524)</td>
</tr>
<tr>
<td>PROFIT(^8)</td>
<td>.372</td>
<td>.479</td>
<td>(.559)</td>
</tr>
<tr>
<td>STDDEV(^9)</td>
<td>.053</td>
<td>.100</td>
<td>(.861)</td>
</tr>
<tr>
<td>Observations</td>
<td>97</td>
<td>97</td>
<td></td>
</tr>
<tr>
<td>F-statistic</td>
<td>1.37</td>
<td>1.48</td>
<td>(.222)</td>
</tr>
<tr>
<td>Adjusted R(^2)</td>
<td>.030</td>
<td>.039</td>
<td></td>
</tr>
</tbody>
</table>

\(^a\) The estimated coefficients and two-tailed p-values (reported in the parenthesis).

\(^1\) A dummy variable set to one if the firm is in the top quartile of its AIMR industry disclosure ranking, zero otherwise.
A dummy variable set to one if the firm is in the bottom quartile of its AIMR industry disclosure ranking, zero otherwise.

Total long-term debt is the book value of long-term debt.

Capital intensity is the ratio of fixed assets to total assets.

Advertising intensity is the expenditure on advertising as a percentage of sales.

R & D intensity is the expenditure on research and development as a percentage of sales.

CAPEX is capital expenditures as a percentage of total assets.

Current year operating income before depreciation and taxes, scaled by total assets.

The standard deviation of market-adjusted annual returns over the preceding ten fiscal years.
Table 6

Results of Rank Regression Tests of the Effect of Firm's Disclosures on their Method of Financing.

<table>
<thead>
<tr>
<th>Independent Variables(^a)</th>
<th>Dependent Variable: Proportionate Level of Public Debt</th>
<th>Effect of more open disclosure policies on proportionate levels of public debt</th>
<th>Effect of less open disclosure policies on proportionate levels of public debt</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTERCEPT</td>
<td>.427 (.001)</td>
<td>.443 (.001)</td>
<td></td>
</tr>
<tr>
<td>HDISC(^1)</td>
<td>.060 (.035)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LDISC(^2)</td>
<td></td>
<td>-0.021 (.48)</td>
<td></td>
</tr>
<tr>
<td>L-T Total Debt(^3)</td>
<td>.127 (.008)</td>
<td>.134 (.005)</td>
<td></td>
</tr>
</tbody>
</table>

| Observations                | 441                                             | 441                                                                               |                                                                                |
| F-statistic                 | 6.36 (.002)                                     | 4.34 (.014)                                                                      |                                                                                |

\(^a\) The estimated coefficients and two-tailed p-values (reported in the parenthesis).

1 A dummy variable set to one if the firm is in the top quartile of its AIMR industry disclosure ranking, zero otherwise.

2 A dummy variable set to one if the firm is in the bottom quartile of its AIMR industry disclosure ranking, zero otherwise.

3 Total long-term debt is the book value of long-term debt.
Table 7  

Results of Rank Regression Tests of the Effect of Firm’s Disclosures on their Method of Financing.

<table>
<thead>
<tr>
<th>Independent Variables(^a)</th>
<th>Dependent Variable: Proportionate Level of Public Debt</th>
<th>Effect of more open disclosure policies on proportionate levels of public debt</th>
<th>Effect of less open disclosure policies on proportionate levels of public debt</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTERCEPT</td>
<td>0.226 (0.150)</td>
<td>0.260 (0.093)</td>
<td></td>
</tr>
<tr>
<td>HDISC(^1)</td>
<td>-0.022 (0.718)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LDISC(^2)</td>
<td></td>
<td></td>
<td>-0.095 (0.113)</td>
</tr>
<tr>
<td>L-T TOTAL DEBT(^3)</td>
<td>0.153 (0.169)</td>
<td>0.134 (0.213)</td>
<td></td>
</tr>
<tr>
<td>CAPITAL INTENSITY(^4)</td>
<td>0.133 (0.366)</td>
<td>0.159 (0.276)</td>
<td></td>
</tr>
<tr>
<td>ADVERTISING INTENSITY(^5)</td>
<td>0.106 (0.341)</td>
<td>0.114 (0.295)</td>
<td></td>
</tr>
<tr>
<td>R &amp; D INTENSITY(^6)</td>
<td>0.053 (0.662)</td>
<td>0.061 (0.609)</td>
<td></td>
</tr>
<tr>
<td>CAPEX(^7)</td>
<td>0.157 (0.347)</td>
<td>0.094 (0.559)</td>
<td></td>
</tr>
<tr>
<td>PROFIT(^8)</td>
<td>0.011 (0.929)</td>
<td>0.028 (0.815)</td>
<td></td>
</tr>
<tr>
<td>STDDEV(^9)</td>
<td>0.026 (0.801)</td>
<td>0.020 (0.841)</td>
<td></td>
</tr>
<tr>
<td>Observations</td>
<td>97</td>
<td>97</td>
<td></td>
</tr>
<tr>
<td>F-statistic</td>
<td>0.86 (0.557)</td>
<td>1.18 (0.319)</td>
<td></td>
</tr>
</tbody>
</table>

\(^a\) The estimated coefficients and two-tailed p-values (reported in the parenthesis).

\(^1\) A dummy variable set to one if the firm is in the top quartile of its AIMR industry disclosure ranking, zero otherwise.

\(^2\) A dummy variable set to one if the firm is in the bottom quartile of its AIMR industry disclosure ranking, zero otherwise.

\(^3\) Total long-term debt is the book value of long-term debt.
Capital intensity is the ratio of fixed assets to total assets.

Advertising intensity is the expenditure on advertising as a percentage of sales.

R & D intensity is the expenditure on research and development as a percentage of sales.

CAPEX is capital expenditures as a percentage of total assets.

Current year operating income before depreciation and taxes, scaled by total assets.

The standard deviation of market-adjusted annual returns over the preceding ten fiscal years.
REFERENCES


ANALYSIS OF THE NEW CORPORATE PARADIGM—
DIRECTORS AND MANAGEMENT—THE UNHOLY ALLIANCE,
AND THE BUSINESS ETHICS OF TOMORROW

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ABSTRACT

The purpose of this paper is to examine the most important challenges to the practice of accounting and business law since the Savings and Loan scandals of the early 1990’s. Are the accounting and business law professions seething with the same substantive and procedural legal and ethical issues that surfaced back then? If the status quo is unacceptable, and Sarbanes-Oxley (SOX) of 2002 appears to be a manifestation of its intolerance, what can the professions do to change the course of corporate history? This inquiry will identify systemic corporate accounting and legal weaknesses and their underlying causes. Case analysis will address issues common in the business community, while focusing on recommendations for change and new standards for implementation. Lastly, the indispensable ethics component will be discussed with a view to its future role in corporate reform.

Introduction

Is “Wall Street’s” Gordon Gekko correct that “Greed is good for America”? Public Citizen Advocate Ralph Nader argues American corporations are the most pernicious forms of business organizations exploiting investors, consumers, and workers in our society today, beyond anything seen before in history.

Is this due to the historic corporate model changing from shareholders electing directors who hire executive officers accountable to them to (1) a new modus operandi that has directors pledging their allegiance, not to shareholders who elect them, but to corporate officers that recruit and arrange their noncompetitive election and reelection; (2) does this lack of shareholder accountability engender a “greed” approach to serve the financial interests of incumbent directors and officers, leaving shareholders with the lowest position of corporate influence? And (3), are accountants and business lawyers the willing agents that transformed this governance model?

The Carnage

What's the fuss all about? In his epic “Wealth of Nations”, Adam Smith presciently observed, “The directors of companies, however, being the managers of other people’s money than their own, it cannot well be expected, that they should watch over it with the same anxious vigilance [as owners] ....Negligence and profusion, therefore, must always prevail, more or less, in the management of the affairs of such a company” (Hemalin & Weisbach, 2003, p. 9).

Fast forward to the 21st century—2001, and a Fortune 500 company, in fact #7 on its...
list in 2001. Enron, while appearing to be profitable and encouraging its workers to invest, hid billions in debt while executives sold more than $1 billion in stock. December 2, it filed for bankruptcy. Between 1998 and January 2002, Gary Winnick, founder and chairman of Global Crossing sold $734 million in stock while his company filed for bankruptcy on January 28, 2002, the fourth largest in corporate history. April 28, the Securities and Exchange Commission approved a settlement involving nine of Wall Street’s largest investment firms for illegal activity involving analysts’ stock research and the firms’ investment banking interests costing them $1.4 billion. June 3, Tyco’s CEO Dennis Kozlowski was indicted and later charged with massive fraud looting $600 million from his company. (Gerena-Morales, 2003, p. 3).

Big numbers do not necessarily mean big problems, or do they? Ironically, Enron’s “new” post-bankruptcy board of directors had the temerity to file suit against six firms they allege conspired with former corporate executives to “cook the company’s books” resulting in personal and business profit to the tune of over $500 million in revenues for their banks. Mega players such as J.P. Morgan, Citigroup, Merrill Lynch, Deutsch Bank, Barclays, and CIBC head the parade. Already contrite J.P. Morgan, Citigroup, and Merrill Lynch stepped up to the plate and paid $366 million in fines and promised to impose internal reforms that would prevent them “from doing the sort of deals they did with Enron” (McLean, Elkind & Koudsi, 2003, p. 80).

Robbery Without A Gun

“Free” cash flow (uncommitted liquidity) presents serious potential conflicts between managers and investors. There are four options management can take with free cash flow: (1) pay it out to the firm’s shareholders; (2) reinvest it in new or existing projects; (3) retain it by investing in passive financial securities; or (4) use it for themselves (Denis, 2001, p. 3). Michael D. Eisner, CEO for Mickey’s Disney, saw his compensation rise 498% to $6 million in 2002 while shareholder return fell 18%. Leo F. Mullin, Delta’s CEO, received $13.8 million, a 104% increase over the previous year, while asking the pilots union to take a reduction in previously negotiated wages, concurrent with a shareholder loss in equity that plummeted 58%. Miles D. White, CEO at Abbott Labs, in 2002 received $25,545,490, a meager 147% increase amidst a shareholder decrease of 27% in stock price. (Nader, 2003).

The most impressive holdup without a gun, winning an Oscar for most dramatic getaway, must be Enron’s leadership team—CEO Ken Lay pocketed $67 million in compensation during the year prior to its bankruptcy, Jeffrey Skilling, president, rifled $40 million, and CFO Andrew Fastow (who has since pleaded guilty to fraud receiving 5 years imprisonment that he is currently serving) made away with a mere $5.6 million. But the breath taker is the discovery that 140 Enron executives received a total of $680 million, averaging $4.7 million apiece, for their dedicated, loyal, and honest effort on behalf of their shareholders. (“Suggestions for Reform,” 2003)

A few wayward corporate bandits do not make a formidable gang, or do they? “CEOs of the 350 biggest U.S. companies enjoyed a 7% rise in their pay, despite an average 13% fall in corporate profitability during the year [2002] (“Suggestions for Reform,” 2003). Even management by objectives scion Dr. Peter F. Drucker forewarned the increasing pay gap between CEOs and employees in the early 1980’s. He observed that such disparity threatens the credibility of corporate leadership, maintaining that no leader should earn more than 20 times the company’s lowest paid employee (Ibid.).

Why should shareholders be concerned? As one blunt investment manager observed in a CATO Institute report on this subject, “Enron ain’t the problem….The unremarked gut issue today is that over the past decade there was a landslide transfer of wealth from public shareholders to corporate managers. Enron was just the tip of the iceberg ready to happen” (Niskanen, 2002). Do shareholders care about paying 140 company executives in one company $680 million? After all, it is their money and are we not talking about the “C” word here—corruption? One key symptom of corporate corruption is runaway CEO pay. During the past decade, CEO pay has grown
from 42 times average employee pay to 531 times average employee pay. Comparing other industrialized nations, Japanese CEOs make only 20 times what an average worker earns while British CEOs make 35 times, a far cry from their colonial cousins (“Suggestions for Reform,” 2003).

Who Is Minding the Store?

Responsible and accountable corporate governance is dependent on three critical components balancing and checking one another—shareholders, management, and the board of directors. Effective governance is exercised by each component carrying out its respective, but different function. When they work together, they operate as an effective system of corporate checks and balances. When one or more components defaults, or neglects its performance, “the system as a whole can become dangerously unbalanced” (Montgomery & Kaufman, 2003, p. 88).

The American corporate governance model requires that a board of directors be elected by the shareholders. As agents of the shareholders, they are supposed to be accountable to them. But in view of the above, are they being held accountable? Some argue board elections offer only one slate of candidates, one for every position that is hand-picked by management—the officers the board is supposed to supervise. Instead of being independent, they are chosen by the very executives they should question; resulting in their being beholden to those executives that placed them in the board positions, not the shareholders who perfunctorily checked the noncompetitive nominations (“Corporate Governance (A Special Report) --- What’s Your Solution?” 2003, p. R8).

What makes the stock market really tick? Critics observe that corporate accounting scandals of the past two years undermined the stock market’s most important asset—trust (Gerena-Morales, 2003, p. 1).

How important is that asset really? On July 23, 2002, the Dow Jones Industrial average closed at 7,702, a loss of 1,500 points in four weeks (Ibid, p. 3). So who is losing trust in whom? Institutional investors own almost half of all U.S. corporate shares with the 20 largest pension funds owning roughly one-third of the assets of the 1000 largest corporations (Firstenburg & Malkiel, 1994, p. 28). When institutional investors catch a cold, the stock market catches pneumonia. Critics argue that accounting fraud at Enron, WorldCom, and Tyco, to name only a few of the headliners, savaged their belief in a corporate governance system in which “corporate leaders are supposed to honestly boost shareholder value, auditors are supposed to ensure the accuracy of financial reports, and the boards of directors are supposed to make sure everyone is doing their jobs” (Gerena-Morales, 2003, p. 1).

The old canard that CEOs were compensated lavishly because their ability to improve their company’s performance aligned perfectly with that of their shareholders, has been debunked by recent study. David Leonhardt’s results (2003), published in the New York Times, confirm there is often no direct relationship between executive compensation and their company’s performance (p. 4).

In fact, additional research discloses that during the 1990’s corporate officers and directors were generously self-rewarded with stock options. At first glance it would appear these corporate leaders were aligning themselves with shareholder interest—share value. But upon closer inspection, is that what really happened? Research discloses that many executives engaged in whatever action proved necessary to boost short-term stock price, to the long-term detriment of the
company they were leading. When the economic bubble formed, because they knew the true financial numbers within their companies, executives usually cashed out before the stock crashed, often with the support of the board of directors (“Corporate Governance 101,” 2003).

Should it disturb shareholders that 208 executives and directors from the 25 largest U.S. companies that filed for bankruptcy between January 2001 and July 2002 made away with gross earnings of $3.3 billion, most of it realized from stock sold before the company collapsed (Cheng, 2002, p. 10)? How should the investor feel about executives and directors of 1,035 corporations whose stock fell at least 75 percent from the highs they achieved just before 2001, cashing out with $66 billion (Gimein, 2002, p. 67)? If there is any doubt about greed, at the 25 corporations where executives cashed out the most before scandals broke, would anyone be surprised to learn 466 insiders carried off a haul of $23 billion (Ibid.)?

If the previously mentioned fail to reflect there may be a problem at the top in corporate America, former Federal Reserve Chairman Paul Volcker observed, “I was struck not too long ago when a leading figure on Wall Street said to me, ‘What do you expect when for 20 or 30 years all our best business schools have been teaching the ideology that the stock price is the only thing that counts.’ And it wasn’t to stretch the corollary far to say anything you can do to get the stock price up is appropriate” (“Venerable Group Dissects U.S. Corporate Governance Accounting,” 2003, 2). No right thinking accountant or business lawyer would be seduced by such mantras, correct? A recent survey revealed one in six chief financial officers reported being pressured by chief or other high ranking executives to misrepresent financial results, with 5% even confessing to violating accounting rules during the past five years (Malone & Exall, 2003, p. 54).

The General Accounting Office disclosed one in ten publicly traded companies had to restate their earnings between 1997 and 2002 because of serious accounting irregularities (GAO-03-138, 2002). Not to be outdone, Department of Justice prosecutors are investigating 130 public companies for corporate fraud (“Suggestions for Reform,” 2003). Even a 2002 report from the Association of Certified Fraud Examiners reveals the median loss for detected fraudulent statements is $4.25 million, more than 50 times the median loss for more common business crimes like inventory theft or payroll fraud (Malone & Exall, 2003, p. 54).

Round Up the Usual Suspects

At the conclusion on the Savings and Loan investigations in 1995, the Department of Justice’s Office of Special Counsel reported 5,506 defendants had been convicted (a 96.5 percent conviction rate) with officers, directors, and CEOs comprising 29 percent of the miscreants, while accountants, lawyers, and consultants totaled 71 percent (Jennings, 2003, p. 323). Is there a pattern developing? Even with corporate executives and boards of directors running ethically and greedily amuck, how is it possible for this suspect class to defraud Wall Street and investors? Enter the accountants and the business lawyers, the handmaidens of disaster.

Asked recently whether it is legally possible for a financially unhealthy company to be materially represented as a healthy one in an annual or quarterly report, a professor of accounting at a well known Midwest university confirmed “it is lawfully doable, applying an aggressive interpretation of the GAAP standards.” This may explain why the U.S. Department of Justice prosecuted Arthur Andersen only for obstruction of justice, as opposed to fraud and securities reporting violations with respect to its Enron activities. So if it is legally possible to make a financial turkey look like a soaring eagle, the humorous inquiry to an accountant by his CEO as to how much one plus one adds up to, and the accountant’s response “how much do you want it to be?”, might be more truth than fiction. Is this not the heart of the current dilemma facing corporate America?

Recent criminal and civil investigations discovered a willingness that surpassed even the achievements of the Savings and Loan accounting and legal feats of the 1990’s. Highly regarded Wall Street firms’ misconduct,
revealed in shocking email, make their accountants, lawyers, and investment bankers co-conspirators in masking Enron debt as cash flow from operations creating phony profits, at the end of a quarter (McLean, Elkind & Koudsi, 2003, p. 80). The accounting tool most often used by Chase Manhattan and Citigroup to disguise more unpleasant data was "prepay." This clever tool allowed Enron to book loans as operating cash flow. "Enron loves these deals", wrote a Chase banker in 1998, "as they are able to hide funded debt from their equity analysts" (Ibid.). Not to be outdone, another Chase executive wrote in 1999, "They are understood to be disguised loans and approved as such." Completing over $8 billion in such loans to Enron, a Citigroup banker wrote "E gets money that gives C flow but does not show up on the books as big D debt" (Ibid., p. 81).

The bank loan accounting standard is captured best when one banker observed, "In investment banking, the ethic is “Can this deal get done?” If it can and, you’re not likely to get sued, then it’s a good deal." Better yet, David Bushnell, head of risk management for Citigroup’s investment banking division cautioned in an email, “The GAAP accounting is aggressive and a franchise risk to us if there is publicity.” You guessed it, the deal got done anyway (Ibid., p. 86). A Merrill banker managing the Enron account wrote a memo to his colleagues relating, “We are clearly helping them make earnings for the quarter and year (which has great value in their stock price, not to mention personal compensation)” (Ibid.). Fully appreciating the wrongfulness of their conduct in this high stakes deal making, one Merrill Lynch executive wrote, “Reputational risk, i.e., aid/abet Enron’s income statement manipulation” (Ibid., 94).

Restatement of earnings by nearly 1000 firms since 1997, capped by recent announcement that both Rite Aid and WorldCom had overstated their earnings by at least $1.6 billion, would lead the most impartial of observers to inquire ‘why are the accountants and business lawyers changing their minds’ (Niskanen, 2002)?

Speaking of lawyers, they appear to have partnered with accountants to cook the books as well. Tyco’s former general counsel, business lawyer Mark Belnick, is charged with falsifying business records to conceal $14 million in loans from Tyco. The Vinson & Elkins and Kirkland & Ellis law firms are defendants in civil suits claiming they aided and abetted Enron in its financial scams (Haggman, 2002, p. A7).

Former Chairman and Senior Policy Advisor at the Chicago Mercantile Exchange Leo Melamed, captured the professional character flaw during a panel discussion on this topic observing, “I think Bob nailed it on the head when he said it’s greed. Because for a long time there were many of us in the markets... that were looking at something that went far beyond irrational exuberance. It was pervasive, an almost anything goes attitude. Maybe the accountants had a higher role in it or a higher degree of fault, but it was everywhere. Whether it was investment bankers or brokers, or lawyers or whatever. And it was an attitude of whatever you can get away with as long as the stock price went up” (“Venerable Group Dissects U.S. Corporate Governance Accounting,” 2003, 4).

In Search of an Accountant with an Attitude

Authors of “The Enron Effect” claim “There have been plenty of accounting scandals before—Sunbeam, Cendant, Waste Management, to name some recent fiascoes—but nothing seems to have changed all that much in response to them. Corporate America and the accounting profession have a remarkable ability to frustrate fundamental reform” (Sloan et al., 2002, p. 34). Paul Volcker says, “And that’s all the more reason why auditing has to be cleaned up. I think what the game is all about is not in the detailed rules. You better get an auditor that has the attitude that he really has to say no sometimes...Unless you get that attitude reinforced, you’re in trouble” (“Venerable Group Dissects U.S. Corporate Governance Accounting,” 2003, 4).

So how do we get “an accountant with an attitude”, or a business lawyer with one? After extensive study of the subject, Mark Rosenball and Rich Thomas offer the most succinct remedy for Mr. Gekko’s greed disease, “The bottom line is this: we have to change the rules to make companies deathly afraid of producing
dishonest numbers, and we have to make accountants mortally afraid of certifying them. Anything else is window dressing” (Sloan et al., 2002, p. 36).

Conclusion—For Starters:
Based on the Savings and Loan scandals of the 1990s and the present corporate immolation, shareholders are not taking it any more. The Sarbanes-Oxley Act of 2002 and its creation of a Public Accounting Oversight Board under the SEC are actions to hold accountants and lawyers to a higher standard of practice than in the past. Further recommendations for holding Mr. Gekko’s disciples more accountable are:

2. Require rotation of auditing firms by the SEC every five years (Marshall, 2002, pp. 34-35).
3. Require principle based accounting standards (Ibid. 35).
4. Establish a TIPS Hotline operated by a third party that reports TIPS to the board of director’s auditing committee and the auditors (Malone & Exall, 2003, 55).
5. Require disclosure of all civil settlements and penalties by the SEC for financial reporting irregularities (“Suggestions for Reform,” 2003).
6. Require disclosure of the portion of the corporate tax return necessary to compare the accuracy between the annual report to shareholders and what is reported to the IRS (Ibid.)
7. While state licensed, suspend from SEC related activities any accounting or law firm whose employees or partners were involved in any conduct in which the SEC or Department of Justice assesses a fine or penalty of any type, until such time as the CPA and/or bar licenses of accountants and lawyers involved in the misconduct are revoked.
8. Require all financial officers, corporate executives, and boards of directors, to sign annually a company Code of Ethics containing the principles found in the Federal Executives International Code of Ethics (Ibid., p. 2).

The Ethics of Tomorrow
Gordon Gekko may not be right after all. Greed is not necessarily good for America as felt by employee pension and retirement funds and shareholder monthly statements. Time will tell whether the greed-seeking stock price ethic of yesterday or the memories of ‘making money the old fashioned honest way’ will return to the marketplace. Until then, in God we trust, everyone else we should check, inspect, and correct.

References


THE RELATIONSHIP BETWEEN ALTERNATIVE COST STRUCTURES, FIRM VALUE, OPERATING LEVERAGE, AND BREAKEVEN SALES

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ABSTRACT

An index of relative firm values is developed for comparing values under alternative cost structures. This index explicitly incorporates relative measures of income and of risk, including the degree of operating leverage. Value and relative risk are assessed in the context of the index in terms of the relationship between the degree of operating leverage, breakeven sales and the margin of safety.

INTRODUCTION

A manager is considering changing his operating processes from a low leverage structure to a high leverage structure. An important question from the manager’s point of view is to decide whether the high leverage cost structure will provide a higher firm value than the low leverage structure. Presumably, a higher leverage structure will result in higher expected cash flows but also higher risk. This study addresses the comparison of firm values under alternative cost structures.

Gahlon and Gentry (G&G, 1982) have developed an equation for the discount rate that is expressed in terms of the degree of operating leverage (DOL). When incorporated into a firm valuation model, separation of the cash flow and risk expressions is maintained. Using this model, the relative values under the alternative cost structures can be measured as an index. With appropriate assumptions, the index allows identification of the relative effects on firm value of the cash flows and operating risk as measured by degree of operating leverage.

The contribution of this study is the application of the G&G model to comparison of the firm values for relatively high and low cost structures with particular emphasis on the isolation of the effects of relative cash flows and operating leverage on those values. The index also provides empirical predictions concerning what type of firms will be likely to choose high or low leverage structures.

This study is exploratory, focusing on operating risk to clarify relationships and reveal potential empirical implications. It is also preliminary to a broader study which will incorporate the degree of financial leverage (DFL). Additionally, the examination will be expanded to incorporate alternative models of Beta (Mandelker and Rhee, 1984) which also include DOL and DFL but which have not been specified in firm valuation models.

DEVELOPMENT OF THE MODEL

For purposes of analysis, we assume that under the alternative cost structures:
(1) there is a common capital structure with no debt and taxes;  
(2) there is a common sales distribution; and,
Definition and Characteristics of EBIT

Earnings before interest and taxes (EBIT) is defined as

\[ EBIT = p(Q) - v(Q) - F \]  
\[ EBIT = (p - v)(Q) - F \]  
\[ EBIT = C(REV) - F \]

where \( p \) is the selling price, \( v \) is variable cost per unit, \( F \) is fixed cost in total, and \( C \), the contribution margin ratio is \( C = \frac{p - v}{p} \), and \( REV = pQ \) is the level of REV. Here \( p, v, \) and \( F \) are assumed constant across the expected sales distribution, while \( Q \) varies across the distribution.

The expected value of EBIT for a sales distribution is

\[ E(EBIT) = E(C(REV)) - F \]  
\[ E(EBIT) = E(REV)C - F.\]

The variance and standard error of EBIT are measured as

\[ Var(EBIT) = Var(C(REV)) - F \]  
\[ Var(EBIT) = C^2Var(REV) \]  
\[ SD(EBIT) = C\sqrt{Var(REV)}. \]

Given the common sales distribution, a higher leverage cost structure will always have the higher standard deviation because it has the higher contribution margin ratio.

The Relationship Between Cost Structure, Breakeven Sales Revenue, and Degree of Operating Leverage

In examining the relationships between cost structure, breakeven sales revenue (BESS$), and the degree of operating leverage (DOL), we construct two high leverage cost structures (HLS’s), H1 and H2. These HLS’s are constructed as multiples of the low leverage cost structure (LLS). This construction is consistent with the observation that all cost structures are multiples of one another, and allows us to control the level of the DOL for alternative structures.

The two HLS’s serve as reference points in the analysis of the value index. They specify points at the ends of a range of alternative HLS’s.

- At the left end of the range, H1 will have a higher E(EBIT) and SD(EBIT) than LLS, but an equal DOL.
- At the right end of the range, H2 will have an E(EBIT) equal to that for the LLS, a higher SD(EBIT) than the LLS, but also a higher DOL than the LLS.

The LLS is defined as having a contribution margin ratio, \( C_L \), and fixed cost, \( F_L \), such that its breakeven sales revenue, \( BES_{LS} \), is defined as

\[ \frac{F_L}{C_L} = BES_{LS} \]

It is assumed for the analysis that none of the tails of the common sales are below breakeven for the LLS.

Dran (1991) and King (1997) have demonstrated that the DOL is a function of the reciprocal of the margin of safety percentage (MOS%):

\[ DOL = \frac{C}{E(EBIT)} \]  
\[ DOL = \frac{1}{(MOS\%)} = \frac{1}{E(REV) - BES_{LS}} \]

Therefore, for the LLS, the degree of operating leverage, \( DOL_L \), is

\[ DOL_L = \frac{1}{(MOS\%)} = \frac{1}{E(REV) - BES_{LS}} \]

The HLS’s are created from the LLS by multiplying both \( Q_L \) and \( F_L \) by alternate combinations of two constants, \( k_1 \) and \( k_2 \) where:

\[ 1 < k_1 < k_2. \]

The first high leverage structure, H1, provides a reference point at which the BES$$'s and DOL's for the two structures are equal. For HLS1, the new structure is defined by multiplying both \( Q \) and \( F \) by \( k_1 \):
\[
\frac{F_L(k_1)}{C_L(k_1)} = \frac{F_H}{C_H} = BES$H1 = BES$L \quad (14)
\]

and it follows that
\[
DOL_{H1} = \frac{1}{(MOS\%_{H1})} = \frac{1}{(MOS\%_{L})} = DOL_L. \quad (15)
\]

Since \(C_{H1} > C_L\) for H1, then from equations (5) and (8), both the E(EBIT) and the SD(EBIT) are larger than for LLS.

Thus relative to the LLS, H1 is a cost structure with a higher E(EBIT), higher SD(EBIT), equal BES\$, and equal DOL.

The second high leverage cost structure, H2, is defined as the cost structure for which the E(EBIT) is equal to that for LLS,
\[
E(EBIT_{H2}) = E(EBIT_L). \quad (16)
\]

This condition can be established by raising the fixed cost relative to H1, thus reducing the E(EBIT) until (16) is met. H2 is constructed by multiplying \(C_L\) by \(k_1\) and \(F_L\) by \(k_2\) such that
\[
\frac{F_L(k_2)}{C_L(k_1)} = \frac{F_{H2}}{C_{H1}} = BES$H2 > BES$L \quad (17)
\]

where \(k_2\) is large enough that (16) is met. Because H2 has the higher breakeven, \(BES$H2\) has shifted upward within the common sales distribution relative to \(BES$L\). Losses will occur for H2 in that part of the sales distribution below the new \(BES$H2\) and above \(BES$L\). With \(k_2\) set at the proper level, then \(BES$H2\) moves up into the sales distribution to the point that those losses reduce the \(E(EBIT_{H2})\) to the point of equality with the \(E(EBIT_L)\) as indicated in equation (16).

However, since
\[
C_{H2} = C_{H1} > C_L \quad (18)
\]
then following from equations (8) and (18)
\[
SD(EBIT_{H2}) = SD(EBIT_{H1}) > SD(EBIT_L) \quad (19)
\]
since the standard deviation depends on the value of \(C\).

Also, from equations (14) and (17), we know
\[
BES$H2 > BES$H1 = BES$L \quad (20)
\]

Following from equations (11) and (20),
\[
\frac{1}{(MOS\%_{H2})} < \frac{1}{(MOS\%_{H1})} = \frac{1}{(MOS\%_{L})} \quad (21)
\]

and
\[
DOL_{H2} > DOL_{H1} = DOL_L. \quad (22)
\]

Thus relative to the LLS, H2 is a cost structure with a higher BES\$, DOL, and SD(EBIT), but with E(EBIT) equal to that of the LLS.

With respect to H2, if the constant \(k_2\) in equation (17) were replaced by a larger constant \(k_3\) to form a third high leverage structure, H3, then, following an analysis similar to equations (16) – (22) for H2, H3, and the LLS, we would find that
\[
E(EBIT_L) = E(EBIT_{H2}) > E(EBIT_{H3}); \quad (23)
\]
\[
SD(EBIT_L) < SD(EBIT_{H2}) = SD(EBIT_{H3}); \quad (24)
\]
\[
DOL_L < DOL_{H2} < DOL_{H3} \quad (25)
\]

From equations (23) – (25), we conclude that management would prefer the LLS over H2 or H3. That is because LLS provides an E(EBIT) that is equal to or greater than H2 or H3, but at a lower risk than H2 or H3. Additionally, we note that the firm values associated with H2 and H3 should be less than the LLS.

On the other hand, if the constant \(k_2\) in equation (17) were replaced by a smaller constant \(k_4\) such that
\[
1 < k_1 < k_4 < k_2 \quad (26)
\]
then, again following an analysis similar to equations (16) – (22), we would find that
\[
E(EBIT_{H1}) > E(EBIT_{H4}) > E(EBIT_{H2}) = E(EBIT_L); \quad (27)
\]
\[
SD(EBIT_{H1}) = SD(EBIT_{H4}) = SD(EBIT_{H2}) > SD(EBIT_L); \quad (28)
\]
\[
DOL_L = DOL_{H1} < DOL_{H4} < DOL_{H2}. \quad (29)
\]

H4 allows us to think of a range of HLS’s between H1 and H2 for which there would be a higher return and higher risk than for the LLS. Unlike the
comparison of LLS to H2 and H3, there is no clear ranking based on risk and return tradeoff. For HLS’s H1 through H4, management’s preference would be based on relative firm values.

Selecting a Cost Structure
By Comparing Values of the Firm
To compare the values of the firm for the two cost structures and to choose between the two cost structures, we construct an index of values based on a variation of the CAPM pricing model. That variation is the equivalent of the usual form of the model, but provides for explicit separation of cash flow measures, operating risk measures, and market risk measures.

Gahlon and Gentry (1982) have developed the equivalent equation. Their statement for the value of the firm is expressed in terms of DOL and allows for a ready separation of the expression into EBIT, operating and financial risk components, as well as the other systematic risk components: standard deviation of the market returns, and to MRP which is the market risk premium, and ρ, the correlation of firm and market returns.

Value in their model is the quotient of after-tax profit and the risk-free discount rate, multiplied by a risk adjustment factor that brings \( R_f \) to the appropriate risk-adjusted discount rate:

\[
V = \frac{EBIT}{R_f} \left(1 - \lambda^* \phi\right)
\]  

(31)

where the right hand term on the RHS is the risk adjustment term to adjust \( R_f \) to \( R \), the appropriate discount rate, and

\[
\lambda^* = \frac{MRP}{SD(R_m)}
\]  

(32)

and

\[
\phi = DOL \times DFL \times CV(REV) \times \rho.
\]  

(33)

where DFL is the degree of financial leverage, CV(REV) is the coefficient of variation of revenue.

We then expand \( \phi \) following the G&G presentation except that we let DFL = 1 where no debt is present and there are no taxes so that we can use substitute EBIT for after-tax profit.

\[
V = \frac{EBIT}{R_f} \left(1 - \lambda^* \phi\right)
\]  

(34)

Since the G&G expression contains DOL explicitly as part of the risk adjustment factor, it reflects explicitly and separately the internal and external risk components.

To compare the values for the two cost structures, we create a ratio of the value for the high leverage structure, \( V_H \), and the value of the low leverage structure, \( V_L \).

\[
\frac{V_H}{V_L} = \frac{EBIT_H}{EBIT_L} \left[1 - \lambda^* (DOL_H \cdot CV(REV) \cdot \rho)\right] 
\]  

(36)

The index of \( V_H/V_L \) can be seen as the product of an EBIT index and a risk adjustment index. In the risk index, the factors \( \lambda^* \), CV(REV), and \( \rho \) are constant between the two cost structures when for CV(REV) a constant sales distribution is assumed. This means that the numerator and denominator of the risk factor differ only by the values of DOL\(_H \) and DOL\(_L \). Thus the relative values of \( V_H \) and \( V_L \) depend on the relative values of EBIT\(_H \) and EBIT\(_L \) and of DOL\(_H \) and DOL\(_L \). The comparison can be understood more fully by evaluating the index by comparing alternatively the values for the two alternative high leverage structures discussed earlier to the value for the low leverage structure.

First, we evaluate the relative values for H1 and LLS as defined in Equations (14) and (9):

\[
\frac{F_L(k_i)}{C_L(k_i)} = \frac{F_H}{C_H} = BES_H = BES_L
\]  

(14)

where the DOL multipliers are equal given the common sales distribution. In this case, the risk adjustment index will take on the value 1, assuming that \( \lambda^* \), CV(REV), and \( \rho \) are constant between the two cost structures:

\[
\frac{V_H}{V_L} = \frac{EBIT_H}{EBIT_L} [\lambda^*] > 1.
\]  

(37)

Since EBIT\(_H\) > EBIT\(_L\), then the EBIT index will be greater than 1 and its value will determine the
relative values of the firms. Therefore, the level of the value index will be greater than 1 indicating that that \( V_H \), the value of the firm with the high leverage structure, is higher than \( V_L \), the value of the firm with the low leverage structure.

Next, we evaluate the relative values for the H2 defined in Equation (17) and LLS:

\[
\frac{F_L(k_2)}{C_L(k_1)} = \frac{F_{H2}}{C_{H1}} = BES_{H2} \tag{16}
\]

In this case since breakeven for the high leverage structure, \( BES_{H2} \), was seen to be higher than the low leverage structure:

\[
BES_{H2} > BES_L \quad \text{and} \quad DOL_{H2} > DOL_L.
\]

Additionally, the parameters were set for H2 such that \( EBIT_H = EBIT_L \). In this case, the EBIT index will be equal to 1 and the risk adjustment index will be less than 1:

\[
\frac{V_H}{V_L} = 1 \left[ 1 - \lambda^* \left( DOL_H \cdot CV(REV) \cdot \rho \right) \right] < 1. \tag{38}
\]

The value index will be less than 1, indicating that \( V_L \), the value of the firm with the low leverage structure will be higher than \( V_H \), the value of the firm with the high leverage structure.

**CONCLUSIONS**

When the value index for H1 is greater than 1 then \( V_H > V_L \). When the value index for H2 is less than 1 then \( V_H < V_L \). Thus, the high leverage structure at which \( V_H = V_L \) lies between H1 and H2. For that high leverage structure such that \( V_H = V_L \), there is a risk and return tradeoff in terms of firm value such that the manager might be indifferent between the two cost structures.

Equation (38) also gives insight into which types of firms will prefer high (or low) cost structures. Note that \( \lambda^* \), DOL, and CV(REV) are positive. Now consider a case in which \( \rho > 0 \). Since \( DOL_H > DOL_L \), the RHS of (38) is decreasing in CV(REV). Thus, greater uncertainty about revenues fosters a lesser desire to use a high cost structure. This suggests, for example, that tech companies will prefer a low cost structure while food producers will prefer a high cost structure.

The case in which \( \rho < 0 \) is quite interesting because higher values of CV(REV) lead to a higher index. Thus for counter-cyclical firms, greater uncertainty about revenues fosters a greater desire to use a high cost structure.

**REFERENCES**


A FINITE MARKOV CHAIN APPROACH TO PRICING AMERICAN OPTIONS WITH DISCRETE DIVIDEND PAYMENTS

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ABSTRACT

Numerical methods often are used to price American call options on assets such as dividend paying stocks. Finite Markov chain processes are flexible numerical models suitable for pricing American put and call options on assets with periodic cash flows. The finite Markov chain process developed in this paper facilitates valuation of American options on securities with discrete dividends payments. The finite Markov chain has the lattice method’s intuitive appeal without the concomitant node explosion that occurs as the number of discrete dividends increases. As a flexible approach to pricing American options, the finite Markov chain process offers computational advantages over lattice and finite difference methods. The Markov chain’s convergence properties with American options on dividend paying stocks appear better than other methods including lattice, finite difference, and those based on the Black-Scholes model. The approach developed in this paper is equal or superior to many of the branching approaches in speed and accuracy without significant limitations on the number of dividends from the underlying asset. The Markov chain process also provides excellent estimates of gamma and delta.
Students have different learning styles that characterize the manner in which they receive and process information. The matching concept states that students learn most comfortably from a professor who has a similar learning style that carries over into teaching. However, life and career experiences present information in many forms, regardless of one’s learning style preference. A curriculum that prepares students best will accommodate a variety of learning styles and encourage students to develop a mental flexibility that will serve them well in other academic courses, in a chosen career, and in life.

Four learning style models dominate in education. These are the Myers-Briggs Type Indicator; Kolb’s Learning Style Model; the Herrman Brain Dominance Model; and the Felder-Silverman Learning Style Model. Each of the theories has its strengths and weaknesses in applications to the classroom and its own test to classify learning style preferences. The Felder-Silverman Learning Style Model, Index of Learning Styles (ILS), and related questionnaire were developed to explain both teaching and learning styles in engineering classrooms and to improve the retention rate among engineering majors.

Of the many learning styles theories and tests applied to accounting students, the Kolb model had been cited most frequently. As professions, however, accounting and engineering have much common ground including a vast technical lexicon and a professional license examination that tests the mastery of technical facts, terminology, procedures, and processes. Thus, the Felder-Silverman model and ILS may have useful applications and provide interesting insights into the academic behavior of students in accounting classrooms.

This paper presents an analysis of more than 100 student responses to the ILS questionnaire. The student sample includes undergraduate business administration students from an introductory course in Managerial Accounting and MBA students enrolled in a required graduate level Managerial Accounting course. The sample includes students from a wide range of undergraduate majors, including accounting and finance.
HARMONIZING QUALIFICATIONS OF ACCOUNTANTS-
STEPS TOWARD RECIPROCITY IN A GLOBAL PROFESSION

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Morgan Burrows  
School of Business  
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Fredonia, NY 14063
ABSTRACT

While significant steps have been made toward the acceptance and use of harmonized international accounting standards, progress is slower for international credentials for accountants – that is, developing a harmonized set of qualifications for entry into and practicing in the profession. Inasmuch as harmonized accounting standards may lead to financial statements that cross borders without restatement or translation, international standards for professional accountants may lead to the freer movement of professional accountants across borders. The organization taking responsibility for this daunting task is IFAC – the International Federation of Accountants. This paper aims to monitor the progress of IFAC’s mission by looking at the professional qualification standards and reciprocity agreements in place in member countries. Country standards are investigated in light of IFAC’s recent initiatives to harmonize member bodies’ requirements in the areas of education and professional codes of ethics. Noteworthy, however, when classified by world regions, differences appear to exist in the context of the requirements for continuing education and practical experience for professional accountants. Furthermore, certain variations among the information regarding reciprocity level among countries and regions warrant opportunities for additional exploratory research.
Figure 1

Tootsie Roll Industries, Inc and Subsidiaries
Consolidated Statement of Financial Position

(in thousands except per share data)

December 31,

<table>
<thead>
<tr>
<th>ASSETS</th>
<th>2001</th>
<th>2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>CURRENT ASSETS:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cash and cash equivalents</td>
<td>$106,532</td>
<td>$60,882</td>
</tr>
<tr>
<td>Investments</td>
<td>68,629</td>
<td>71,605</td>
</tr>
<tr>
<td>Accounts receivable trade, less allowances of $2,037 and $2,147</td>
<td>20,403</td>
<td>23,568</td>
</tr>
<tr>
<td>Other receivables</td>
<td>3,329</td>
<td>1,230</td>
</tr>
<tr>
<td>Inventories:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Finished goods and work-in-process</td>
<td>24,770</td>
<td>24,984</td>
</tr>
<tr>
<td>Raw materials and supplies</td>
<td>16,392</td>
<td>16,906</td>
</tr>
<tr>
<td>Prepaid expenses</td>
<td>4,269</td>
<td>2,685</td>
</tr>
<tr>
<td>Deferred income taxes</td>
<td>1,772</td>
<td>1,351</td>
</tr>
<tr>
<td>Total current assets</td>
<td>246,096</td>
<td>203,211</td>
</tr>
<tr>
<td>PROPERTY, PLANT AND EQUIPMENT, at cost:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Land</td>
<td>8,354</td>
<td>8,327</td>
</tr>
<tr>
<td>Buildings</td>
<td>43,613</td>
<td>36,937</td>
</tr>
<tr>
<td>Machinery and equipment</td>
<td>189,528</td>
<td>183,858</td>
</tr>
<tr>
<td>Total cost</td>
<td>241,495</td>
<td>229,122</td>
</tr>
<tr>
<td>Less - Accumulated depreciation</td>
<td>108,920</td>
<td>98,004</td>
</tr>
<tr>
<td>Net cost</td>
<td>132,575</td>
<td>131,118</td>
</tr>
<tr>
<td>OTHER ASSETS:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intangible assets, net of accumulated amortization of $30,695 and $26,917</td>
<td>117,499</td>
<td>121,263</td>
</tr>
<tr>
<td>Investments</td>
<td>71,131</td>
<td>62,548</td>
</tr>
<tr>
<td>Cash surrender value of life insurance and other assets</td>
<td>51,375</td>
<td>44,302</td>
</tr>
<tr>
<td>Total other assets</td>
<td>240,005</td>
<td>228,113</td>
</tr>
<tr>
<td>$618,676</td>
<td>$562,442</td>
<td></td>
</tr>
</tbody>
</table>

LIABILITIES AND SHAREHOLDERS' EQUITY

| CURRENT LIABILITIES: | | |
| Accounts payable | $9,223 | $10,296 |
| Dividends payable | 3,536 | 3,436 |
| Accrued liabilities | 34,295 | 33,336 |
| Income taxes payable | 10,792 | 10,378 |
| Total current liabilities | 57,846 | 57,446 |
| NONCURRENT LIABILITIES: | | |
| Deferred income taxes | 16,792 | 12,422 |
| Postretirement health care and life insurance benefits | 7,450 | 6,956 |
| Industrial development bonds | 7,500 | 7,500 |
| Deferred compensation and other liabilities | 20,627 | 19,422 |
| Total noncurrent liabilities | 52,369 | 46,300 |

SHAREHOLDERS' EQUITY

Common stock, $.69-4/9 par value -
120,000 and 120,000 shares authorized -
34,139 and 32,986, respectively, issued
23,708 | 22,907
Class B common stock, $.69-4/9 par value -
  40,000 and 40,000 shares authorized -
  16,319 and 16,056, respectively, issued  
    11,332   11,150
Capital in excess of par  
  323,981  256,698
Retained earnings, per accompanying statement  
  161,345   180,123
Accumulated other comprehensive earnings (loss)  
  (9,913)  (10,190)
Treasury stock (at cost) -
  53 shares and 52 shares, respectively  
    (1,992)  (1,992)
  508,461  458,696
  $618,676  $562,442

(The accompanying notes are an integral part of these statements.)
### Tootsie Roll
#### Balance Sheet
#### Current Assets and Liabilities
December 31, 2001 and 2000

<table>
<thead>
<tr>
<th>Assets</th>
<th>Liabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current</td>
<td></td>
</tr>
<tr>
<td>Cash</td>
<td>Accts Pay</td>
</tr>
<tr>
<td>Investments</td>
<td>Dividends Pay</td>
</tr>
<tr>
<td>Accts Rec</td>
<td>Accrued Liab</td>
</tr>
<tr>
<td>Other Rec</td>
<td>Inc Tax Pay</td>
</tr>
<tr>
<td>Inventory</td>
<td></td>
</tr>
<tr>
<td>Prepaid Exp</td>
<td></td>
</tr>
<tr>
<td>Def Inc Tax</td>
<td></td>
</tr>
</tbody>
</table>

![Graph showing cumulative values in millions from 0 to 252 million]
Tootsie Roll
Balance Sheet
Non-Current Assets and Liabilities
December 31, 2001 and 2000

<table>
<thead>
<tr>
<th>Assets</th>
<th>Liabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Current</td>
<td></td>
</tr>
<tr>
<td>PP&amp;E (net)</td>
<td>Def Inc Tax</td>
</tr>
<tr>
<td>Intangibles</td>
<td>Postretir Health</td>
</tr>
<tr>
<td>Investments</td>
<td>Indust Dev Bonds</td>
</tr>
<tr>
<td>Cash Surr Val</td>
<td>Def Comp</td>
</tr>
</tbody>
</table>

(in millions, cumulative)
Figure 4

Tootsie Roll
Balance Sheet
Shareholders' Equity
December 31, 2001 and 2000

Common stock
Common Stock Class B
Capital In Excess of Par
Retained Earnings
Accum Other Comp Earnings
Treasury Stock

Cash Dividends
Stock Dividends
### Consolidated Statement of Earnings, Comprehensive Earnings and Retained Earnings

<table>
<thead>
<tr>
<th></th>
<th>2001</th>
<th>2000</th>
<th>1999</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Net sales</strong></td>
<td>$423,496</td>
<td>$427,054</td>
<td>$396,750</td>
</tr>
<tr>
<td><strong>Cost of goods sold</strong></td>
<td>216,657</td>
<td>207,100</td>
<td>192,561</td>
</tr>
<tr>
<td><strong>Gross margin</strong></td>
<td>206,839</td>
<td>219,954</td>
<td>204,189</td>
</tr>
<tr>
<td><strong>Selling, marketing and administrative expenses</strong></td>
<td>109,117</td>
<td>105,805</td>
<td>96,964</td>
</tr>
<tr>
<td><strong>Amortization of intangible assets</strong></td>
<td>3,778</td>
<td>3,420</td>
<td>2,706</td>
</tr>
<tr>
<td><strong>Earnings from operations</strong></td>
<td>93,944</td>
<td>110,729</td>
<td>104,519</td>
</tr>
<tr>
<td><strong>Other income, net</strong></td>
<td>6,843</td>
<td>7,079</td>
<td>6,928</td>
</tr>
<tr>
<td><strong>Earnings before income taxes</strong></td>
<td>100,787</td>
<td>117,808</td>
<td>111,447</td>
</tr>
<tr>
<td><strong>Provision for income taxes</strong></td>
<td>35,100</td>
<td>42,071</td>
<td>40,137</td>
</tr>
<tr>
<td><strong>Net earnings</strong></td>
<td>$65,687</td>
<td>$75,737</td>
<td>$71,310</td>
</tr>
<tr>
<td><strong>Net earnings</strong></td>
<td>$65,687</td>
<td>$75,737</td>
<td>$71,310</td>
</tr>
<tr>
<td><strong>Other comprehensive earnings (loss)</strong></td>
<td>277</td>
<td>(1,250)</td>
<td>1,583</td>
</tr>
<tr>
<td><strong>Comprehensive earnings</strong></td>
<td>$65,964</td>
<td>$74,487</td>
<td>$72,893</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>2001</th>
<th>2000</th>
<th>1999</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Retained earnings at beginning of year</strong></td>
<td>$180,123</td>
<td>$158,619</td>
<td>$164,652</td>
</tr>
<tr>
<td><strong>Net earnings</strong></td>
<td>65,687</td>
<td>75,737</td>
<td>71,310</td>
</tr>
<tr>
<td><strong>Cash dividends ($0.28, $0.26 and $0.23 per share)</strong></td>
<td>(14,021)</td>
<td>(13,350)</td>
<td>(11,654)</td>
</tr>
<tr>
<td><strong>Stock dividends</strong></td>
<td>(70,444)</td>
<td>(40,883)</td>
<td>(65,689)</td>
</tr>
<tr>
<td><strong>Retained earnings at end of year</strong></td>
<td>$161,345</td>
<td>$180,123</td>
<td>$158,619</td>
</tr>
<tr>
<td><strong>Earnings per share</strong></td>
<td>$1.30</td>
<td>$1.49</td>
<td>$1.37</td>
</tr>
<tr>
<td><strong>Average common and class B shares outstanding</strong></td>
<td>50,451</td>
<td>50,898</td>
<td>51,877</td>
</tr>
</tbody>
</table>

(The accompanying notes are an integral part of these statements.)
### Tootsie Roll Industries, Inc and Subsidiaries

**Consolidated Statement of Cash Flows**

(in thousands)

<table>
<thead>
<tr>
<th></th>
<th>2001</th>
<th>2000</th>
<th>1999</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CASH FLOWS FROM OPERATING ACTIVITIES:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Net earnings</td>
<td>$65,687</td>
<td>$75,737</td>
<td>$71,310</td>
</tr>
<tr>
<td>Adjustments to reconcile net earnings to net cash provided by operating activities:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Depreciation and amortization</td>
<td>16,700</td>
<td>13,314</td>
<td>9,979</td>
</tr>
<tr>
<td>- Gain on retirement of fixed assets</td>
<td>-</td>
<td>(46)</td>
<td>(43)</td>
</tr>
<tr>
<td>Changes in operating assets and liabilities, excluding acquisitions:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Accounts receivable</td>
<td>3,096</td>
<td>(4,460)</td>
<td>400</td>
</tr>
<tr>
<td>- Other receivables</td>
<td>(2,100)</td>
<td>4,486</td>
<td>(2,392)</td>
</tr>
<tr>
<td>- Inventories</td>
<td>910</td>
<td>(768)</td>
<td>1,592</td>
</tr>
<tr>
<td>- Prepaid expenses and other assets</td>
<td>(8,857)</td>
<td>(7,903)</td>
<td>(15,672)</td>
</tr>
<tr>
<td>- Accounts payable and accrued liabilities</td>
<td>(224)</td>
<td>(1,717)</td>
<td>968</td>
</tr>
<tr>
<td>- Income taxes payable and deferred</td>
<td>4,402</td>
<td>5,691</td>
<td>2,232</td>
</tr>
<tr>
<td>- Postretirement health care and life insurance benefits</td>
<td>494</td>
<td>399</td>
<td>412</td>
</tr>
<tr>
<td>- Deferred compensation and other liabilities</td>
<td>1,206</td>
<td>337</td>
<td>4,162</td>
</tr>
<tr>
<td>- Other</td>
<td>191</td>
<td>(189)</td>
<td>(13)</td>
</tr>
<tr>
<td><strong>Net cash provided by operating activities</strong></td>
<td>81,505</td>
<td>84,881</td>
<td>72,935</td>
</tr>
</tbody>
</table>

| **CASH FLOWS FROM INVESTING ACTIVITIES:** |       |       |       |
| Acquisitions of businesses, net of cash acquired | - | (74,293) | - |
| Capital expenditures | (14,148) | (16,189) | (20,283) |
| Purchase of held to maturity securities | (243,530) | (156,322) | (238,949) |
| Maturity of held to maturity securities | 228,397 | 176,576 | 235,973 |
| Purchase of available for sale securities | (64,640) | (78,993) | (117,694) |
| Sale and maturity of available for sale securities | 74,166 | 82,754 | 113,960 |
| **Net cash used in investing activities** | (19,755) | (66,467) | (26,993) |

| **CASH FLOWS FROM INVESTING ACTIVITIES:** |       |       |       |
| Issuance of notes payable | - | 43,625 | - |
| Repayments of notes payable | - | (43,625) | - |
| Treasury stock purchases | - | - | (1,019) |
| Shares repurchased and retired | (1,932) | (32,945) | (25,850) |
| Dividends paid in cash | (14,168) | (13,091) | (11,313) |
| **Net cash used in financing activities** | (16,100) | (46,036) | (38,182) |

| Increase (decrease) in cash and cash equivalents | 45,650 | (7,760) | 8,744 |
| Cash and cash equivalents at beginning of year | 60,882 | 88,504 | 80,744 |
| **Cash and cash equivalents at end of year** | $106,532 | $60,882 | $88,504 |

**Supplemental cash flow information:**

| Income taxes paid | $30,490 | $35,750 | $38,827 |
| Interest paid | $356 | $1,067 | $453 |

(The accompanying notes are an integral part of these statements.)
Figure 8

Tootsie Roll
Statement of Cash Flows
Years Ended December 31, 2001, 2000, 1999

Cash Flows from Operating
Cash Flows from Investing
Cash Flows from Financing
Change in Cash

(in millions)
ABSTRACT

Visual depictions of financial information are common in annual reports because they highlight important information and aid readers in interpretation and understanding. This paper attempts to develop a framework for presenting the whole of the financial statements in visual form. This paper proscribes the methods and systems for reducing the financial statements to a picture, in order to prevent the abuses that have been identified in previous research of annual report graphic depictions. The next steps are to assess whether the visual schema developed in this paper does help reader perception and understanding.

INTRODUCTION

Visually depicting information is thought to help understanding and processing of the underlying information. Judging by the percentage of annual reports that contain some form of visual representation, the companies that prepare annual reports would concur. One study found that 79% of the annual reports sampled contained graphics (Frownfelter-Lohrke and Fulkerson 2001) and another study found that 91% of the annual reports reviewed displayed graphs (Burgess 2002).

While graphs are common in annual reports, they are also often faulty. Studies have found that from at least 10% (Burgess 2002) to 30% (Beattie and Jones 1992) of annual reports contained graphs that were not faithful representations of the underlying data. The most common method of manipulation was in how the axis was scaled. Some graphs did not have any axis scaling, which can hinder interpretation.

Financial statements are complicated affairs, and to analyze them takes some work. Tools and methods such as horizontal analysis, vertical analysis and ratio analysis are usually performed to facilitate understanding and interpretation. While there are many rules to be followed when preparing financial statements, there are no rules for preparing the visual depictions (see Cleveland and McGill 1984, Taylor and Anderson 1986, McNelis 2000, Frownfelter-Lohrke and Fulkerson 2001). Companies choose which items of information they will highlight in the visual depictions. If graphs, charts and similar do aid in improving understanding and inference, then it is reasonable to think that visually depicting the whole of the financial statements would be a positive step. Before this can be achieved, rules would have to be developed so that all visually prepared financial statements were prepared on the same basis. Once the rules are developed, tests can be employed to see if understanding is enhanced.

This paper develops the rules for presenting the visual depictions. The visually prepared statements are by no means a replacement of
the financial statements, but are intended to be supplementary to them. Future papers will test whether the depictions aid in understanding.

LITERATURE REVIEW

Graphs can be an effective way to communicate financial information. In one study 79% of the annual reports sampled contained graphics (Frownfelter-Lohrke and Fulkerson 2001). Another study found that 91% of the annual reports reviewed displayed graphs (Burgess 2002). Visual representations of financial data are a recognized way to present information to increase and aid reader perception and understanding (Cleveland and McGill 1984, Taylor and Anderson 1986, McNelis 2000, Frownfelter-Lohrke and Fulkerson 2001). However, inclusion of graphs and charts does not come without a potential price.

Studies have found that the visual depictions were misleading in at least 10% of the cases (Burgess 2002) to 29.5% (Johnson, et al. 1980) to 30% (Beattie and Jones 1992). Problems with the depictions were described as being constructed incorrectly or constructed in a manner as to be misleading (Johnson, et al. 1980).

In order for external users to be able to utilize visually depicted financial statements, they must be free from bias and manipulation. To accomplish this, there must be proscribed methods of preparation. Just as there are rules to be followed in preparing the underlying financial statements, the visual depictions must follow a set of standards that allow reasonably learned users to interpret and infer meaning from the visualizations.

RULE DEVELOPMENT

Companies choose the element(s) to highlight with a graphic display in the annual report. In order to visually display only some elements of the financial statements, a value judgment would have to be made that certain items are unimportant for readers to see. Accounting guidance does not allow for such a value judgment. Therefore, all elements of the financial statements must be depicted.

There are four financial statements (Statement of Income, Statement of Retained Earnings, Balance Sheet and Statement of Cash Flows) and all have different uses and formats. The Balance Sheet is prepared based on balances that exist at the close of business on a specific day, and the other three statements cover a period of time that ends on the Balance Sheet date. Given the differences, rules specific to each statement need to be developed.

As part of this development process, a sample annual report is used. The company is Tootsie Roll Industries, Inc., and the annual report is for the year ended December 31, 2001 with comparative years of 2000 and 1999 included. Tootsie Roll was chosen because of its accessibility (it came packaged with a financial accounting textbook). The rules for depicting each statement will be developed separately.

General Rules

To prevent the types of problems in graphing financial information that has been identified, the number of vertical gradations should be proscribed, and all graphs should contain (or start at) zero. The number of vertical gradations has been arbitrarily set at 15. Therefore, taking the maximum value the graph will contain and dividing by 14 will produce the increment of each gradation (after rounding up). Where there are both negative and positive values, the lowest and greatest values are summed and then divided by 14 to get the increment.

Setting the number of gradations at 15 is arbitrary, but so is much of accounting. There is no reason that intangible assets should be amortized over the lesser of useful life, legal life or 40 years, nor is there any reason to cap the maximum depreciable life. Arbitrary rules are employed in many situations.

Balance Sheet

The Balance Sheet is divided into current assets, non-current assets (frequently shown under the headings of plant, property and equipment, investments, intangible assets and other), current liabilities, non-current liabilities
and the equity section. Based on prevalence in the literature, common usage of the current asset and liability sections are to predict short-term liquidity. The current ratio (current assets divided by current liabilities) is a popular ratio, and a variation is the quick ratio (cash plus accounts receivable plus marketable securities divided by current liabilities). The quick ratio recognizes that not all assets (even among current ones) are equal in the ability to be collected in the short term.

The visual depiction of the financial statements should not make a value judgment as to including or omitting any item that appears, but at the same time should recognize user needs in the construction. Since current assets and current liabilities are frequently combined in financial calculations, they will be graphed simultaneously. The numerical value to be graphed for each will be a cumulative number, so that the final data point will be equal to the total current assets and total current liabilities. The reader will have immediate knowledge about relative values of total current assets and current liabilities, and the incrementally growing values as each variable is added in order of liquidity. The Balance Sheet of Tootsie Roll is shown in Figure 1.

[INSERT FIGURE 1 HERE]

Graphing the Balance Sheet according to the rules produces the visual depiction shown in Figure 2.

[INSERT FIGURE 2 HERE]

From Figure 2, it is obvious that current assets are much greater than current liabilities and that the most liquid assets are much greater than the most liquid liabilities. The visual depiction clearly shows that Tootsie Roll is in an excellent liquidity position.

Additionally, if a line were drawn between the point representing total current assets and total current liabilities, the inverse of the slope would be the current ratio, one of the commonly calculated ratios. Visually, it would appear to be a strong current ratio.

Noncurrent assets and liabilities are graphed on a separate graph.

[INSERT FIGURE 3 HERE]

Using similar protocols (the amounts are cumulative, listed in the same order as in the financial statements), it is apparent that noncurrent assets are substantially greater than noncurrent liabilities. The visual financial statement leads to a much quicker conclusion than analysis of the underlying financial statements, and also provides a visualization of the relative difference.

The equity section is contained in a third and fourth graph.

[INSERT FIGURE 4 HERE]

The graphs show that 2001 was marginally better than 2000. In the case of Tootsie Roll, the visual presentation of the equity section allows for a quick interpretation that the results for 2001 and 2000 were similar.

Income Statement

The Income Statements for Tootsie Roll for the years 2001, 2000 and 1999 are contained in Figure 5.

[INSERT FIGURE 5 HERE]

The Income Statements would seem to be pretty consistent. The consistency is readily apparent when the Income Statement is graphed.

[INSERT FIGURE 6 HERE]

Using the standard of 15 gradations, the Income Statements for the three years are virtually identical. This leads to the quick (and inescapable) conclusion that Tootsie Roll has...
a stable earnings pattern over the three period.

**Statement of Cash Flows**

The Statement of Cash Flows shows operating cash flows of consistent levels over the three years, an acquisition of a business in 2000 leading to a larger use of funds for investing, and a lower use of funds for financing in 2001 than 2000 or 1999.

[INSERT FIGURE 7 HERE]

**CONCLUSION**

Graphs can provide visual information about underlying financial statements that aids in user understanding and processing. Graphing a complete set of financial statements for Tootsie Roll Industries, Inc. yields the visual depictions presented.

**REFERENCES**


ABSTRACT

Investors’ utility functions are based upon return and risk. The cost of equity is often measured as a function of risk, defined as market beta. Despite beta's long and wide acceptance as an analysis tool and a measure of investor utility, the character of beta remains a matter of debate. The causes of variation in firm betas have received little research attention. This study examines one-time items as a potential cause of inter company beta variation. The analysis tests the proposition that repeated reports of one-time items (i.e., discontinued operations, extraordinary items and accounting changes) have an incremental impact on the firm beta, which is modeled as a function of operating and financial leverage. The findings indicate that market betas associate with frequency, magnitude, and direction (gain or loss) of one-time items.

1. Introduction

Return and risk are the two key measures used by investors in making decisions to buy and sell securities. The vast majority of research focuses on securities returns, largely ignoring the effects of risk. An understanding of the causes of the variation of risk among firms will lead to better investment decisions and research designs (Kothari 2001). This study examines how one-time items affect firm systematic risk. The specific research question is: "Do the frequency, direction and magnitude of one-time items associate with firm risk as proxied by firm market beta?"

This study presents a review of the definition of and the common proxy for securities risk. Next, a model of the determinates of risk is proposed. A statistical analysis is conducted to investigate the association of leverage and one-time items with firm systematic risk. The final section of the study concludes with a discussion of the implications for financial analysis.

2. Nature of risk

The most common definition of firm risk provides for two types: (1) risk that is specific to the firm, e.g. strikes, lawsuits, natural disasters, etc.; and (2) risk that affects all firms, e.g. war, inflation, po-
firms. Firm specific risk is often called "unique risk" and risk that affects all firms is often called "market risk," or "systematic risk."

The CAPM states that security returns are related to a factor "M," (unexpected macroeconomic shocks). Individual securities respond in varying ways to macroeconomic shocks, some increasing, and some decreasing in value. The average of all returns, (by definition, the "market return"), is used as a proxy for "M" in the model. The ratio of the return of an individual security to the market return is expressed as the coefficient, "beta." Beta is interpreted as the specific market risk of that individual firm. (Sharpe 1964)

It is well established (Chen and Known 1985) that beta is not stationary, rather, beta changes across time for any individual firm, and it also varies among firms at any specific time. Other than in the events of stock splits (Lamoureux and Poon 1987, Brennan and Copeland 1988), and dividend announcements (Carroll and Sears 1994), specific causes of beta changes have not been identified, although current research indicates that the likely cause is a combination of (1) investors incorporating new information into buy-sell decisions, (2) bias in calculating beta (Carroll and Sears 1994) (3) the degree of operating and financial leverage of the firm (Prezas, 1987) and (4) other, non-specified factors specific to the firm. The simple question, "Why is the beta of one firm different from that of another?" has received scant empirical attention. The current study addresses this situation.

As investors impound specific economic information into decisions concerning the securities of firms, the returns of that firm, relative to market returns, change from what they were absent the information. The effect of an economic shock upon an individual firm is determined by the individual characteristics of the firm, such as capital structure, industry, and the perceived ability of management to operate profitably.

3. Model of beta as a function of leverage
A number of studies have developed theoretical models that express a firm’s systematic risk as a function of operating leverage and financial leverage (Hamada, 1969; Rubenstein, 1973; Percival, 1974; Gahlon and Gentry, 1982; O’Brien and Vanderheiden, 1987; and Prezas, 1987). A distillation of their logic follows. First, a firm’s price in the stock market is a function of the firm’s ability to transform resources into shareholder value. A firm’s operating characteristics are key part of the transformation process. Thus, operating leverage is typically defined as the impact of the uncertainty of earnings before interest and taxes relative to the uncertainty of sales (O’Brien and Vanderheiden, 1987). Financial leverage is defined as the rate of change in net income relative to a change in earnings before interest and taxes (EBIT). Thus, Beta is a function of operating and financial leverage:

Empirical research shows that there is a positive relationship between leverage and risk (Breen and Lerner, 1973; Beaver, Kettler, and Scholes, 1970; Logue and Merville 1972; Pettit and Westerfield, 1972; Mandelker and Rhee, 1984; Huffman, 1989 and Kim and Sorenson, 1986). Findings of the empirical relationship between Beta and operating leverage are conclusive, however. Lev (1974) and Mandelker and Rhee (1984) find a positive relation, but Huffman (1989) reports a negative relation. The current study seeks to resolve the relation between Beta and operating leverage.

4. Research design
The previous section demonstrates a positive relationship between leverage factors and risk that can be taken as a base case. Upon this basic model, this study will develop the proposition that one-time items may have an incremental effect upon the market risk.

\[ \text{Beta} = f((\text{operating leverage, financial leverage}) + \text{One-Time Charge Effects}) \] (1)

The reasons for expecting that one-time items have an incremental effect on Beta are presented as follows. First, the issue will be discussed of whether or not the effects of one-time items upon the relative riskiness of a firm’s equity securities are transitory. Second, the signals provided by multiple instances of one-time items are examined. Third, the characteristics of one-time item effects (i.e., frequency, magnitude and direction) are identified. Lastly, a summary of hypothesized effects upon beta is given for each of the one-time item categories: discontinued operations, extraordinary items, and accounting changes.

4.2 The transitory nature of one-time items
If one-time items are actually nonrecurring events, then their effect upon current earnings is transitory. The common wisdom is that one-time items are not important to future cash flows and therefore are of little interest to investors (Weil and Leisman 2001). However, many firms report one-time items period after period. Can such repeated
charges truly be a series of discrete, transitory events that are of little effect upon the core business of the firm? Do multiple reports of one-time items comprise a methodology of business and reporting that affects the probability distribution of expected future cash flows?

If repeated one-time items cannot be considered as either nonrecurring or extraordinary, such multiple occurrences should have clear effect upon investors’ evaluation of the firm and of its management.

The issue of increased market risk associated with repeated reports of one-time items has not been addressed in the literature. The literature concerning one-time items has primarily addressed two effects: (1) the use of one-time items for the purpose of managing reported income and (2) the effect of one-time items in the returns of the firm, increasing the beta of that firm.

4.3 Risk and one-time item signaling

We propose that distrust of management assertions by investors is one source of the variation of risk among firms. After the 2001 Enron debacle, there has been much popular press given to this issue, but no particular hard research evidence. The current study does provide some data on the issue. Given the voluminous body of research into market responses to information, one would expect that information that is “bad news,” i.e. evidence that management assertions concerning financial operations are not to be trusted, would lead to increased skepticism on the part of investors and consequent increased price sensitivity variation. Increased distrust of management will result in an increased perception of the relative risk of the securities of the firm. An increased perception of relative risk will lead to greater variation in the returns of the firm, increasing the beta of that firm.

4.4 Differential market effects of gains versus losses

Investors react more strongly to losses than to gains. Studies of securities returns and investor behavior have long implied such differential ef-

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Table 1: Expected effects of one-time items upon security prices and returns. Support has been found under certain circumstances for the proposition that management uses its discretion over the recognition of one-time items to manage reported income (e.g., Smith 1993).

Little support is found for the proposition that one-time items have discernable effect upon securities returns (e.g., Easton 1990).

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<tr>
<th>Type of one time charge</th>
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<th>Magnitude</th>
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fects. For example, the original Ball and Brown study (1968) reports a maximum "abnormal performance index" (API) of approximately 1.08 for "good news" (gain) events and approximately 0.87 for "bad news" (loss) events. Because of the manner in which Ball and Brown construct the API, the "bad news" level of 0.87 represents a return that is 0.12 points less than that of the market, while the "good news," API represents a return that is only 0.08 points greater. Bad news events result in more than half again the change in API than good news events. Brown and Harlow (1988) show that investors react more strongly to losses than to gains in the prices of individual securities. Hayn (1995) finds that the earnings response coefficient of individual securities increases significantly when loss cases are excluded from the regression. Jan and Ou (1995) provide confirmatory evidence of a differential relationship between negative or positive earnings per share and stock price.

5. HYPOTHESES

5.1 The characteristics of one-time items
One expects investors to react differently to each of the three types of one-time items required to be disclosed: (1) discontinued operations, (2) extraordinary events and (3) accounting changes. Thus, it is necessary to examine separately the effect of each upon the beta of the affected security. The predicted effects of the frequency of reporting, the direction (gain/loss), the relative size of one-time items, and the interactions among these factors are presented in Table 1. As an examination of Table 1 shows, there are six (6) main effects and twelve (12) interactions possible for each of the three types of one-time items. This provides 54 different possible effects of one-time items upon the beta of affected firms' equity securities.

5.2 Discontinued operations
The disposal by a company of a segment of its business is likely to have a significant and lasting effect upon future income and cash flows (APB No. 30). The magnitude and direction of the effect upon equity securities of disposing of a business segment will depend upon several factors including (1) the magnitude of the immediate gain or loss caused by discontinuing the segment relative to the magnitude of the capital of the remaining business, (2) the immediate effect of the disposal, e.g. whether the disposal provides a gain or a loss, (3) expectations concerning future cash flows due to the disposal, and (4) other undefined factors. The first two factors may be directly observed in the financial statements of the firm. Expectations are not observable. Consistent with prior usage, this study assumes that expectations can be proxied by the observable factors, i.e. a relatively large loss would lead to expectations of lowered future cash flows.

This study hypothesizes that frequent reports of one-time items, including discontinued operations, will result in increased investor skepticism of management assertions. Combining these factors and investor reactions provides the following testable hypothesis:

**Frequency:**
- one event: no discernable effect on beta
- many events: a measurable effect upon beta

**Size:**
- small magnitude: no discernable effect upon beta
- large magnitude: a measurable effect upon beta

**Direction:**
- positive (gain): no discernable effect on beta
- negative (loss): a measurable effect upon beta

H1: Firms that report many large negative (loss) discontinued operations will have a larger market beta than firms that do not.

5.2 extraordinary items
APB Opinion No. 30 in 1973 also mandated the reporting of extraordinary items. The Financial Accounting Standards Board (FASB) modified the treatment of extraordinary items in FASB Statement No. 4 (1975), adding the early extinguishment of debt to this category of one-time item. Unlike discontinued charges, extraordinary items are not expected to have a significant and lasting effect upon future income and cash flows. Thus, the relative magnitude of extraordinary charges is not expected to have any discernible effect upon the beta of equity securities.

As with discontinued operations, however, it is expected that investors will react more strongly to negative (loss) extraordinary items, than to positive (gain) extraordinary items. Consistent with the research question of this study, it is expected that frequent reporting of extraordinary items will result in increased skepticism on the part of investors, resulting in increased beta. Combining these factors and investor reactions provides the following
testable hypothesis:

**Frequency:**
- One event: no discernable effect on beta
- Many events: a measurable effect upon beta

**Size:**
- Small magnitude: no discernable effect upon beta
- Large magnitude: no discernable effect upon beta

**Direction:**
- Positive (gain): no discernable effect on beta
- Negative (loss): a measurable effect upon beta

H2: Firms that report many negative (loss) extraordinary items will have a larger market beta than firms that do not.

5.3 Accounting changes
Accounting changes are expected to have neither significant nor lasting income and cash flow effects. In fact, with the exception of changes between LIFO and FIFO, which may have cash flow effects due to the application of income tax, accounting changes are widely perceived as having no economic reality. Accounting changes are perceived as a re-ordering of prior reported financial results. Because accounting changes are perceived as having no economic effect, the magnitude and direction (loss/gain) of reported accounting changes is irrelevant to beta.

However, as with both discontinued operations and extraordinary items, the frequency with which accounting changes are reported is expected to effect market beta due to increased investor skepticism. Combining these factors and investor reactions provides the following testable hypothesis:

**Frequency:**
- One event: no discernable effect on beta
- Many events: a measurable effect upon beta

**Size:**
- Small magnitude: no discernable effect upon beta
- Large magnitude: no discernable effect upon beta

**Direction:**
- Positive (gain): no discernable effect on beta
- Negative (loss): no discernable effect upon beta

H3: Firms that report many accounting changes will have a larger market beta than firms that do not.

6. DATA SELECTION AND METHODOLOGY
6.1 Data source
This study covers the years 1993 through 1997 and is drawn from the Standard & Poor's Research Insight database of firm specific information. The years are before the market turmoil of the late 1990s, but recent enough to be relevant. Industrial firms with SIC codes between 2000-3999 (industrial firms) are initially selected to insure a degree of homogeneity to the sample.

Table 2: Frequencies and Pearson correlations
Any firm that does not have complete information for the previous five years for (1) discontinued operations, (2) extraordinary items, or (3) accounting changes is eliminated from the sample. For each firm in the sample, the following variables are extracted: (1) market beta, (2) flev which is net financial obligations divided by common stockholders’ equity, (3) ollev which is operating liabilities divided by net operating assets, (4) number of
common shares outstanding, the value of (5) discontinued operations, (6) extraordinary items and (7) accounting changes reported for the current year of the study and for each of the five previous years.

Table 2 presents the frequency and simple correlation statistics for the sample drawn for each type of one-time item. Research Insight (Compustat) reports negative as well as positive market Betas.

Correlations indicate a direct association of Beta with OLLEV (operating leverage) when the empirical Betas are positive and this sample subgroup of Betas have no significant association with FLEV (financial leverage). On the other hand, in the subgroup of negative Betas, FLEV has a direct association with Beta but OLLEV has no association of importance. This finding is not completely consistent with prior work. The operating leverage finding adds evidence in favor of a positive direct relation with Beta. However, the financial leverage finding of a lack of significance for positive Betas during this sample period of the 1990s suggests that some dynamics may have changed from the previous works' sample periods.

6.2 methodology
As shown in Table 2, the preponderance of firms reports no one-time items in the current year neither of the sample period nor in any of the previous five years. To allow for the unequal population of the cells of the analysis of variance, the SAS generalized linear model is utilized to examine the sample. For each of the three one-time items, discontinued operations, extraordinary items and accounting changes, the following six models are estimated:

\[
\text{beta} = f(flev, ollev, frequency) \\
\text{beta} = f(flev, ollev, direction) \\
\text{beta} = f(flev, ollev, absolute magnitude, magnitude squared) \\
\text{beta} = f(flev, ollev, frequency, direction, frequency*direction) \\
\text{beta} = f(flev, ollev, frequency, absolute magnitude, frequency*absolute magnitude) \\
\text{beta} = f(flev, ollev, direction, absolute magnitude, direction*absolute magnitude, direction*magnitude squared)
\]

where:

flev  (net financial obligations divided by common stockholders' equity)

ollev  (operating liabilities divided by net operating assets)

sign  (negative, zero, or positive (indicator variable))

frequency  (zero, one or many)

absolute magnitude  (absolute value of one-time item / common shares outstanding)

magnitude squared  (value of one-time item / common shares outstanding)

The sample is divided into those observations with positive betas and those with negative betas. A multiple regression is run that beta is a function of the basic model of FLEV and OLLEV and one-time item effects from the frequency, direction, (positive or negative) and magnitude.

7. EMPIRICAL TESTS AND RESULTS

7.1 Overview
First, incremental effects by type of one-time item will be presented and then second the accumulated impact will be discussed. The basic model that relates beta to firm financial and operating leverage shows consistent results. The financial leverage variable is significant for the negative beta sub sample and insignificant for the positive sub sample. The operating leverage variable results are exactly the opposite those of financial leverage. Therefore, this explanation will not be repeated again in this section. The conclusion is that operating leverage associates with the expected normal activities of the CAPM, but leverage takes on significance when the market views the firm's returns negatively. The operating leverage result seems obvious and the finding that financial leverage is important in negative beta situation also makes sense because the firm's financial position will become a critical consideration when investors expectations of the securities are for them to move contrary to market changes.

The fact that the financial leverage variable is not significant for the positive beta group does not necessarily mean leverage is not important. Financing has become increasingly sophisticated and decompositions may be needed to fully understand the situation.

Because of space limitations, the complete statistics from the SAS generalized linear regressions for all six models of each one time charge are not shown here. Rather, Table three provides summary results.

7.2 Discontinued operations
Discontinued Items for the positive beta sub sample, does not disclose any significant impact upon
Beta. The negative beta subgroup, however, shows consistent significant effect. Hypothesis 1 is supported for the negative beta subgroup of frequent reporters of large negative discontinued operations. Frequency is significant in its own right in Model 1 (probability = 0.00). In particular, the mean betas are significantly different between many reports and the no reports or one report. Negative discontinued operations associate with large negative betas. Direction is also significant in general linear Model 2. Frequency and direction do have a significant interaction as shown in Model 4. Magnitude effects, by themselves, are not significant in Model 3 but the squared magnitudes do have significant interactions with frequency and direction in Models 5 and 6. Cumulatively, these findings suggest that the market perceives that firms with negative discontinued operations charges are possibly in some distress forcing unfavorable divestitures, thus increasing the uncertainty of positive future cash flows.

7.3 Extraordinary items
The association of extraordinary items with market betas is different from the discontinued operations results. As is shown in Table 3, all three one-time item effects have an association with risk for both the positive and negative beta samples. Also, all of the extraordinary one-time items have significant interactions with each other. Thus, it appears that investors are conscious of the nature of these charges and do not consider them in isolation. All of the extraordinary one-time items have some significant interaction with each other. Thus, investors are conscious of the nature of these charges and do not consider them in isolation.

7.4 ACCOUNTING CHANGES
Accounting change factors have several measurable effects upon market beta that are contrary to the predicted discussion. As with the previous two one-time items, there are differences according to positive and negative Beta subgroups. As prior research (e.g., Harrison 1977) has established, the market is quite able to "look past" accounting changes to the economic reality underlying them. The frequency variable is significant for the negative Beta subgroup but not for the positive subgroup. In the positive subgroup, the firms who have not made accounting changes appear to have significantly higher Betas. The results suggest that positive Beta firms make accounting changes to position themselves with lower variability but this behavior does not affect investors’ per-

<table>
<thead>
<tr>
<th>Table 3: Summary of Key Results (H1=Hypothesis One, etc.)</th>
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<tbody>
<tr>
<td><strong>Base Model</strong></td>
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<tr>
<td>Flev</td>
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<tr>
<td>Ollev</td>
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<tr>
<td><strong>Discontinued Operations</strong></td>
</tr>
<tr>
<td>H1 Frequency: number of one time charges: zero, one, many</td>
</tr>
<tr>
<td>H1 Sign: sign of one time event negative, zero, or positive</td>
</tr>
<tr>
<td>H1 absolute magnitude of (value of one time charge / common shares outstanding)</td>
</tr>
<tr>
<td>H1 squared magnitude: (value of one time charge)² / common shares outstanding</td>
</tr>
<tr>
<td>H1 interaction frequency x absolute magnitude: many x large</td>
</tr>
<tr>
<td><strong>Extraordinary Items</strong></td>
</tr>
<tr>
<td>H2 frequency: number of one time charges: zero, one, many</td>
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<tr>
<td>H2 Sign: negative, zero, or positive</td>
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<tr>
<td>absolute magnitude</td>
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<tr>
<td>magnitude: (value of one time charge)² / common shares outstanding</td>
</tr>
<tr>
<td>H2 interaction frequency x direction: many x negative</td>
</tr>
<tr>
<td>interaction frequency x absolute magnitude: many x large</td>
</tr>
<tr>
<td>interaction direction x absolute magnitude: negative x large</td>
</tr>
<tr>
<td><strong>Accounting Changes</strong></td>
</tr>
<tr>
<td>H3 frequency: number of one time charges: zero, one, many</td>
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<tr>
<td>Sign: control variable: negative, zero, or positive</td>
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<tr>
<td>absolute magnitude</td>
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<tr>
<td>magnitude: (value of one time charge)² / common shares outstanding</td>
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<tr>
<td>interaction frequency x direction: many x negative</td>
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<tr>
<td>interaction frequency x absolute magnitude: many and large</td>
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ceptions of risk. On the other hand, firms with negative Betas are perceived as being influenced by accounting changes, but they do not change any inherent risk position. These results are the opposite of Hypothesis Three.

Similar to the extraordinary items, the one-time item direction is a significant factor for firm Betas. The magnitude of the accounting change has an impact for negative Beta sub sample but not for the positive Beta subgroup. There is no significant interaction between frequency and direction or between frequency and size. A significant interaction does occur between direction and size for the negative Beta subgroup only.

7.5 SUMMARY DISCUSSION
As is shown in Table 3, support is found for all three hypotheses. The support is most pronounced for Hypotheses Two and Three. The impact of extraordinary items is stronger than was predicted which suggests that there are more factors at work than was specified.

8. Summary and Conclusions
In summary, this study finds support for the hypotheses that higher frequency, direction (loss/gain), and bigger magnitude of one-time items associate with market betas. Operating (financial) leverage is significant for the positive (negative) Beta subgroup but not for the negative (positive) sub sample. For only the negative Beta subgroup, the frequency and sign are significant for discontinued operations, but, contrary to the hypothesis, magnitude is not. As hypothesized, the extraordinary items generally had a significant association with Beta. The frequency of accounting changes is significant, as predicted.

The primary limitation of this study is that no inference of causality can be made. The data support that one-time items factors are associated with increased market betas, but it cannot be stated that one additional one-time item will cause beta to increase marginally by some identifiable percent. Furthermore, it is possible that both the reports of one-time items and increases in market beta arise from some other unknown unspecified common factor. Avenues for future research include (1) examining the sources of one-time items to determine the issue of causality (2) examining discontinued operations over a longer time period to determine if the lack of significance of the frequency of reporting is an attribute of the specific sample used in this study (3) examining the nature of accounting changes to determine if the market does differentiate between changes having implications for future cash flows and those not having such implications in determining market risk, (4) specifically testing the assertion that investors react more strongly to negative (loss) events than to positive (gain) events.

Overall, the association of one-time item / beta findings do have a clear implication for financial analysts. Ignoring repeated reports of one-time items in the belief that such events have no implications for future cash flows may cause analysts to overlook serious changes in the risk-return balance of investment portfolios. Changes in the betas of the securities of a portfolio may expose an investor to increased risk without the increased returns such risk demands.

REFERENCES


A NATIONWIDE SURVEY OF PERSONAL FINANCIAL PLANNING
COURSES:
WHAT IS BEING TAUGHT?

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ABSTRACT

This paper reports the results of a survey of AACSB accredited business schools to determine what topics are being covered in personal financial planning (PFP) courses. The paper may be of interest to departments considering adding a PFP course to the curriculum. It should also prove useful for evaluating existing courses.

The study examines course content, allocation of class time, annual enrollment information, prerequisites, textbooks used, degrees requiring course, and some instructor and student demographics. Of 311 institutional responses, only 141 (45.3 percent) offer a PFP course, and only about 7 percent of them required it for a degree in accounting or finance. Investment planning strategies appears to be the most heavily covered topic. It is concluded that many schools are missing an opportunity to help educate students in the fundamentals of personal finance that may assist some in their choice of career and for others in making informed financial decisions.
AN ANALYSIS OF LINEAR GRANGER CAUSALITY IN PETROLEUM FUTURES PRICES

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ABSTRACT

This study investigated the underlying long-term economic and statistical relationships among petroleum futures prices – namely crude oil, unleaded gasoline and heating oil futures prices. The study finds that the three petroleum futures price series are cointegrated and that these series share only one common stochastic trend. Our study also indicates that heating oil and unleaded gasoline futures prices adjust to clear deviations from long-term equilibrium relationship. In contrast, crude oil futures prices do not adjust to clear deviations from long-run equilibrium relationship at short lags. This is consistent with our findings that the common stochastic trend shared by the three price series is the crude oil variable. Finally, we find that there is a short-term bi-directional Granger Causality between crude oil, heating oil and unleaded gasoline futures prices.

I. INTRODUCTION

Economic theory suggests that there should be a long-run equilibrium pricing relationship between input prices and output revenue with the spread exhibiting a tendency to converge to the long-term average. This paper investigates the causal relationship between crude oil, heating oil and unleaded gasoline futures prices using cointegration theory and causality techniques.

Cointegration theory is extremely useful in estimating and testing long-term equilibrium relationships among non-stationary asset prices and allows one to make useful statistical inferences. Several studies have used the theory of cointegration to test for long-run economic relationships between two or more asset price series in different financial markets. For example, in petroleum futures markets, Moosa and Al-Loughani (1995) and Crowder and Hamel (1993) investigate the relationship between crude oil futures and spot prices using monthly observations and find that crude oil spot and futures prices are cointegrated. Similarly, Schwarz and Szakmary (1994), using daily crude oil, heating oil and unleaded gasoline futures and spot prices, find that the petroleum spot prices are cointegrated with their respective futures prices. Serletis (1994) also finds that crude oil, heating oil and unleaded gasoline are cointegrated with one single common factor over the period from 3 December 1984 to 30 April 1993. More recently, Silvapulle and Moosa (1999) test for cointegration between daily crude oil spot and daily crude oil futures contract prices for maturities of one month, three months, and six months and find that cointegration exists only between the spot price and the one-month futures contract price. Silvapulle and Moosa note that a finding of cointegration for the short maturity only is consistent with the widely held viewpoint that speculators in the crude oil futures market try to minimize uncertainty by taking decisions that cover short time horizons.

Several studies have also used cointegration theory when testing for market efficiency. For example, Serletis and Banack (1990) test for efficiency in the petroleum futures market using
Cointegration analysis. Crowder and Hamed (1993) use cointegration to test the simple efficiency hypothesis and the arbitrage condition for crude oil futures. Finally, Schwarz and Szakmary (1994) examine the price discovery process in the markets for crude oil, heating oil and unleaded gasoline using cointegration techniques.

Causality analysis has also been used to examine the relationship between spot and futures prices [Some relevant studies include, among others, Abhyankar (1995), Chan (1992), Frino, Walter, and West (2000), Min and Najand (1999), Shyy, Vijayaraghavan, and Scott-Quinn (1996), and Stoll and Whaley (1990)]. For example, Silvapulle and Moosa (1999) examine the relationship between spot and futures prices for crude oil. Using a linear causality analysis, they find that linear causality runs in one direction from futures prices to spot prices. However, when a nonlinear causality approach is used, Silvapulle and Moosa find a strong bidirectional nonlinear causality between spot and futures prices. Abhyankar (1998) also uses linear and nonlinear causality analysis to investigate the lead-lag relationship between the FT-SE 100 cash index and futures prices and finds that the futures price tends to lead the cash price when linear analysis is used. On the other hand, when a nonlinear causality approach is adopted, Abhyankar finds that neither market leads or lags the other.

In spite of the abundance of the literature aimed at detecting cointegration and/or causality between cash and futures prices, very little is known about how the futures prices themselves are linked together. In other words, studies that examine explicitly whether or not petroleum futures prices are cointegrated are almost nonexistent. This paucity of research is surprising in light of the fact that the success of popular trading strategies such as the 3:2:1 crack spread, the 1:1:0 gasoline crack spread, or the 1:0:1 heating oil crack spread and options on gasoline and heating oil crack spreads may hinge crucially on whether or not the underlying futures contracts are cointegrated. Furthermore, understanding the linkages among

the three futures contracts is important for energy traders that simultaneously employ crude oil, heating oil, and unleaded gasoline futures and options on futures to hedge price uncertainty. For example, Fleming and Ostdiek (1999) show that successful hedging of price uncertainty can be accomplished by taking advantage of the significant informational linkages across the three energy markets. Therefore, testing and accounting for cross-market linkages between the three energy futures markets is important because it may help improve short-term price predictability which, in turn, may lead to the construction of more accurate hedge ratios and long-term improvements in investment strategies.

This paper extends the existing research on petroleum futures markets in several important ways. First, we investigate the underlying long-term economic and statistical relationships among petroleum futures prices – namely crude oil, unleaded gasoline and heating oil futures prices – over a relatively long time period. Second, we test for short-term and long-term Granger causality between these futures prices. Finally, this paper posits that the success of trading the crack spreads and options on these spreads may hinge crucially on the three petroleum futures prices being cointegrated with only one common stochastic trend or, equivalently, two cointegrating vectors.

The findings of this paper are of considerable interest and importance to producers of crude oil, refiners, retailers and speculators. For example, the crude oil market is one of the largest futures markets, second only to the Eurodollar futures market, with open interest of 633,553 contracts as of January 14, 2003 (Barron’s, January 20, 2003). The same issue of Barron’s report on traders’ commitment shows that the number of long commercial hedges as of January 14, 2003 was 393,610 while the number of short commercial hedges was 429,865. Understanding the dynamics of crude oil, heating oil and unleaded gasoline futures prices is important for producers, refiners and retailers, who may only want to hedge their positions selectively, and for risk arbitrageurs (speculators) who trade petroleum crack spread futures and crack spread futures options to exploit relative mispricing. Therefore, the findings of this paper are important to practitioners and researchers alike.

1 A somewhat related study is that of Sadorsky (2000) who finds that monthly crude oil, heating oil, and unleaded gasoline futures prices are cointegrated with a trade-weighted index of exchange rates over the period from January 1987 to September 1997.
The rest of the paper will be organized as follows: section two describes the data, section three discusses the methodology, section four examines the empirical results and section five provides concluding remarks.

II. DATA AND UNIT ROOT TEST

The data used in modeling and testing the relationship between petroleum futures prices consist of daily futures prices of crude oil, heating oil and unleaded gasoline contracts from December 1984 to December 1999. Our data source is DRI database.

A single time series used to analyze the relation between petroleum futures prices is created by taking daily closing prices, for a given calendar trading month (henceforth called M), from each contract that is deliverable in M+2 months. On the first day of the next calendar-trading month (M+1) it is rolled over to the next contract that is deliverable in two months (M+3 months). The choice of contracts that are deliverable M+2 months (rather than spot months) avoids the problem of maturity mismatch between the three contracts.

Since crude oil prices are quoted in terms of dollars per barrel, while unleaded gasoline and heating oil prices are quoted in terms of dollars per gallon we converted all three quotations into the same unit of measure. Therefore, the crude oil prices are divided by 42 (there are 42 gallons per barrel) to convert the crude oil prices to per gallon basis and all prices are measured in dollars per gallon.

We have also conducted unit root tests to examine the time series properties of these futures prices. More specifically, we test for the order of integration using Banerjee, Lumsdaine, and Stock’s (BLS) (1992) methodology, which is capable of accounting for possible breaks in the series. BLS’s methodological contribution is to provide an asymptotic distribution theory for statistics that pertain to the shifting-root/shifting-trend hypotheses. BLS (1992) proposed three classes of statistics, namely, recursive, rolling, and sequential Augmented Dickey-Fuller (ADF) statistics (see BLS (1992)). The ADF and ADF-type tests are often criticized on the grounds that their failure to reject the null of a unit root may be due to their low power against weakly stationary alternatives. We also use the Kwiatkowski, Phillips, Schmidt, and Shin (KPSS) (1992) stationary test as a complementary procedure.

Table I summarizes the results of the BLS recursive minimum (Panel A), rolling minimum (Panel B), and sequential minimum (Panel C) ADF unit root tests. The three tests unanimously fail to reject the null hypothesis of unit root in the levels of the three petroleum futures contract prices at any conventional level of significance. However, when the same tests are applied to the first difference of price series, they firmly reject the null of a unit root at better than the 1% level. The results of the KPSS stationary test are also reported in Table I (Panel D). These results clearly show that the null hypothesis of stationarity in the levels of the futures price series can be rejected at better than the 1% level for all three petroleum contracts. By contrast, the KPSS test results do not reject the hypothesis of stationarity in the changes of the three futures price series. Taken together, the results in Table I imply that all three futures prices are nonstationary and have the same order of integration of one – i.e., I(1).

III. METHODOLOGY

In this section, we discuss the econometric methodologies used to examine linear Granger causality between crude oil (CO), heating oil (HO) and unleaded gasoline (UG) futures prices. We first discuss Johansen’s multivariate cointegration analysis technique, and then the error correction model.

Cointegration Modeling and Testing

We test for cointegration among the three futures price series using the multivariate cointegration model advocated by Johansen’s (1988,1991) and Johansen and Juselius (1990). They propose the following maximum likelihood approach for both estimating and testing the number of cointegrating relationships in finite order Gaussian VAR models:

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2 Crude oil futures stop trading three working days before the 25th day of the month prior to the delivery month while the heating oil and unleaded gasoline contracts trade to the last trading day of the month.
### TABLE I

RESULTS OF UNIT ROOT TESTS FOR PETROLEUM FUTURES

<table>
<thead>
<tr>
<th>Variables</th>
<th>Panel A: Recursive</th>
<th>Panel B: Rolling</th>
<th>Panel C: Sequential</th>
<th>Panel D: KPSS</th>
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<tr>
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<tr>
<td>Levels</td>
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<tr>
<td>Crude Oil</td>
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<tr>
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<td>-3.0471</td>
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</tr>
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</table>

| First Differences  |                    |                  |                     |              |
| Crude Oil          | -31.8003^a         | -5.9937^a        | -27.0298^a          | 0.0585       |
| Unleaded Gasoline  | -31.8119^a         | -6.1346^a        | -27.0389^a          | 0.0437       |
| Heating Oil        | -32.4350^a         | -6.0282^a        | -27.5688^a          | 0.0570       |

^1, ^2, and ^3 are the recursive minimum, rolling minimum, and sequential minimum unit root test statistics described in Banerjee, Lumsdaine, and Stock (BLS) (1992). ^4 KPSS is the stationarity test statistic described in Kwiatkowski, Phillips, Schmidt, and Shin (KPSS) (1992). Critical values for the BLS tests are from Banerjee, Lumsdaine, and Stock (1992) and those for the KPSS tests are from Kwiatkowski, Phillips, Schmidt, and Shin (1992). ^a Significant at 1% level.

These results use three lagged terms and do not include a time trend. The results are similar when a time trend is included and/or when other lags are used.

The data cover the periods from December 1984 to November 1999 and includes all contracts that are deliverable through December 1999.

---

\[ x_t = \sum_{i=1}^{p} \Pi_i x_{t-i} + \varepsilon_t, \quad \varepsilon_t \sim N(0, \Omega), \quad t=1,...,T \]  \hspace{1cm} (1)

which is conveniently reparameterized in vector error correction form as

\[ \Delta x_t = \sum_{i=1}^{p-1} \Gamma_i \Delta x_{t-i} + \Gamma_p x_{t-p} + \varepsilon_t, \]  \hspace{1cm} (2)

where \( \varepsilon_t \) denotes a \( k \)-dimensional normal variate with mean zero and non-singular covariance matrix \( \Omega \) and \( \Gamma_i = -I + \Pi_1 + ... + \Pi_i \) with \( i = 1, ..., p \). The lag length \( p \) is selected such that the errors \( \varepsilon_t \)'s are independent and identically distributed (i.i.d). It is assumed that the roots of the implicit characteristic polynomial are outside, or at most on the unit circle. The rank, \( r \), of the matrix \( \Gamma_p \) determines the number of linearly independent vectors that are stationary. If \( r=0 \), the variables are not cointegrated and, therefore, a simple VAR can be used to test for Granger causality. In contrast, if \( r=k \), all the variables in the system are stationary. The interesting cases arise when \( r<k \), in which case there are \( k-r \) unit roots in the system, or \( k-r \) common stochastic trends and \( r \) cointegrating relationships. The matrix \( \Gamma_p \) can then be written as \( \alpha \beta' \), where both \( \alpha \) and \( \beta \) are \( (k \times r) \) matrices of full column rank. The \( r \) first rows of \( \beta' \) are the \( r \) cointegrating vectors, while the elements of \( \alpha \), interpreted as the speed of adjustment, are the weights of the cointegrating vectors in the different equations. Provided that none of the elements of \( x_t \) is integrated to an order higher than one, the maximum likelihood estimates of the basis of the cointegrating space is given by the empirical canonical variates of \( x_{t-p} \) with respect to \( \Delta x_t \) corrected for the short-run dynamic and the deterministic components. The number of significant canonical correlations gives the number of cointegrating relationships. Their significance can be tested by means of a sequence of Likelihood Ratio (LR) tests whose limiting distribution is expressed in terms of vector Brownian motion [see Johansen (1988) and Johansen and Juselius (1990)].

In this paper, the cointegrating rank \( (r) \) of the matrix \( \Gamma_p \) is tested using two test statistics: The first is the maximum eigenvalue test \( (\lambda_{\max}) \) defined as follows,

\[ \lambda_{\max} = -T \ln \left( 1 - \lambda_{r+1}^* \right) \]  \hspace{1cm} (3)

where the \( \lambda_{i}^* \)'s \( (i = 1,...,k) \) are the estimated eigenvalues. The null hypothesis for the \( \lambda_{\max} \) test is \( r = n \) cointegrating vectors against the alternative hypothesis that \( r \leq n+1 \). The second statistic is known as the trace statistic and is calculated as
\[ Trace = - \sum_{i=r+1}^{k} T \ln \left( 1 - \lambda_i^* \right) \] (4)

where the null hypothesis is \( r = n \) against the alternative hypothesis that \( r \leq k \).

**Error-Correction and Granger Causality**

If crude oil, heating oil and unleaded gasoline futures prices are cointegrated, and have stationary cointegrating regression residuals, then, these futures prices have a long-run equilibrium relationship. Then, the error correction model can be used to examine the Granger causality between the three petroleum futures prices.

Engle and Granger (1987) have shown that cointegrated variables must have an error correction model (ECM) representation. The main reason for the popularity of ECM is that it provides a formal framework for testing and estimating short- and long-run relations among economic or financial variables. Furthermore, the ECM strategy provides an answer to the problem of spurious correlations.

We examine the causal relations between crude oil (CO), unleaded gasoline (UG), and heating oil (HO) futures prices using the following ECM representation,

\[ \Delta CO_t = \alpha_0 + \sum_{i=1}^{p} \alpha_{1,i} \Delta CO_{t-i} + \alpha_{2,i} \sum_{i=1}^{p} \Delta UG_{t-i} + \sum_{i=1}^{p} \alpha_{3,i} \Delta HO_{t-i} + \Theta_1 \mu_{t-1} + \zeta_1 \] (5)

\[ \Delta UG_t = \alpha_0 + \sum_{i=1}^{p} \alpha_{1,i} \Delta UG_{t-i} + \alpha_{2,i} \sum_{i=1}^{p} \Delta CO_{t-i} + \sum_{i=1}^{p} \alpha_{3,i} \Delta HO_{t-i} + \Theta_1 \mu_{t-1} + \zeta_1 \] (6)

\[ \Delta HO_t = \alpha_0 + \sum_{i=1}^{p} \alpha_{1,i} \Delta HO_{t-i} + \alpha_{2,i} \sum_{i=1}^{p} \Delta UG_{t-i} + \sum_{i=1}^{p} \alpha_{3,i} \Delta CO_{t-i} + \Theta_1 \mu_{t-1} + \zeta_1 \] (7)

Where all variables are stationary time series, \( \Delta \) is the difference operator, the \( \alpha \)'s, \( \beta \)'s, and \( \delta \)'s are time-invariant coefficients, \( p \) is the optimal lag, \( \zeta \)'s are serially uncorrelated random error terms, and the \( \mu \)'s are the lagged values of the error-correction terms derived from the long-run cointegrating equation.

Several authors have argued that causality results are sensitive to the lag length in the VAR (See e.g., Thornton and Batten (1985)). We concur and thus use the Schwarz (1978) information criterion (SIC) in determining the optimal lag length \( p \).

More specifically, this study investigates the causal linkages between the petroleum futures markets by testing the following hypotheses:

- **H1**: UG \( \not \rightarrow \) CO: if \( \alpha_{2,i} = 0, \forall i \) [Equation (5)];
- **H2**: HO \( \not \rightarrow \) CO: if \( \alpha_{3,i} = 0, \forall i \) [Equation (5)];
- **H3**: UG&HO \( \not \rightarrow \) CO: if \( \alpha_{2,i}=\alpha_{3,i}=0, \forall i \) [Equations (5)];
- **H4**: CO \( \not \rightarrow \) UG: if \( \beta_{2,i} = 0, \forall i \) [Equation (6)];
- **H5**: HO \( \not \rightarrow \) UG: if \( \beta_{3,i} = 0, \forall i \) [Equation (6)];
- **H6**: CO&HO \( \not \rightarrow \) UG: if \( \beta_{2,i} = \beta_{3,i} = 0, \forall i \) [Equations (6)];
- **H7**: CO \( \not \rightarrow \) HO: if \( \delta_{2,i} = 0, \forall i \) [Equation (7)];
- **H8**: UG \( \not \rightarrow \) HO: if \( \delta_{3,i} = 0, \forall i \) [Equation (7)];
- **H9**: UG&CO \( \not \rightarrow \) HO: if and only if \( \delta_{2,i}=\delta_{3,i}=0, \forall i \) [Equations (7)];

Hypotheses \( H_1 \) through \( H_9 \) are tested using the following Wald \( \chi^2 \) test statistic:

\[ \chi^2_{(p_i)} = (c-CF)\left(C\Sigma_x C\right)^{-1}(c-CF)^t, \quad i=1-4. \]

\( c \) is a \((p\times 1)\) vector of constants, \( C \) is a \((p\times k)\) hypothesis design matrix of constants, \( \Phi \) is a \((k\times 1)\) vector of the regression coefficients, and \( \Sigma_x \) is the estimated covariance matrix of the regression coefficients. A statistically significant \( \chi^2 \) implies that lagged values of a specific right-hand side (independent) variable help in the short-run prediction of the left-hand side (dependent) variable.

**IV. EMPIRICAL RESULTS**

In this section we present and discuss the empirical results of Johansen’s multivariate cointegration tests and long-run Granger causality. Then, we discuss the results of short-term...
Granger-causality tests among the petroleum futures prices.

Cointegration Test Results

We conduct the analysis of common stochastic trends at various lag lengths (up to 20) because the Johansen’s cointegration test is known to be sensitive to lag length selection. In the sake of brevity, Panel A of Table II only displays the results of the Johansen’s test at lag 4. The findings in Panel A show that crude oil, unleaded gasoline and heating oil futures prices are cointegrated. They also show that the rank of the matrix \( \Gamma_p \) (equation 2), or the number of linearly independent stationary vectors, is two. These results are significant at the 1% confidence level whether using the \( \lambda_{\text{max}} \) or the trace test, implying that the three futures prices share only one common stochastic trend. The empirical results for other lag selections (not reported here but available from the authors upon request) are consistent and robust, that is, they too show that the three energy price series share only one common stochastic trend, or equivalently, are tied together by two cointegration relations.

Panel B of Table II shows the significance of the two cointegrating relations in each of the three petroleum futures equations. The first cointegrating relation is significant in the equations for heating oil (\( \Delta HO_t \)) and unleaded gasoline (\( \Delta UG_t \)), but it is insignificant in the crude oil equation (\( \Delta CO_t \)). In these two equations, \( \alpha \), the speed of adjustment parameter, is 0.042 and 0.025, respectively. More importantly, these \( \alpha \) estimates are significant at the 1 percent and 5 percent levels, respectively, indicating that heating oil and unleaded gasoline futures prices adjust to clear deviations from long-term equilibrium relationship. In contrast, the crude oil futures prices do not adjust to clear deviations from long-run equilibrium relationship. Panel B of Table II also shows that the equation for unleaded gasoline (\( \Delta UG_t \)), in the second cointegration relation, is significant at the 10% level only (\( \alpha=0.006, t\text{-value}=1.689 \)). However, the second cointegration relation is not significant in the crude oil equation (\( \Delta CO_t \)) and in the heating oil equation (\( \Delta HO_t \)). Furthermore, we have investigated the speed of adjustment parameters for up to lag 20 (result not reported here but available from the authors upon request) and found that at longer lags, crude oil futures prices also appear to adjust to clear deviations from long-run equilibrium relationships.

Finally, Panel C of Table II gives the estimate of the \( \Gamma_p \)-matrix calculated as \( \alpha \beta' \) and the corresponding t-values. The rows of Panel C, thus, give the estimates of the combined effect of the two cointegration relations in each of the three equations. The empirical estimates of \( \alpha \beta' \) for the crude oil (\( CO_t \)) variable are significant at the 1% level in the heating oil (\( \Delta HO_t \)) equation (\( \alpha \beta' =0.042, t\text{-value}=3.596 \)) and at the 5% level in the unleaded gasoline (\( \Delta UG_t \)) equation (\( \alpha \beta' =0.024, t\text{-value}=2.136 \)). As for the heating oil (\( HO_t \)) variable, \( \alpha \beta' \) is significant (at the 1% level) only in the heating oil equation (\( \Delta HO_t \)) itself (\( \alpha \beta' =-0.028, t\text{-value}=-3.919 \)). Finally, \( \alpha \beta' \) for the unleaded gasoline (\( UG_t \)) variable is significant at the 10% level in the heating oil (\( \Delta HO_t \)) equation (\( \alpha \beta' =-0.011, t\text{-value}=-1.817 \)) and at the 1% level in the unleaded gasoline (\( \Delta UG_t \)) equation itself (\( \alpha \beta' =-0.016, t\text{-value}=-2.745 \)).

In summary, the results in Panel A of Table II show that the three petroleum futures price series examined are cointegrated and tied together in the long run by two cointegrating vectors, implying that these series share only one common stochastic trend. Furthermore, the findings in Panels B and C reveal that the crude oil variable is weakly exogenous and the common stochastic trend shared by the three price series is the crude oil variable. These findings are consistent with those reported by Serletis (1994) who also finds that crude oil, heating oil and unleaded gasoline are cointegrated with one common trend over the period from 3 December 1984 to 30 April 1993. Furthermore, the presence of a single common stochastic trend means that the three futures prices are highly correlated over long (i.e., infinite) horizons, a finding that one would expect because of the fact that unleaded gas and heating oil are derivatives of crude oil. Engle and Granger (1987) have shown that a linear combination of two independent cointegrating vectors is also stationary. Therefore, one may create any of the existing crack spreads by taking a linear combination of these two cointegrating vectors. In other words, the fact that the three petroleum futures prices are tied together by two cointegrating vectors is consistent with the
The empirical results of the error correction model are reported in Table III. Table III, columns 2-4, show the chi-square ($\chi^2$) statistic for testing the null hypothesis that all the estimated coefficients on the independent variable X are jointly equal to zero. Similarly, column 5 shows that the chi-square ($\chi^2$) statistic for testing the null hypothesis that all the estimated coefficients on the independent variables X and Y are jointly equal to zero. Focusing first on the crude oil equation (Equation 5), the results in Table III indicate

existence of trading strategies such as the 3:2:1 crack spread and the unleaded and heating oil crack spreads.

Granger-Causality Results

Critical values for the $\lambda_{max}$ and the Trace tests are from Enders (1995), page 420. A common Lag p was selected based on the Schwarz’s (1978) information criteria.

Panel A: Estimation of Cointegrating Vectors at Lag 4 (p=4)

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>$r = 0$</th>
<th>$r \leq 1$</th>
<th>$r \leq 2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Largest Eigenvalues</td>
<td>$\lambda_{max}$</td>
<td>62.49$^a$</td>
<td>24.22$^a$</td>
</tr>
<tr>
<td>Trace</td>
<td>97.97$^a$</td>
<td>35.47$^a$</td>
<td>11.25</td>
</tr>
</tbody>
</table>

Panel B: Speed of Adjustment Parameter Estimate ($\alpha$)

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>$\Delta CO_t$</th>
<th>$\Delta HO_t$</th>
<th>$\Delta UG_t$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\alpha_1$</td>
<td>-0.003</td>
<td>0.042</td>
<td>0.025</td>
</tr>
<tr>
<td>(t-value)</td>
<td>(-0.268)</td>
<td>(3.569)$^a$</td>
<td>(2.164)$^b$</td>
</tr>
<tr>
<td>$\alpha_2$</td>
<td>-0.002</td>
<td>-0.006</td>
<td>0.006</td>
</tr>
<tr>
<td>(t-value)</td>
<td>(-0.778)</td>
<td>(-1.638)</td>
<td>(1.689)$^c$</td>
</tr>
</tbody>
</table>

Panel C: Combined Effect of the Two Cointegration Relations ($\alpha \beta'$)

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>$CO_t$</th>
<th>$HO_t$</th>
<th>$UG_t$</th>
<th>Constant</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\Delta CO_t$</td>
<td>-0.003</td>
<td>-0.001</td>
<td>0.004</td>
<td>-0.000</td>
</tr>
<tr>
<td>(t-value)</td>
<td>(-0.256)</td>
<td>(-0.135)</td>
<td>(0.689)</td>
<td>(-0.604)</td>
</tr>
<tr>
<td>$\Delta HO_t$</td>
<td>0.042</td>
<td>-0.028</td>
<td>-0.011</td>
<td>0.002</td>
</tr>
<tr>
<td>(t-value)</td>
<td>(3.596)$^a$</td>
<td>(-3.919)$^a$</td>
<td>(-1.817)$^c$</td>
<td>(2.372)$^b$</td>
</tr>
<tr>
<td>$\Delta UG_t$</td>
<td>0.024</td>
<td>-0.008</td>
<td>-0.016</td>
<td>0.002</td>
</tr>
<tr>
<td>(t-value)</td>
<td>(2.136)$^b$</td>
<td>(-1.097)</td>
<td>(-2.745)$^a$</td>
<td>(-2.705)$^a$</td>
</tr>
</tbody>
</table>
that unleaded gasoline and heating oil individually Granger-cause crude oil. The $\chi^2$ statistics used to test whether unleaded gasoline ($\chi^2_{ug}$) or heating oil ($\chi^2_{ho}$) may be excluded from the crude oil equation are significant at 1 percent and 5 percent levels, respectively. Furthermore, unleaded gasoline and heating oil jointly ($\chi^2_{X,Y}$) may be excluded from crude oil equation is highly significant ($\chi^2_{ug,ho}=27.84^a$) at 1% levels, indicating that unleaded gasoline and heating oil jointly Granger-cause crude oil. Next, examination of unleaded gasoline equation (equation 6), results in Table III, show that crude oil and heating oil individually Granger-cause unleaded gasoline. This finding is indicated by the fact the $\chi^2$ exclusion test statistics for crude oil ($\chi^2_{co}$) and heating oil ($\chi^2_{ho}$) are both significant at the 5 percent level. The evidence, in Table III, also shows that crude oil and heating oil jointly Granger-cause unleaded gasoline at the 1 percent ($\chi^2_{co,ho}=17.84^a$). Third, the empirical evidence on the heating oil equation (equation 7), Table III, shows that the $\chi^2$ statistics for crude oil ($\chi^2_{co}=24.56^a$) and unleaded gasoline ($\chi^2_{ug}=15.62^a$) are significant at the 1 percent level, implying that crude oil and unleaded gasoline individually Granger-cause heating oil. The table also shows that crude oil and unleaded gasoline are jointly ($\chi^2_{X,Y}$) significant in the heating oil equation ($\chi^2_{X,Y}=32.97^a$) at 1% level, implying that crude oil and unleaded gasoline jointly Granger-cause heating oil. Finally, the above Granger causality test results suggest that there is a short-term bi-directional Granger causality running among petroleum futures prices, specifically, between crude oil, unleaded gasoline, and heating oil futures prices.

The results of this study are important to hedgers as well as speculators. For example, a hedger, such as a refiner, who observes an unusually wide futures crack spread, would short heating oil and unleaded gasoline futures contract to lock in a higher gross profit margin. This is because the hedger expects that the spread is most likely to be narrowed by a decline in the futures price of heating oil and unleaded gasoline rather than by an increase in crude oil prices. In contrast, in the short-term, the hedger will have to take simultaneous short positions in unleaded gasoline and heating oil futures and a long position in crude oil futures contract in order to lock in the wider gross profit margin. In the short-term, because there is bi-directional granger causality among the petroleum futures prices, there is a need to take both long and short positions to properly hedge profit margins. On the other hand, if hedgers/speculators observe an unusually narrow futures crack spread, they could take a long position in heating oil and unleaded gasoline futures and simultaneously short the crude oil futures with the expectation that the spread will widen. In this case, the expectation is that the futures crack spread will widen to a more “normal” level of gross profit margin.

It follows from the discussion above that hedgers, speculators, as well as arbitrageurs in petroleum futures market need to fully understand the dynamics of petroleum futures prices. Failure to do so would impede the
ability of these market participants to take advantage of the significant informational linkages across the three energy markets to reduce price uncertainty and enhance portfolio performance. Hence, the results of this study are important to hedgers, speculators, and other petroleum futures markets participants alike.

V. CONCLUSION

This study finds that crude oil, unleaded gasoline and heating oil futures prices are cointegrated and are significant at the 1% confidence level. The results show that the three petroleum futures price series examined are cointegrated and tied together in the long run by two cointegrating vectors, implying that these series share only one common stochastic trend. Furthermore, our findings reveal that the crude oil variable is weakly exogenous and the common stochastic trend shared by the three price series is the crude oil variable.

The study demonstrates that there is both short-term and long-term Granger causality among petroleum futures prices. Specifically, there is short-term bi-directional Granger causality running between crude oil, unleaded gasoline, and heating oil futures prices. These results are significant at better than 5% level of statistical significance. In addition, the study indicates that heating oil and unleaded gasoline futures prices adjust to clear deviations from long-term equilibrium relationship and they are significant at the 1 percent and 5 percent levels, respectively. In contrast, crude oil futures prices do not adjust to clear deviations from long-run equilibrium relationship at short lags.

Finally, it is important for hedgers as well as speculators to understand the short-term dynamics and long-term linkages of petroleum futures prices in order to implement their strategies. Failure to do so would impede the ability of these market participants to take advantage of the significant informational linkages across the three energy markets, to reduce price uncertainty and enhance portfolio performance. This article demonstrates the long-term linkage as well as the short-term dynamics between crude oil, heating oil and unleaded gasoline futures prices. Hence, the results of this study are important to hedgers, speculators, and other petroleum futures markets participants alike.

REFERENCES


ACCOUNTING DISCLOSURES AND INDUSTRY CONCENTRATION: AN EMPIRICAL COMPARISON OF THE POLITICAL COST AND THE PROPRIETARY COST HYPOTHESES

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Brian R. Greenstein
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ABSTRACT

This study examines empirically the effect of industry concentration on the disclosure practices of firms in various industries. Prior studies, investigating the role of costs with respect to corporate disclosure policies, have focused on specific accounting choices or disclosures. These studies have yielded conflicting predictions about the effect of industry concentration on a firm’s propensity to disclose favorable information.

The political cost theory predicts that firms in high barrier to entry industries enjoying monopolistic profits have disincentives, in the form of risking increased taxation and regulation, to voluntarily disclose favorable information. Darrough and Stoughton, on the other hand, theorize that firms in high barrier to entry industries are less subject to competition and, therefore, will be more willing to voluntarily disclose favorable information. They predict that when entry barriers are high, the benefits of improved access to capital markets outweigh the proprietary costs of increased disclosure.

Using earnings in excess of the industry median as a proxy for favorable information and the AIMR Report scores as a measure of disclosure, we find strong empirical support for the theory that firms in high barrier to entry industries are more likely to disclose favorable information than firms in more competitive industries. Additionally, we find that the disparity in disclosure levels is most significant for voluntary, informal disclosures unregulated by financial reporting standards.

Key Words: Voluntary Disclosures, Political Costs, Agency Costs, Proprietary Costs, Cost of Capital.

Data Availability: The data used in this study are from publicly available sources.
ABSTRACT

An effective financial report communicates useful information about an entity to facilitate rational decisions by its important constituents, with respect to economic issues. For instance, the providers of intellectual capital should be enabled to formulate reasonable expectations with respect to their remuneration and office/classroom facilities at a not-for-profit (NFP) university. In accordance with the primary purpose of financial reporting, our survey seeks to obtain feedback from faculty about two financial report formats. First, respondents are asked to rate the usefulness of the GAAP-based statement of activities, along with a related pie chart that illustrates expenditures by functional sectors. Second, a supplemental stakeholder statement and related “proverbial pie” charts are evaluated. The stakeholder report is designed to focus on resource allocations to major constituents and the entity itself. The anticipated results may provide potentially valuable information from arguably the most important but generally neglected, potential financial report users at not-for-profit colleges and universities. In sum, we are surveying what potential users of a financial report might prefer so as to achieve the primary objective of financial reporting.

BACKGROUND DISCUSSION

The FASB (1980) established a decision usefulness focus for not-for-profit (NFP) entities with a relatively narrow scope, e.g., accountability and fiscal solvency that (to many observers) appears somewhat similar to the profit-seeking business entity. On a related note, FASB (1993) implemented the decision usefulness objective with a business-like model when specifying the required financial statements. The emphasis on communicating useful information to the providers of financial capital to assist decisions related to the allocation of scare resources is very appropriate. However, we contend that the limited scope does have valid criticisms and there are some noteworthy suggestions to improve the existing accounting model. For instance, Estes (1996) effectively identifies the failures of the model, especially with respect to the providers of human capital, i.e., employees. To correct for such a problem, Morley (1979), Meek and Gray (1988), the AAA (1991), and the International Accounting Standards Committee (1997) recommend the addition of a stakeholder allocation statement (SAS) entitled the value added statement (VAS) as prescribed by the Institute of Chartered Accountants in England and Wales (1975). See Hudack, Orsini, and McAllister (2002) for a contemporary presentation of a VAS. Furthermore, Orsini, Hudack, and Zekan (1999) adapted the VAS for use by a Private NFP University. Yet, virtually all
Private NFP Colleges and Universities throughout the United States continue to prepare financial reports to comply with FASB (1993) and make little effort to communicate useful information to their providers of intellectual capital, i.e., their Faculty.

This failure to communicate between University Administrators and Faculty has resulted in a faulty process when negotiating Faculty compensation (salaries and benefits). Faculty at Universities throughout the United States frequently rely on the American Association of University Professors’ (AAUP) annual publication in ACADEME to assess their compensation against similar institutions. A process that makes sense, but it is incomplete by itself. We contend the providers of intellectual capital must be informed about their institution’s financial affairs in a manner relevant to their needs.

**OBJECTIVE OF STUDY**

In accordance with the primary purpose of financial reporting, this survey seeks to obtain feedback from faculty about two financial report formats, i.e., the traditional statement of activities based on generally accepted accounting principles (GAAP) and a supplemental stakeholder allocation statement (SAS). Respondents should note: an effective financial report communicates useful information about an entity to facilitate rational decisions by its important constituents, with respect to economic issues. Accordingly, our study’s motive is to obtain potentially valuable information from arguably the most important but generally neglected, potential financial report users at not-for-profit (NFP) colleges and universities.

In sum, we are surveying what potential users of a financial report might prefer. All responses from individual participants will be kept confidential. Only aggregated results will be reported in our study.

**RESEARCH QUESTIONS**

1. Are faculty interested in the financial performance of their Private Not-for-Profit University?
2. Are faculty interested in the allocation of resources to stakeholders at their Private NFP University?

**FACULTY SURVEY**

The survey instrument seeks to obtain feedback about two financial report formats:

1. The traditional *Statement of Activities* based on GAAP as depicted in EXHIBITS 1 – 3.

Faculty will be asked to take approximately 10 minutes to offer their opinion about two financial report formats and their related illustrations. We believe this is a great opportunity to participate in a study to determine what, arguably the most important potential users of financial statements for a Private Not-for-Profit University, might actually prefer! Now, before they begin to yawn at the thought of reviewing an accounting report, or have fears of becoming “glassy-eyed” please note that 4 of the 6 exhibits are pictures! The survey instrument is presented in Appendix A.

Why might Faculty be interested in participating in the study? We believe that if the Faculty are well informed about their University’s financial affairs, then rationally-determined requests for the following three priorities are possible: (a) fair salaries, (b) reasonable benefits and (c) the necessary institutional facilities/resources to be an effective teacher and scholar within the scope of resources that are available for allocation.

**SURVEY DIRECTIONS**

1. Please take a few minutes to review the survey’s six exhibits, with the intent of providing your opinion about the usefulness of each exhibit from a faculty member’s perspective.
2. The first three exhibits illustrate the traditional *statement of activities* and related disclosures that are based on generally accepted accounting principles (GAAP).
3. The last three exhibits present a proposed supplemental *stakeholder allocation statement* (SAS) and related disclosures.
4. While formulating your opinion, be sure to consider the typical faculty expectations regarding financial matters, e.g., fair salary, reasonable benefits, and the necessary institutional facilities and resources to be an effective teacher and scholar in accordance with the university’s mission.
5. After reviewing the two financial report formats (GAAP and SAS), respond to the six survey questions by placing an X in the appropriate box.
6. Narrative comments or opinions about the two formats are encouraged. Comments should be made on the back of the survey instrument.
RESEARCH HYPOTHESES

H1. Faculty are not interested in the financial performance of their NFP university based on a review of the traditional statement of activities according to GAAP. Refer to Appendix A: EXHIBITS 1-3.

H2. Faculty are not interested in the allocation of resources to stakeholders based on a review of a supplemental stakeholder allocation statement (SAS). Refer to Appendix A: EXHIBITS 4-6.

METHODOLOGY & DATA ANALYSIS

Analysis and interpretation of data will rely on the following five procedures: frequency distributions, averages, standard deviations, matched pair t-tests, and regression analysis. First, responses to each of the six questions will be aggregated according to frequencies of scores about usefulness that range from low (1), moderate (3) to high (5). Second, average scores will be calculated. Third, standard deviations will be determined. Fourth, matched pair t-tests will compare GAAP versus SAS report formats. Fifth, respondent demographics will be used as independent variables to determine if they have influenced the perceived level of usefulness, i.e., usefulness scores will be the dependent variables.

SURVEY RESULTS?

At this time, data analysis is not completed. We anticipate the matched pair t-tests will either fail to reject or reject hypothesis one and hypothesis two. In addition, the frequencies, averages, and standard deviations will enable an interpretation of our results.

REFERENCES


International Accounting Standards Committee. 1997. International Accounting Standard Number 1. IASC.


APPENDIX A: Faculty Survey About Financial Reporting

Questionnaire

Only aggregated results will be reported. Individual responses will be kept confidential.

Six Survey Questions – Check your perceived level of usefulness as a faculty member

<table>
<thead>
<tr>
<th>Low</th>
<th>Moderate</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

1. Exhibit 1 Statement of Activities
2. Exhibit 2 Program and Activity Allocations
3. Exhibit 3 Specific Program Allocations
4. Exhibit 4 Stakeholder Allocation Statement
5. Exhibit 5 Revenue Based Proverbial Pie
6. Exhibit 6 Net Margin Based Proverbial Pie

Please check the most appropriate response

<table>
<thead>
<tr>
<th>Respondent’s Demographics</th>
<th>Full-time Teaching</th>
<th>Full-time Administrator</th>
<th>Part-time Administrator</th>
<th>Part-time Teaching</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Faculty status</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Contract status</td>
<td>Tenured Contract</td>
<td>Tenure Tract</td>
<td>Full-time One Year</td>
<td>Part-time Adjunct</td>
</tr>
<tr>
<td>3. Number of years in higher education</td>
<td>Under 5 Years</td>
<td>5 to 10 Years</td>
<td>11 to 20 Years</td>
<td>Over 20 Years</td>
</tr>
<tr>
<td>4. Number of years at the University</td>
<td>Under 5 Years</td>
<td>5 to 10 Years</td>
<td>11 to 20 Years</td>
<td>Over 20 Years</td>
</tr>
<tr>
<td>5. Identify school affiliation</td>
<td>School of Business</td>
<td>Other, please write-in your school below</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Have you ever served on a university finance or benefits committee?</td>
<td>No</td>
<td>Yes</td>
<td>If yes, indicate the number of years served</td>
<td></td>
</tr>
</tbody>
</table>

Are you interested in receiving an updated report, FYE 6/30/03? Yes No

Please provide your comments about either the GAAP or SAS report formats on the back.
EXHIBIT 1
PRIVATE NOT-FOR-PROFIT UNIVERSITY
STATEMENT OF ACTIVITIES

Objective: To communicate the allocation of resources among the various programs and support activities in accordance with generally accepted accounting principles (GAAP). The primary purpose is to monitor and promote fiscal responsibility by administrators with respect to resource allocation decisions about funding programs and support activities related to the institution’s operations. For instance, the CPA auditors’ report on the financial statements is directed to the Board of Trustees.

<table>
<thead>
<tr>
<th>Revenues, Gains and Support</th>
<th>FYE June 30, 2002</th>
<th>FYE June 30, 2001</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tuition and fees, net of financial aid [note 1]</td>
<td>$ 72,843,816</td>
<td>69.91%</td>
</tr>
<tr>
<td>Private gifts and grants</td>
<td>10,330,074</td>
<td>9.91%</td>
</tr>
<tr>
<td>Government grants and contracts</td>
<td>10,843,325</td>
<td>10.41%</td>
</tr>
<tr>
<td>Auxiliary enterprises</td>
<td>7,654,563</td>
<td>7.35%</td>
</tr>
<tr>
<td>All other revenue and support [see note 2]</td>
<td>2,529,035</td>
<td>2.43%</td>
</tr>
<tr>
<td>Total revenues, gains and support</td>
<td>$ 104,200,813</td>
<td>100.00%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Expenses and Losses</th>
<th>FYE June 30, 2002</th>
<th>FYE June 30, 2001</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic departments and programs</td>
<td>$ 53,802,759</td>
<td>51.63%</td>
</tr>
<tr>
<td>Grants and contracts</td>
<td>8,332,834</td>
<td>8.00%</td>
</tr>
<tr>
<td>Academic support</td>
<td>7,745,847</td>
<td>7.43%</td>
</tr>
<tr>
<td>Student services</td>
<td>13,484,230</td>
<td>12.94%</td>
</tr>
<tr>
<td>Institutional support</td>
<td>12,883,471</td>
<td>12.36%</td>
</tr>
<tr>
<td>Other expenses</td>
<td>526,036</td>
<td>0.50%</td>
</tr>
<tr>
<td>Independent operations</td>
<td>6,305,293</td>
<td>6.05%</td>
</tr>
<tr>
<td>Auxiliary enterprises</td>
<td>5,529,511</td>
<td>5.31%</td>
</tr>
<tr>
<td>Total expenses</td>
<td>$ 108,609,981</td>
<td>104.23%</td>
</tr>
</tbody>
</table>

Increase (decrease) in net assets before cumulative effect of a change in an accounting principle [refer to note 3] $ (4,409,168) -4.23% $ 1,405,043 1.47%

Note 1. Financial assistance to students was $ 27.3 million in 2002 and $ 24.0 million in 2001.

Note 2. Some details about other revenues, gains and support have been condensed for this survey.

Note 3. The operating deficit FYE 6/30/02 was reduced by $ 2,461,627 due to cumulative effect of a change in an accounting principle so that the reported decrease in net assets was $ (1,947,541).
EXHIBIT 2
PRIVATE NOT-FOR-PROFIT UNIVERSITY
TOTAL PROGRAM AND ACTIVITY ALLOCATIONS

$108.6 MILLION FYE JUNE 30, 2002

Dollar amounts in millions. Percentages are based on total revenues.

<table>
<thead>
<tr>
<th>ALLOCATIONS</th>
<th>FYE 2001</th>
<th>FYE 2000</th>
<th>FYE 1999</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic Programs</td>
<td>$47.7</td>
<td>$43.6</td>
<td>$35.9</td>
</tr>
<tr>
<td>Grants &amp; Contracts</td>
<td>5.4</td>
<td>4.2</td>
<td>3.6</td>
</tr>
<tr>
<td>Academic Support</td>
<td>6.7</td>
<td>6.1</td>
<td>4.6</td>
</tr>
<tr>
<td>Student Services</td>
<td>12.5</td>
<td>11.3</td>
<td>9.6</td>
</tr>
<tr>
<td>Institutional Support</td>
<td>10.6</td>
<td>10.1</td>
<td>8.6</td>
</tr>
<tr>
<td>Other Expenses</td>
<td>0.5</td>
<td>0.4</td>
<td>0.8</td>
</tr>
<tr>
<td>Independent Operations</td>
<td>6.0</td>
<td>5.7</td>
<td>4.9</td>
</tr>
<tr>
<td>Auxiliary Enterprises</td>
<td>4.8</td>
<td>4.5</td>
<td>4.3</td>
</tr>
<tr>
<td>Total Expenses</td>
<td>$94.2</td>
<td>$85.9</td>
<td>$72.2</td>
</tr>
</tbody>
</table>
EXHIBIT 3
SPECIFIC ACADEMIC PROGRAM ALLOCATIONS
$ 53.8 MILLION ACADEMIC PROGRAM COSTS

Dollar amounts in millions. Percentages are based on total program costs.

<table>
<thead>
<tr>
<th>Academic Program Costs by Schools</th>
<th>FY 2001</th>
<th>FY 2000</th>
<th>FY 1999</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Arts and Sciences</td>
<td>$7.2</td>
<td>$6.2</td>
<td>$5.5</td>
</tr>
<tr>
<td>2. Business</td>
<td>3.1</td>
<td>2.9</td>
<td>2.8</td>
</tr>
<tr>
<td>3. Adult and Continuing Education</td>
<td>9.4</td>
<td>7.7</td>
<td>6.0</td>
</tr>
<tr>
<td>4. Education</td>
<td>6.6</td>
<td>5.5</td>
<td>4.6</td>
</tr>
<tr>
<td>5. Social Work</td>
<td>2.7</td>
<td>2.6</td>
<td>2.5</td>
</tr>
<tr>
<td>6. Human Perform. / Leisure Sciences</td>
<td>1.2</td>
<td>1.0</td>
<td>0.9</td>
</tr>
<tr>
<td>7. Nursing</td>
<td>2.7</td>
<td>2.6</td>
<td>2.7</td>
</tr>
<tr>
<td>8. Natural and Health Science</td>
<td>2.8</td>
<td>2.7</td>
<td>2.8</td>
</tr>
<tr>
<td>9. Graduate Medical Sciences</td>
<td>3.4</td>
<td>3.5</td>
<td>3.1</td>
</tr>
<tr>
<td>10. Law</td>
<td>2.8</td>
<td>3.2</td>
<td>0.3</td>
</tr>
<tr>
<td>Other academic program costs</td>
<td>5.8</td>
<td>5.8</td>
<td>4.7</td>
</tr>
<tr>
<td>Total Academic Program Costs</td>
<td>$47.7</td>
<td>$43.6</td>
<td>$35.9</td>
</tr>
</tbody>
</table>
EXHIBIT 4
PRIVATE NOT-FOR-PROFIT UNIVERSITY

STAKEHOLDER ALLOCATION STATEMENT

Objective: The stakeholder allocation statement (SAS) is designed to communicate the distribution of resources among the various stakeholders including the amount retained by the university, i.e., surplus (deficit) plus depreciation charges. Depreciation is added back because it is a non-cash flow cost. An entity must retain adequate resources in order to refresh or replace its equipment, facilities, etc., to facilitate its long-term survival. Hence, the monitoring of an institution’s financial capital maintenance practices should benefit all stakeholders with a long-term interest in the university.

<table>
<thead>
<tr>
<th>Resources Generated</th>
<th>FYE June 30, 2002</th>
<th>FYE June 30, 2001</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tuition and fees, net financial aid</td>
<td>$ 72,843,816</td>
<td>69.91%</td>
</tr>
<tr>
<td>All other revenue and support</td>
<td>31,356,997</td>
<td>30.09%</td>
</tr>
<tr>
<td>Total revenues and gains</td>
<td>$ 104,200,813</td>
<td>100.00%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Stakeholder Allocations</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>S1. Faculty salaries and benefits</td>
<td>$ 45,034,955</td>
<td>43.22%</td>
</tr>
<tr>
<td>S2. Academic support compensation</td>
<td>5,965,096</td>
<td>5.72%</td>
</tr>
<tr>
<td>S3. Student services compensation</td>
<td>6,994,534</td>
<td>6.71%</td>
</tr>
<tr>
<td>S4. Administrators’ salaries and benefits</td>
<td>8,518,386</td>
<td>8.17%</td>
</tr>
<tr>
<td>S5. All other employees’ compensation</td>
<td>3,316,169</td>
<td>3.18%</td>
</tr>
<tr>
<td>S6. Resources retained by the university</td>
<td>142,620</td>
<td>0.14%</td>
</tr>
<tr>
<td>S7. Suppliers for materials and services</td>
<td>31,428,593</td>
<td>30.16%</td>
</tr>
<tr>
<td>S8. Creditors for interest on debt</td>
<td>2,800,460</td>
<td>2.69%</td>
</tr>
<tr>
<td>Total resource allocations to stakeholders</td>
<td>$ 104,200,813</td>
<td>100.00%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Net Margin Available</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total revenues and gains</td>
<td>$ 104,200,813</td>
<td>100.00%</td>
</tr>
<tr>
<td>Less: External allocations (S7 &amp; S8)</td>
<td>34,229,053</td>
<td>32.85%</td>
</tr>
<tr>
<td>Net margin available to employees</td>
<td>$ 69,971,760</td>
<td>67.15%</td>
</tr>
</tbody>
</table>

EXHIBIT 5

PROVERBIAL PIE ALLOCATIONS TO ALL STAKEHOLDERS

$104.2 MILLION TOTAL REVENUES FYE JUNE 30, 2002

Dollar amounts in millions. Percentages are based on total revenues.

<table>
<thead>
<tr>
<th>ALLOCATIONS</th>
<th>FYE 2001</th>
<th>FYE 2000</th>
<th>FYE 1999</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1. Faculty</td>
<td>$37.7</td>
<td>$34.4</td>
<td>$28.8</td>
</tr>
<tr>
<td>S2. Academic support</td>
<td>3.3</td>
<td>2.8</td>
<td>2.2</td>
</tr>
<tr>
<td>S3. Student services</td>
<td>6.1</td>
<td>5.5</td>
<td>4.8</td>
</tr>
<tr>
<td>S4. Administrators</td>
<td>5.9</td>
<td>5.1</td>
<td>4.4</td>
</tr>
<tr>
<td>S5. All other employees</td>
<td>3.1</td>
<td>3.3</td>
<td>4.3</td>
</tr>
<tr>
<td>S6. Resources retained</td>
<td>4.9</td>
<td>6.6</td>
<td>9.2</td>
</tr>
<tr>
<td>S7. Suppliers</td>
<td>33.5</td>
<td>30.2</td>
<td>23.0</td>
</tr>
<tr>
<td>S8. Creditors</td>
<td>1.2</td>
<td>1.2</td>
<td>1.4</td>
</tr>
<tr>
<td>Total allocations</td>
<td>$95.7</td>
<td>$89.2</td>
<td>$78.2</td>
</tr>
</tbody>
</table>
EXHIBIT 6

NET MARGIN AVAILABLE TO EMPLOYEES AND THE UNIVERSITY

$ 70 MILLION NET MARGIN AVAILABLE FYE JUNE 30, 2002

Dollar amounts in millions. Percentages are based on net margin available.

<table>
<thead>
<tr>
<th>ALLOCATIONS</th>
<th>FYE 2001</th>
<th>FYE 2000</th>
<th>FYE 1999</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1. Faculty</td>
<td>$ 37.7</td>
<td>$ 34.4</td>
<td>$ 28.8</td>
</tr>
<tr>
<td>S2. Academic support</td>
<td>3.3</td>
<td>2.8</td>
<td>2.2</td>
</tr>
<tr>
<td>S3. Student services</td>
<td>6.1</td>
<td>5.5</td>
<td>5.5</td>
</tr>
<tr>
<td>S4. Administrators</td>
<td>5.9</td>
<td>5.1</td>
<td>4.4</td>
</tr>
<tr>
<td>S5. All other employees</td>
<td>3.1</td>
<td>3.3</td>
<td>4.3</td>
</tr>
<tr>
<td>S6. Resources retained</td>
<td>4.9</td>
<td>6.6</td>
<td>9.2</td>
</tr>
<tr>
<td>Net margin available</td>
<td>$ 61.0</td>
<td>$ 57.7</td>
<td>$ 53.7</td>
</tr>
</tbody>
</table>
AN EMPIRICAL STUDY OF THE IMPACT OF FINANCIAL REPORTING SCANDALS ON ACCOUNTING STUDENTS

Steven R. Jackson,
The University of Tennessee at Martin
Martin, Tennessee
sjackson@utm.edu
(731) 587-7228

ABSTRACT

At no other time in our history have we had such an impact to our financial reporting function within our capital market structure. The institutions responsible for such reporting are reeling from the fallout of these financial-reporting scandals. “Reports on the collapse of Enron, the bankruptcy of WorldCom, and a growing list of failures and near failures have exposed massive manipulations of financial reporting by management, inexplicable breakdowns in the independent audit process, and astonishing revelations of holes in our financial-reporting standards and practices, and stunning lapses of corporate governance”. (Sutton, 2002). As Sutton also points out, in this environment, investors and the public have become increasingly skeptical about a system that seems to be out of control.

The impact on perceptions of the investing public must also include students studying business and more specifically students studying accounting. This study uses a questionnaire developed by Gramling, et.al. (1996) to study the perceptions of auditing students before and after the above mentioned financial-reporting scandals. Students in two auditing classes, one before the scandals and one after, were given the questionnaire at the beginning of their auditing course. The results show a significant change in student perceptions concerning audit expectation issues after the scandals, but before they studied auditing.

INTRODUCTION

At no other time in our history have we had such an impact to our financial reporting function within our capital market structure. In the past the profession has had scandals and questions about the auditing profession but the media coverage of these items was not as public as the media coverage today. Potential and current accounting students as well as their parents, have greater access to information concerning the current accounting scandals.

As far back as the 1960s financial scandals raised questions about the performance of auditors, and during that time the number and size of lawsuits against accounting firms increased. Those cases which resulted in huge losses and raised auditor performance questions, included Westec (1965), National Student Marketing (1969), Penn Central and Four Seasons Nursing Centers (1970). In 1967 John L. Carey said that “the accounting profession is going through a most unusual and difficult period. On some days it seems as though we were being attacked from all sides.” He was concerned over “a feeling that CPAs are not quite the stalwart protectors of investors and creditors that the public had assumed they were” (Carey, 1967, 15).
In 1972, the Stirling Homes bankruptcy followed by Equity Funding in 1973 had a major impact on the accounting profession. Once again the credibility of auditors was questioned. These failures plus other problems caused the first broad attack by Congress against the profession. Senators Moss and Metcalf in separate reports questioned the independence of the Big Eight firms from their clients. Both these reports recommended that the federal government set accounting and auditing standards for publicly traded corporations. However, no legislation was passed. This led the AICPA to create the Division of CPA Firms and the Public Oversight Board (POB).

In the 1980s the amount of nonaudit services offered by some independent public accountants and the growth of MAS services and the contribution of those practice areas to profits caused concerns about independence, objectivity and professionalism in the profession. In 1979 the POB said in a major study:

> there is enough concern about the scope of services in responsible quarters so that the question cannot be dismissed as a “nonproblem.” The board believes that there is potential danger to the public interest and to the profession in the unlimited expansion of MAS to clients, and some moderating principles and procedures are needed. (Public Oversight Board 1979, 56)

Also in 1980 at the annual AICPA meeting William R. Gregory warned members of the increasingly fractious climate in the profession:

> It seems that the effects of the phenomenal growth in the profession and competitive pressures have created in some CPAs attitudes that are intensely commercial and nearly devoid of the high-principled conduct that we have come to expect of a true professional. It is sad that we seem to have become a breed of highly skilled technicians and businessmen, but have subordinated courtesy, mutual respect, self-restraint, and fairness for a quest for firm growth and a preoccupation with the bottom line.

During the 1980s the cases of auditor fraud were very embarrassing to the profession. These cases—ESM Government Securities, Wedtech Corp. and ZZZZ Best raised questions about the propriety of accounting and auditing.

Mark Stevens in his book, The Big Six, wrote:

> As the firms become more intimately involved with their clients through their consulting practices, as they think of themselves more and more as consultants who happen to do audits just to get a foot in the door and as they continue to reward salesmanship and marketing over technical proficiency, they are clearly headed toward a day of reckoning—a day when the firms, or Congress acting for them, will force the issue and demand that they decide whether they want to retain the licensed privilege of auditing the corporate community by spinning off the MAS practices, or whether they want to join in the open competition of management consulting by ejecting the audit practices. (Stevens 1991, 250-251)

During the 1990s the big firms expanded into global, multidisciplinary professional services firms that also happened to conduct audits. In June 1996 Arthur Levit, then SEC Chairman, said “I’m deeply concerned that ‘independence’ and ‘objectivity’ are increasingly regarded by some [in the accounting profession] as quaint notions….I caution the [accounting] industry, if I may borrow a Biblical phrase, not to ‘gain the whole world, and lose [its] own soul’” (Levit 1996).

All of these problems and warnings came at a time when media coverage was not as extensive and thus the general public, the population not directly involved in financial services, were not as aware of the problems. Today these events would receive much more media coverage such as what happened with Enron and WorldCom and others.

The institutions responsible for such reporting are reeling from the fallout of these financial-reporting scandals. “Reports on the collapse of Enron, the bankruptcy of WorldCom, and a growing list of failures and
near failures have exposed massive manipulations of financial reporting by management, inexplicable breakdowns in the independent audit process, and astonishing revelations of holes in our financial-reporting standards and practices, and stunning lapses of corporate governance". (Sutton, 2002). As Sutton also points out, in this environment, investors and the public have become increasingly skeptical about a system that seems to be out of control.

This impact on perceptions of the investing public must also include students studying business and more specifically students studying accounting. Sutton points out that we must confront some challenging questions in light of the failures mentioned above. These questions are:

- Can we believe in and rely on the independent audit?
- Can we believe that our accounting and disclosure standards provide the transparency that is essential to investors and the public?
- Can we rely on self-regulatory systems to ensure audit quality and to root out and discipline substandard performance?
- Can we rely on corporate governance processes---oversight by boards of directors and audit committees---to ride herd on management and to see to it that auditors do their job?

Sutton goes on to say that events have changed how we look at and think about those questions, and the change may last for decades to come. These questions concerning how we deal with and potentially change a system that seems flawed certainly impact the students presently majoring in accounting or thinking about accounting as a field of study.

The remainder of this paper is outlined as follows. The second section reviews the relevant literature. The third section describes the survey instrument used to obtain the empirical evidence and provides information on the survey respondents. The fourth section presents the analysis of the survey responses. The final section concludes with summary comments and suggestions for future research in this area.

**LITERATURE REVIEW**

Student decisions pertaining to majoring in accounting are impacted by the perceptions these students have of the accounting profession. Students may choose accounting as a major right out of high school or may make the choice after starting college. A number of factors such as job availability, starting pay, potential for advancement and the impressions of what the career will provide, impact the decisions of students to become or remain accounting majors.

Many accounting programs have faced declining enrollments in the last few years even while those same accounting programs have updated curricula and increased efforts to recruit students. Barsky et al. (2003) points out that accounting programs cannot control important external issues that arise in today’s dynamic business marketplace. This study looks at one aspect of this business marketplace, specifically the impact of recent accounting scandals and the impact of those scandals on the perceptions of the students about the profession.

Barsky et al. (2003) states that many students and their parents simply do not understand how dramatically the role of accountants and their education has changed during the past decade (Barsky and Catanach 2001). Few realize that the accountant's role has evolved from that of financial accounting and tax advisor to one of consultant who offers advice on a variety of management issues, including performance improvement, human resource systems, and other financial matters (IMA 1999). In fact, a recent Harris poll (2001) on the "prestige of professions" rated accountants 16th out of 17 listed professions. The accounting scandals project the image that accounting may no longer be such a stable profession. The related risk of legal liability, criminal prosecution and pressure for unethical behavior also may dampen student interest in accounting (Barsky, et al. 2003).
In a 1996 study, Gramling et al. presented results of a survey questionnaire used to ascertain whether the perceptions of undergraduate business students about audit expectation issues would be changed after completion of an undergraduate auditing course. They also compared the perceptions of students subsequent to completion of an auditing course to the perceptions of professional auditors. The issues addressed in their study include: the appropriate role for auditors; the specific parties to whom auditors should be responsible; the prohibitions and regulations that should be placed on audit firms; and the decisions that auditors would likely make in a series of specific case studies. The survey results were also used to provide evidence as to the perceptions of these three groups regarding key performance attributes of auditing. This study will use the same questionnaire to study the perceptions of students before and after the accounting scandals.

It has long been accepted that there exists an expectations gap between auditors and users of financial statements regarding the value of the audit function. The expectations gap is defined as “the difference between what the public and financial statement users believe auditors are responsible for and what auditors themselves believe their responsibilities are” (AICPA 1993).

In the United States, auditing standards have been issued as an attempt to reduce the expectations gap (Guy and Sullivan 1988). In general, the research which has been conducted to date tends to focus on one or two expectation gap issues, and only from the perspective of one of the relevant parties.

The Survey Instrument

The survey instrument was based on an instrument developed, tested, and used in a study of the audit expectations gap in Britain (Humphrey et al. 1993). Modifications were made by Gramling et.al. In recognition of differences in auditing and accounting issues between Britain and the United States. The instrument was not modified in the present study. The survey instrument consists of four primary sections: (1) a set of questions designed to elicit opinions on the role and nature of auditing; (2) a set of questions used to identify the attributes that subjects associate with aspects of auditor performance; (3) a series of short case studies used to determine actions that participants perceive auditors would take in a variety of circumstances; and (4) a set of questions designed to obtain biographical information and personality variables about the respondents.

The set of questions on the role and nature of auditing primarily comprises statements regarding existing and possible audit roles, prohibitions and regulations in the audit environment, and parties to whom auditors should be responsible. For each of the statements in this set, respondents were asked to indicate their extent of agreement of disagreement with the statement on a seven-point scale (1=Strongly disagree; 4=Neutral; 7=Strongly agree).

The set of questions used to identify aspects of auditor performance consists of a semantic differential testing instrument requiring respondents to assess the performance of auditors on various attributes of auditing. Although semantic differential instruments usually allow only for bi-polar responses, respondents to the survey reply on a 7 point Likert scale as to how successful they perceive auditors are at various activities (1=Extremely unsuccessful; 4=Neither successful or unsuccessful; 7=Extremely successful). For this set of questions, respondents could also indicate that the activity was not applicable to auditors.

The short cases provide a total of nine responses. Two responses refer to possible audit report qualifications; two refer to potential whistle-blowing situations; one refers to a potential resignation situation; and four refer to the level of work that an auditor would be expected to complete. While beginning auditing students may be less familiar with the situations in the cases, their perceptions are important if the two groups differ.

The first auditing class surveyed was in the spring semester of 2001 and the second auditing class was in the fall of 2003. Both
classes completed the questionnaires the first day of class so the impact of the subsequent auditing class was removed from consideration. The first class consisted of 12 students and the second class had 23 students.

**Discussion of Results**

The results were analyzed using z tests to measure differences between means of the two groups of unequal size.

Table one shows the results of the section of the questionnaire dealing with respondents views about auditors and the auditing process. One question in that section showed a significant difference between the two groups. The students before the scandals were neutral on the statement that “audit committees comprising non-executive directors should improve auditor independence” and students after the event were moderately in agreement. This seems to indicate that the student’s perception of the function of audit committees changed in favor of including non-executive directors.

![Table One](attachment:image.png)

Table two shows the results of the section of the questionnaire dealing with the respondents views about possible prohibitions and regulations on an audit firm. In this section five questions showed significant differences between the two groups.

![Table Two](attachment:image.png)

Post-event students were strongly in favor of audit firms not providing consulting services (MAS) to its audit clients, where pre-event students slightly disagreed with that statement. This is one of the issues that were heavily covered in the media after the Enron and WorldCom failures and these results reflect the increased awareness of students and the public regarding this perceived conflict of interest. These same
students were also in favor of audit firms not being primarily concerned with making a profit which was also an issue discussed in the media. The last two questions in this section reflect the student’s neutral attitude toward someone independent of the firm setting the audit fees and also the attitude toward legal liability. Most students at the beginning of an audit course may not be as familiar with proportionate and joint and several liability as practicing CPA’s so the responses to this question should not be surprising.

Table three contains the results of the group of questions dealing with views about how successful auditors are at selected activities.

### Table Three

**Views About How Successful Auditors Are At Particular Activities**

<table>
<thead>
<tr>
<th>Statement</th>
<th>Students Pre-Event</th>
<th>Students Post-Event</th>
<th>Z-score (p-value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescribing remedies to problems</td>
<td>4.55</td>
<td>5.22</td>
<td>-0.43697 (.075)</td>
</tr>
<tr>
<td>Making a profit</td>
<td>5.58</td>
<td>6.07</td>
<td>-1.305 (.095)</td>
</tr>
<tr>
<td>Preventing errors and Irregularities</td>
<td>3.58</td>
<td>4.91</td>
<td>-2.64043 (.004)</td>
</tr>
<tr>
<td>Acting independently without regard to self-interest</td>
<td>5.42</td>
<td>4.61</td>
<td>1.766715 (.036)</td>
</tr>
<tr>
<td>Being even-handed with the interests of others</td>
<td>6</td>
<td>5.30</td>
<td>1.701947 (.044)</td>
</tr>
</tbody>
</table>

Students post Enron/WorldCom, were a little bit more optimistic about the ability of auditors to solve problems and also make a profit. It is interesting that the post event students were significantly more comfortable with auditors preventing errors and irregularities when that inability was at the core of the failures. These post event students were less in agreement with auditors acting independently and being even-handed with the interest of others. Those responses are more in line with what would be expected given the level of media coverage of those topics.

**Discussion**

What can we, as accounting educators, do to try and overcome this negative media coverage of the profession and to reverse the enrollment trends? By increasing our discussion of our Professional Code of Ethics with prospective students and their parents and show them that there is much more to the practice of public accounting than just auditing we can begin to reverse the trends. We need to emphasize the forensic aspects of fraud investigation, the consulting needs and opportunities available with an accounting degree. Prospective students should also be aware of the value of the accounting degree in other areas of business. An accounting degree is very useful and valuable to other career paths.

These small changes are a start to overcome a negative image associated with our profession.

**Summary**

Overall these results would seem to indicate that students exposed to media coverage of these events which had a negative impact on public perceptions of the auditing profession were inclined to think that consulting services should be independent of auditing services and firms should be less concerned with making a profit and more concerned with providing service to clients and the investing public. These results may provide some insight into the decreasing popularity of accounting as a career choice among young people today.

More research needs to be done in this area to measure the impact of the auditing course on these perceptions and how we as accounting educators might overcome the negative perception of the profession to
attract the best and brightest students to major in accounting.

This study looks at a very small sample of students and may not have validity outside those groups studied. The students were in two different regions of the country which may have an impact on the perceptions of the students. The impact of the audit professor and textbook should have no impact on the responses because the questionnaire was administered at the beginning of each semester however; the other accounting coursework taken preceding the audit class may have impacted the responses. It would be difficult to imagine a situation where these two cases were not discussed in other accounting classes and the perceptions of accounting faculty passed to the students.

These threats aside these results indicate a change in perception of accounting students in today’s environment that should be considered when recruiting and retaining accounting majors.

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Harris Poll. 2001. Number 50: Doctors Seen As Most Prestigious of Seventeen Professions and Occupations, Followed by Scientists (#2), Teacher (#3), Clergy (#4), and Military Officers (#5). *Harris Interactive* (October 10).


FINANCIAL PERFORMANCE VS. CEO COMPENSATION:
RECENT EVIDENCE FROM THE BANKING INDUSTRY

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ABSTRACT

This article examines the corporate executive compensation packages which have recently drawn much of the public attention due to a series of CEO resignations in the corporate world. Executive compensation is one of the four internal governance mechanisms that modern corporations use to assure consistency among the interests of the parties involved in the agency relationship. The paper specifically looks at the issue of corporate governance in the banking industry that shows how banks use compensations for their top-level managers, i.e., CEOs to align the interests of the managers and the stakeholders. Using empirical data, the statistical tests show a weak overall correlation between the executive compensation and the corporate performance.

INTRODUCTION

On September 17, 2003, Richard Grasso, New York Stock Exchange CEO and Chairman of the board, was asked to resign. The next day, the Chairman and CEO, who had worked at the exchange from 1968 as a clerk earning $82.50 a week to its top executive in 1995, resigned. The reason for his resignation was not accounting fraud or questionable management decisions that had occurred in the last a couple of years in the corporate America. Grasso was forced to resign simply because pension fund leaders, exchange seat holders and traders have been outraged by his $140 million pay package (Morgenson and Thomas Jr., 2003). This sends a signal to the corporate world that someone who is said to have been applauded for his management of exchange, including his strong leadership can be fired because of being paid too much.

The question is that how much is too much? CEOs’ compensation has long been considered as one of the integral parts of corporate governance, with the relationship among stakeholders that is used to determine a company’s direction of growth and development and controls its performance (Hitt, Ireland, and Hoskisson, 2001). Executive compensation is one of the four internal governance mechanisms (along with ownership concentration, the board of directors, and multidivisional structure) that modern corporations use to assure consistency among the interests of the parties involved in the agency relationship. High salaries, bonuses and stock options are examples of how this mechanism is used to align the interests of the owners and managers in the short and long terms, respectively. Ultimately, shareholders and the board of directors would have to justify their decision to compensate these corporate visionaries. “The link between performance and reward is the primary tenet of U.S. compensation systems and the justification corporations give for granting large increases in CEO pay” (Miller, 1995). With such extensive compensation packages, CEO’s often enjoy opulence that others can only dream about.
So how are the effects of these multi-million dollar packages on corporate performance? How strong is the correlation between the CEOs’ compensation and corporate performance? The purpose of this paper is to look at the issue of corporate governance in the banking industry. That is, how do banks use compensations for their top-level managers, i.e., CEOs to align the interests of the managers and the stakeholders? Data will be collected from published financial statements of publicly-traded banks in the United States to perform various hypothesis tests. These tests include: Pearson Product Moment Correlation Coefficients between CEOs’ pay and a set of selected financial ratios and the nonparametric alternative test—the Spearman Rank Correlation Coefficients.

In this study, we define CEO compensation as salary and bonuses only. Deferred compensation benefits including stock options, pensions, and profit sharing plans as well as other types of executive compensation are not included in this study. The exclusion of these compensations is due primarily to the fact that the fair market value of these items is difficult to measure.

A research was conducted to examine the role of managerial discretion in the determination of CEO levels of pay (Finkelstein and Boyd, 1998). Managerial discretion refers to the range of options top managers have in making strategic choices. It defines the role that CEOs play in controlling an organization’s form and fate. In this study, a model was developed to test the hypothesis that discretion might be theoretically important to organization and to strategy scholars regarding key interests of an organization. Among the organizational interests discussed in this article were executive profiles, compensation, turnover, strategic persistence, and performance. The authors further extended the study to find that firm performance was higher when there had been a greater degree of fit between CEO compensation and firm context.

The model used by Hambrick and Finkelstein was designed to provide a representative range of executive compensation practices in large U.S. firms. Thus, all firms in the 1987 Fortune 1000 were included in the initial pool, while 600 randomly selected firms with all of the Standard Industrial Classification Codes made up the final cross-sectional sample. CEOs’ pay was total cash compensation and deferred income collected from proxy statements, and was measured by the Black-Scholes and Lambert models. In addition, the three variables of control were prior firm performance, firm size and CEO factors (i.e., tenure and percentage of outstanding shares owned by a CEO). The study focused solely on dimensions of the task environment in the determination of CEO compensation. Current performance and executive tenure were positively related to strategic persistence and consistency with industry norms in high - discretion contexts but not in low - discretion contexts. Further, team size, CEO dominance and strategic leadership were all significantly associated with firm performance in those environments where managerial discretion was high. To summarize these findings, CEO compensation was positively correlated to high-discretion contexts.

Finkelstein and Boyd then explained these correlations based on several variables derived from other studies, including accounting and finance on the investment opportunity set. Marginal product is defined as the relative increment in profit attributable to a specific CEO. Because CEOs will have greater potential impact on a firm in greater discretion environments, his or her potential impact on the marginal product will, in turn, be greater. Secondly, if an environment is accompanied by a higher level of managerial discretion, industry norms are not commonly used in setting strategic direction. Consequently, higher discretion environments entail greater risk for CEOs in setting strategic decisions. Higher compensation is the reward for bearing this greater risk.

Expanding upon these studies, the authors compared more than 1,000 regulated vs. unregulated firms between 1970 and 1990 to find that CEOs were paid more in unregulated firms. The higher pay was justified by the added uncertainty of outcome in the deregulated environment. In addition, they performed tests on different levels of investment opportunities and its effects on CEO compensation. The ability of CEOs to “effectively manage investment opportunities was inversely related to the magnitude of those opportunities.” Thus, firms with multiple investment opportunities created added risk for managers. CEOs in the firms with greater investment opportunities should, according to their study, earn substantially more
than in those with less significant investment opportunities.

To broaden the argument beyond investment opportunities and regulation, Hambrick and Finkelstein also include a discussion of the effects of discretion on CEO compensation in four additional cases. The first case discussed is product differentiability, which is measured by R&D and advertising intensity, and is the amount of variation in the number of products a firm makes. A firm with more product differentiation accounts for a wider discretionary set. Maintaining a wide variety of products in a given firm may account for more difficulty in identifying “means-ends” linkages among the products. These CEOs must also be able to explore a wider range of competitor behavior. Combined, these factors will create more complex CEO jobs, and higher compensation should result from their broader knowledge base. The next case analyzed was demand instability, and its effect on CEO compensation. An environment’s demand instability can range from “predictable and stable” to “changing and uncertain.” Higher demand instability causes new crises and opportunities within these types of environments. As a result, CEOs must constantly modify strategies to adapt to increase information-processing demands, and the complexity of their job must be compensated with a higher salary. The last two cases studied are industry structure and capital intensity in an organization. The relationship between industry structure and CEO compensation could not be clearly predetermined on the basis that discretion could be either high or low in more concentrated industries. Lastly, capital-intensive industries limit options under consideration and reduce uncertainty of outcomes due to rigidity in the organization. Hence, compensation and capital intensity are negatively correlated.

The authors give reasons for the importance of studying CEO compensation, and emphasize need for future research on this topic. Compensation is a highly significant incentive in an organization, and will have influence on managerial strategies. Decisions made by CEOs that result from compensation patterns includes the nature of resource allocations in a firm, intensity of board monitoring, and stakeholder perceptions a firm’s structure. “Managerial quality could be defined in part as the ability to perceive, create, and enact discretion.” For future research, managerial discretion may play a significant role in corporate governance than previously accredited.

Tamara Loomis, in his article entitled, “Shareholder Activism Seen in Proxy Proposals,” discussed the issues of corporate governance through various mechanisms available to shareholders. Due to the recent corporate scandals, investors are taking action through the proxy proposal. There are three main issues included in the proxy proposal: 1) executive compensation, 2) splitting the offices of CEO and Chairman, and 3) getting offshore companies to reincorporate in the United States. Investors believe that executive pay packages have to mirror the company’s portfolio statements. This stockholder activism can be done faster and more efficiently through technology, which provide stockholders opportunities to cast their votes online. Many companies have already taken an active approach to stockholder activism. A few examples of how successful stockholder activism in public traded companies affected CEO compensation are:

- To limit executive severance packages at Verizon Communications, Inc., Sprint Corp. and GlaxoSmithKline Plc.
- To expense stock options at Apple Computer Inc., Eastman Kodak Co. and J.C. Penney Co. Inc.
- To hold annual elections of boards of directors at Avon Co. Inc., the Boeing Co. and Weyerhaeuser Co.
- To oppose the anti-takeover provisions known as poison pills at Yahoo Inc., Delphi Corp. and Southwest Airlines Co.

However, stockholder activism is limited as shareholder resolutions are not binding. Meaning that companies do not have a legal obligation to obey the shareholder resolutions and only need to take the resolutions into the consideration. This legal rule is created in order to protect corporations from hostile takeovers and to allow them to reject any unwanted proposals for corporate governance reform. In conclusion, although the shareholder resolutions are non-binding, shareholder activism is a unique resource to apply pressures on board of directors and CEOs of companies to re-adjust their corporate governance regulations.
A research article entitled, “Business Ethics in The Current Environment of Fraud and Corruption,” by Carroll, Archie B. and Scherer, Robert W, raises two important questions regarding the recent corporate scandals and ethics in business: 1) “what went wrong and who’s to blame?” and 2) “what should be done about the current climate of fraud, deception and scandal in business?”

The first question raised by the authors is “what went wrong and who’s to blame?” The first answer, according to the article, is because of greed and dishonesty that many senior executives have who also have the power to control decisions and the knowledge of what was happening in their companies. The public agrees that senior executives should bear the primary responsibility of corporate scandals. Secondly, because of the greed and dishonesty of many auditors and accountants who participate in the scandals, those auditors and accountants should also be held liable for corporate misgivings. The public expects that auditors and accountants to act responsibly as ethical agents for society and perform the duty of checks and balances. The third answer is because of the failure of government regulators and agencies to enforce the existing laws and to prosecute the wrongdoers. The government regulators and agencies should be more aggressive to prevent the scheming of executives and the accountants who try to hide their crimes. The fourth answer is the board of directors themselves, who do not provide any compliance and ethical leaderships for their companies. The mistakes made by board of directors are that they allow CEOs to hold the chairman position, which offers excessive CEO compensation. As a result, the independence of the board of directors diminishes and the many are unable to govern their corporations properly. Finally, the lack of proper education in business ethics for business leaders is the fourth theory why and who is to blame for the rise in corporate scandal and dishonesty, according to the authors. Most business colleges and universities do not require students to take a business ethics course for their curriculum. The authors commented that “although the business ethics professors had done decent jobs on teaching ethics for students who took the class, one course was just a drop in the bucket when you considered the process of moral maturity.”

The second question raised by the authors is “what should be done about the current climate of fraud, deception and scandal in business?” First, the government should interfere and attempt to control the illegal and unethical behavior of corporations and executives by enacting tougher government regulations. Congress passed the Sarbanes-Oxley Act in the summer of 2002. This new law includes the following mandates: 1) increased accounting regulation with an oversight board; 2) prohibits auditors from offering consulting services to audit-clients; 3) provides for new criminal penalties for securities fraud including jail sentences; and 4) requires CEOs and CFOs to certify financial reports and to forfeit profits and bonuses when earnings are restated due to securities. Secondly, business schools should mandate their business students to take the ethics course or companies should mandate that whoever wants to hold management position, must take business ethics courses.

The authors believe that business ethics are personal ethics. Individuals with strong personal ethics can be effective and honest leaders and therefore better guide the company. As the result, fraud, deception and scandal in business can be reduced or prevented. Therefore, business ethics must be improved in order for corporations and their respective leadership to be compliant and honest in order to regain the trust from shareholders.

DATA AND MODELS

So how does this relate to corporate governance in the banking industry and how close is the relationship between CEO compensation and financial performance? The purpose of this study is to examine the correlation between CEO compensation and the five common measures of financial performance: ROE, ROA, Beta, PE, and PM. To do so, two groups of banks were selected to estimate the correlation coefficients: first, thirty banks were chosen by sampling the largest regional banks across the United States with significant financial holdings and performance data. Second, thirty largest national commercial banks were chosen for the same criterion. Specifically, data on financial performance were gathered by utilizing Yahoo Finance and company proxy statements were used to determine CEO base salaries. For the 30 largest national banks, data were collected from the Federal Reserve
Board of Governors website and the banks were selected and ranked by assets size as of March 31, 2003. Again, data on financial performance were compiled from SEC proxy statements for the selected financial institutions.

Descriptive Measures of Correlation
The relationship between the selected banks financial performance and their CEOs' compensations, which serve as an indicator of “corporate governance,” was investigated using the Pearson Product-Moment Correlation coefficients as well as Spearman's Rank Correlation coefficients. The Pearson Product Moment Correlation coefficient, $R_{xy}$, is defined as follows:

$$R_{xy} = \frac{S_{xy}}{(S_x S_y)}$$

or

$$R_{xy} = \frac{1}{n} \left[ \frac{S(X_iY_i) - (SX)(SY)}{(SX^2 / n) - (S^2)(SY^2 / n)} \right]$$

where $S_{xy}$ = sample covariance $S_x$ = sample standard deviation of $x$ $S_y$ = sample standard deviation of $y$ $X_i$ = the $i$th observation of $x$ $Y_i$ = the $i$th observation of $y$

The Spearman rank-correlation coefficient, $R_{xy}$, is as follows

$$R_{xy} = 1 - \frac{6 \sum d_i^2}{n(n^2 - 1)}$$

where $n$ = the number of items or individuals being ranked $X_i$ = the number of item $i$ with respect to one variable $Y_i$ = the rank of item $i$ with respect to a second variable $d_i = X_i - Y_i$

These two statistical methods were performed on five sets of data: CEOs' pay vs. ROE, ROA, Beta, PE, and PM. The results were reported in Table 1.

### TABLE 1
The Results of the Pearson Product Moment Correlation Coefficient and Spearman Rank-Correlation Coefficient: Regional Commercial Banks

<table>
<thead>
<tr>
<th></th>
<th>Pearson Product-Moment Correlation Coefficient</th>
<th>Spearman’s Rank Correlation Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pay vs. ROA</td>
<td>-0.130</td>
<td>0.108</td>
</tr>
<tr>
<td>Pay vs. ROE</td>
<td>0.129</td>
<td>0.328</td>
</tr>
<tr>
<td>Pay vs. PM</td>
<td>0.205</td>
<td>0.315</td>
</tr>
<tr>
<td>Pay vs. Beta</td>
<td>0.099</td>
<td>0.171</td>
</tr>
<tr>
<td>Pay vs. PE</td>
<td>-0.085</td>
<td>0.095</td>
</tr>
</tbody>
</table>

As shown in Table 1, the correlation coefficients for CEOs’ pay vs. ROE, ROA, Beta, PE, and PM generated by both methods are mixed: while most coefficients are positive, indicating a direct relationship between the CEOs’ pay and financial performance of the selected commercial banks, two of them are negative: ROA and PE ration, both under the Pearson Product-Moment Correlation Coefficient method. However, none of the coefficients has magnitudes large enough to indicate a strong relationship.
TABLE 2
The Results of the Pearson Product Moment Correlation Coefficient and Spearman Rank-Correlation Coefficient:
Largest Commercial Banks

<table>
<thead>
<tr>
<th></th>
<th>Pearson Product-Moment Correlation Coefficient</th>
<th>Spearman’s Rank Correlation Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pay vs. ROA</td>
<td>0.651</td>
<td>0.220</td>
</tr>
<tr>
<td>Pay vs. ROE</td>
<td>0.274</td>
<td>0.148</td>
</tr>
<tr>
<td>Pay vs. PM</td>
<td>0.346</td>
<td>0.105</td>
</tr>
<tr>
<td>Pay vs. Beta</td>
<td>0.257</td>
<td>0.189</td>
</tr>
<tr>
<td>Pay vs. PE</td>
<td>0.130</td>
<td>0.162</td>
</tr>
<tr>
<td>Pay vs. TA</td>
<td>0.158</td>
<td>0.730</td>
</tr>
</tbody>
</table>

As shown in Table 2, the correlation coefficients for CEOs’ pay vs. ROE, ROA, Beta, PE, and PM generated by both methods are positive, indicating a direct relationship between the CEOs’ pay and financial performance of the selected largest commercial banks. Some of the coefficients have magnitudes large enough to indicate a strong relationship.

Hypothesis Test
The hypotheses can be formulated as follows:

Ho: $P_s = 0$
Ha: $P_s \neq 0$

The null hypothesis, Ho, states that there is no rank correlation ($P_s = 0$) between the CEOs’ pay and the financial performance of the selected banks measured by the five financial ratios, whereas the alternative hypothesis, Ha, says that there is a rank correlation between the two, ($P_s \neq 0$). Under the hypothesis of no rank correlation ($P_s = 0$), the rankings are independent, and the sampling distribution of $P_s$ is as follows:

$U_{xy} = 0$
$T_{xy} = \sqrt{V/1-n} - 1$

Where $n=10$, for normal distribution.

TABLE 3
The Testing Results

<table>
<thead>
<tr>
<th></th>
<th>Pearson Product-Moment Correlation Coefficient</th>
<th>Spearman’s Rank Correlation Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>National</td>
<td>Regional</td>
</tr>
<tr>
<td>$a = 0.01$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>? for Pay vs. ROA</td>
<td>0.000</td>
<td>0.501</td>
</tr>
<tr>
<td>? for Pay vs. ROE</td>
<td>0.143</td>
<td>0.504</td>
</tr>
<tr>
<td>? for Pay vs. PM</td>
<td>0.061</td>
<td>0.287</td>
</tr>
<tr>
<td>? for Pay vs. Beta</td>
<td>0.170</td>
<td>0.611</td>
</tr>
<tr>
<td>? for Pay vs. PE</td>
<td>0.947</td>
<td>0.661</td>
</tr>
</tbody>
</table>
At a 1% level of significance, the null hypothesis of no correlation must be rejected if $Z< -1.96$ or if $Z> 1.96$, or if $\rho < a$. The empirical results of the tests, using SPSS, indicate that there is no significant positive correlation between CEOs’ Pay and financial performance of the corresponding banks (both national and regional) using Spearman Rank Correlation method. That is, all correlations are statistically insignificant. The testing results (statistics) are reported in Table 3. This means that neither ratio is strongly related to the CEOs’ compensation.

CONCLUSION

There is no doubt that many Americans know the salaries of chief executive officers (CEO), athletes and entertainers are astronomically high while wages for the common working person increase only marginally. The problem that excessive executive pay is concerned by the general public is not because of the disparity between the CEO’s pay and a pay to an ordinary worker. What people are concerned about is whether the CEO’s contribution is worth the compensation. Apparently, the answer is no in the recent turmoil at the NYSE, where Grasso was forced to resign over furor of his $140 million a year compensation. Even in the time of cost cutting, downsizing, and performance based competition, CEOs still get away with an increasing and undeserved slice of the corporate pie. Thus, this research paper has studied the correlation between CEO compensation and performance of commercial banks, both national and regional. Using correlation coefficients, the test results have shown that there is at best a weak overall correlation between executive compensation and the financial performance of the banks.

The first limitation is the timeframe for the study. The empirical findings could differ if the study consisted of a long time period. The second limitation is from the use of the financial variables. The use of financial ratios “can be criticized as it may not reflect a firm’s true underlying value of performance because executives can manipulate indicators to make financial results look good” (Joyce, 2001). Therefore, financial performance of a company can be quite biased. The third limitation is that CEO’s compensation was defined as just salaries and bonuses. This excludes stock options, profit sharing, and retirement plans, classified as deferred compensation. If stock options and retirement plans had been included, the study results could have been quite different.

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VENTURE CAPITAL: Prophesying and Managing Risk for Profit

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ABSTRACT

Venture capitalists have been called vulture capitalists—e.g. hard individuals, known for “...taking what they did not put in, and reaping what they did not sow.” And yet, their involvement is greatly valued. Among other things, creditors, investors, and follow-up venture capitalists often link their decision to invest in a venture on what is signalled by the venture capitalist’s decision to mentor.

Risk is the main focus of venture capitalists—they select from hundreds of risky high-potential ventures, a mere handful that they can help. This paper argues that, despite their reputation to the contrary, venture capitalists do not make ventures successful or even more successful—they add value by reducing the risk of failure, in the ventures they mentor, to a level that creditors and investors consider acceptable. Thus, an ability to promote a winner and make it more of a winner is of some value, but it is neither necessary nor sufficient for the venture-capital process.

The effect of the venture-risk profile on the venture capital process is examined. Desirable attributes in venture-capitalist and their appropriate asset structure are posited—along with strategies, return possibilities, and risk-to-return allocations. This paper concludes by noting “...venture-capitalists create value by reducing the risk of failure—not by creating winners.”

Key Words: Venture Capital, Risk, Return, Risk Management, Value Added, Leverage, Skewed Distribution.
1.0 INTRODUCTION
There are a number of excellent descriptive articles on what venture capitalists do (Caravalho, 1996; Frear and Wetzel, 1990; Gorman and Sahlman, 1989; Brophy and Verga, 1988) and there is some discussion on how venture capitalists do what they do (Amit, et al, 1998), but little effort appears to have been directed at explaining and linking the why, how, and what of venture capital. This paper postulates a theory of venture capital that links the observed behaviour of venture capitalists to a means of earning substantial returns from selecting a portfolio of venture, managing the risk of those ventures, and leveraging their earnings by involving other investors and creditors.

Venture capital has been described as “brave and patient money” (Bygrave and Timmons, 1992). This paper argues that venture capitalists are neither: “fools rushing in where angels fear to tread” nor are they particularly brave or patient. Venture capitalists are proficient business people using reliable risk-management techniques to select and convert a high-enough percentage of perceived “dross-investments” into gold to cover their costs and provide a rich return.

Fisher (p.223, 1906) asserts “...the value of any capital-good, either of wealth or property rights, assuming that all future income is foreknown, is the discounted value of that income.” In the real world, there is almost always a distribution of expected NPVs (net present values) and the fair risk-neutral price of a venture is the arithmetic mean average of the distribution of its expected NPVs.

This paper examines the effect on a venture's market value (i.e. assumed to be the mean expected NPV) if the application of risk management techniques trims the lower third from its distribution of expected NPVs. Also, the paper considers the effect on the potential venture capital gains of three basic distribution shapes (i.e. normal, skewed left, and skewed right). The initial analysis reviews the pure venture-capitalist effect by assuming that s/he buys the venture and becomes the entrepreneur—common ways venture capitalists leverage their time and returns are covered later.

1.1 Venture Capitalists Earn Superior Returns
The venture-capital process is more than mere speculation (any investor seeks to buy low and sell high) and while venture promotion may have pride of place, it is neither necessary nor sufficient for the venture-capital process. In efficient markets, the fair risk-neutral-market-price of a venture equals its expected NPV (usually the mean of the distribution of expected NPVs) and an investor paying that price expects to earn only a normal return on their investment.

This paper asserts that venture capitalists differ from most investors in that they add value to their investment portfolio via the use of risk management techniques (MacMillan, et al., 1985; Ruhunka and Young, 1991; Driscoll, 1974) to favourably alter the distribution of risk—so as to increase the mean expected NPV of the investment.

The value a venture capitalist helps create is measured by the difference between the venture's exit-point value (i.e. when s/he ceased to mentor it) and the entry-point market value (i.e. when s/he started to mentor it). However, because the exit price often occurs six or more years after the entry price, the two sums are not comparable until the exit price is adjusted to reflect the time-value-of-money (e.g. $1.00 today is more valued than $1.00 six years from today) and any inflation effects (assumed to be nil, for this paper). Thus, the gross gain in the venture during the mentoring should be attributed into the notional gains of:

- A pure capital gain on the increased value of the venture—the exit price (adjusted for the time value of money to the entry time) less the entry price.
- A normal return on the entry price.
- A normal return on the pure capital gain—the nature of this gain (normal return or capital gain) is contentious and needs to be considered in detail in future research.

Venture capitalists are more than speculators—they profit by adding value, in the form of reduced risk and increased survival of the firms they nurture. Understanding the behaviour of venture capitalists is best done by examining first the distribution of venture expected NPVs, then by examining how venture capitalists enhance that distribution, and finally considering how venture capitalists leverage their returns.

1.2 Venture Risk and the Cost of Its Reduction
Definitions of risk usually focus on the total distribution (i.e. the standard deviation) of the expected range of IRR (internal rates of return), or net present values (NPV), or some other measure of return or value (Brealey, et al., pp.280-284 and p.305, 2003; Francis and Ibbotson, p.26, 2002). As shown in the next two sections, venture capitalists have good reason to want to mentor ventures that exhibit strong-right-skewed,
expected-NPV distributions. Asymmetry makes it inappropriate to use standard deviation as a risk proxy. This paper refines the definition of risk to be the distribution of the expected NPVs to the downside (i.e. left) of the mean expected NPV—the upside distribution reflects opportunity rather than risk.

As with any economic activity, risk reduction (i.e. reducing the downside potential) likely works first on the most cost-effective activities and moves progressively through less cost-effective actions until the marginal cost of risk reduction equals its marginal benefit. Rather than develop a complex side-model for risk reduction, this paper develops a logical simplifying assumption. Risk reduction can range from nil to total—given how risk is defined above, the risk reduction range translates to eliminating a range of the expected NPVs of the venture from nil to all of the lower 50 percent of that distribution.

Given that the marginal cost of risk reduction likely rises exponentially as risk is reduced, ridding a venture of all risk (i.e. eliminating the entire downside) is likely infinitely costly. Thus, reduction of the entire nil to half of all risk (i.e. nil to the lower 25 percent of the distribution of expected NPVs) is highly likely and that further elimination of risk becomes progressively less likely as elimination of all risk is approached. A cut-off point must be selected, that point likely varies with the venture, and venture capitalists likely select ventures where risk reduction is easy and cost-effective.

This paper assumes for simplicity that two thirds of the total risk (i.e. the lower one third of the total distribution of NPVs) is eliminated by risk reduction and that one third of the total risk remains. The average level of risk reduction that venture capitalists actually perform on the ventures they mentor is a matter for future empirical research and likely varies from venture to venture.

2.0 DISTRIBUTION OF EXPECTED NPVs
The effect of NPV distribution on venture capital profits was examined using Standard Beta distributions with probability density functions (PDF) of $P(x)$ to mimic normal and skewed distributions of expected NPVs. Beta distributions are used because, per Figure 1, they provide the appropriate shapes and symmetry and their domain is limited (i.e. $0 < x < 1$) in such a way as to provide good control for the analysis.
The following formulas are adapted from von Seggern (pp.248 and 206, 1993) and NIST (2003).

Standard Beta distribution with the PDF defined (subject to: $0 = x = 1; a,b > 0$) as:

$$B(a,b) = \frac{x^{a-1}(1-x)^{b-1}}{B(a,b)}$$  \hspace{1cm} (1)

$x =$ value index; $0 = x = 1.00$

$B(a,b) =$ Beta function

$a,b =$ distribution shape-setting parameters

$$B(a,b) = \int_{0}^{1} n^{a-1}(1-n)^{b-1} dn$$ \hspace{1cm} (2)

$n =$ index value array; $0 = n = 1.00$

$I(a,b) = \int_{0}^{q} q^{a-1}(1-q)^{b-1} dq$ \hspace{1cm} (3)

$q =$ array of index values $0 = q = x$

The cumulative Standard Beta distribution (also called the Incomplete Beta function ratio—NIST, 2003) is defined by replacing the numerator in eqn (1) with the right hand side (RHS) of eqn (3):

$$I(x,a,b) = \int_{0}^{x} P(n)dn = \left\{ \int_{0}^{x} n^{a-1}(1-n)^{b-1} dn \right\}/B(a,b)$$ \hspace{1cm} (4)

The Figure 1 distributions, discussed in subsequent subsections, are formed by using suitable values for parameters “$a$” and “$b$” and substituting the RHS of eqn (2) into (1). The $x$ values at the cumulative distributions (i.e. $S \cdot P(x)$) of the boundary of the lower third, the mean, and the adjusted mean are estimated (to the nearest 0.0001) by substituting the RHS of eqn (3) into eqn (4) for an array of $x$ values.

### 2.1 Normal-Shaped Beta Distribution of $P(X)$

A venture that is normal in every sense of the word produces a normal distribution of expected NPVs. A normal-shaped Beta-curve is generated by setting parameters “$a$” and “$b$” to (respectively) 3.00 and 3.00 so that eqns (1), (2), (3), and (4) simplify to:

$$B(3,3) = \frac{1^3}{3} - \frac{1^2}{2} + \frac{1^1}{5} = \frac{1}{30}$$ \hspace{1cm} (2a)

$$I(3,3) = x^3 - x^2 + x^1/5$$ \hspace{1cm} (3a)

$$P(x) = 30x^2(1-x)^2$$ \hspace{1cm} (1a)

$$\int_{0}^{x} P(n)dn = 30(x^3 - x^2 + x^1/5)$$ \hspace{1cm} (4a)

Equation (1a) is used to draw the normal-shaped Beta curve in Figures 1 and 2. Equation (4a), using increments of 0.0001$x$, is used to identify the arithmetic mean of the unadjusted density curve, the boundary of the lower third of the density curve, and the new mean after the lower third had been eliminated. The discrete approximations from eqn (4a) are not exact. However, their precision is consistent with the quality of real-world data and they are sufficient to provide sensible estimates of the values for the analysis in this paper.

**Figure 2:** Effect on a Venture’s Market Value of Eliminating the Lower One Third of the Normal Distribution of Its Expected NPVs
The values in Figure 2 provide a means to estimate the gross benefit accruing to a venture capitalist from eliminating the lower third of the distribution of expected NPVs in that venture. Specifically, a venture capitalist could buy the unadjusted venture for 0.5000 and sell the risk adjusted venture for 0.5909. Assuming the venture is held for six years, and a normal annual return is eight percent, the venture capitalist earns:

A Gross Exit Price of \((0.5909 \times 1.08^6)\) = 0.9377
Less: The Entrance Price of = 0.5000
Gross Gain of = 0.4377
IRR on 0.5000 = 11.05 %

This gross gain can be notionally separated into:

A Pure Capital Gain \((0.5909 - 0.5000)\) = 0.0909
A Normal Return on the:
• Initial Investment \((0.5000(1.08^6 - 1.0))\) = 0.2934
• Capital Gain \((0.5909-0.5000)(1.08^6-1.0))\) = 0.0534
Gross Gain of = 0.4377

The gross gain is an internal rate of return (IRR) of 11.05 % ((0.9377/0.5000)^{1/6} - 1) or 3.05 percentage points above an 8.00 % normal return. However, the costs of implementing a risk-management program significantly reduce the IRR—that is, they are deducted from the numerator (i.e. the net income). Venture capitalists have, historically, charged 2.0-3.0 percent to manage venture capital funds (Joseph, et al., 2001) and it is reasonable to assume that the cost of their management efforts is closely related. Thus, venture capitalists are unlikely to be excited by the net premium from ventures exhibiting a normal distribution of expected NPVs.

2.2 Left-Skew-Shaped Beta Distribution
A venture that has a small risk of large reductions in NPV exhibits a distribution of expected NPVs that is skewed to the left. A left-skew-shaped Beta-curve is generated by setting parameters “a” and “b” to (respectively) 3.00 and 2.00 so that eqns (1), (2), (3), and (4) simplify to:

\[ B(3,2) = \frac{1^3}{3} - \frac{1^4}{4} = \frac{1}{12} \]  
\[ I(3,2) = x^3/3 - .25x^4 \]  
\[ P(x) = x^212(1-x) \]  
\[ \int_0^x P(n)dn = 12(x^3/3 - .25x^4) \]

Figure 3: Effect on a Venture’s Market Value of Eliminating the Lower Third of the Left-Skewed Distribution of Its Expected NPVs
The values in Figure 3 provide a means to estimate the gross gain accruing to a venture capitalist from eliminating the lower third of the expected NPVs in that venture. Specifically, a venture capitalist could buy the unadjusted venture for 0.6143 and sell the risk adjusted venture for 0.7085.

Assuming the venture is held for six years, and a normal annual return is eight percent, the venture capitalist earns:

A Gross Exit Price of \((0.7085 \times 1.08^6)\) = 1.1243
Less: The Entrance Price of = 0.6143
Gross Gain of = 0.5100
IRR on 0.6143 = 10.60 %

This gross gain can be notionally separated into:
A Pure Capital Gain \((0.7085 - 0.6143)\) = 0.0942
A Normal Return on the:
• Initial Investment \((0.6143[1.08^6 - 1.00])\) = 0.3605
• Capital Gain \(((0.7085 - 0.6143)(1.08^6 - 1.00))\) = 0.0553
Gross Gain of = 0.5100

The gross gain is a 10.60 % \(((1.1243/0.6143)^{1/6} - 1)\) gross IRR, or 2.60 percentage points above the 8.00 % normal return. This return is significantly lower than that of the venture with a normal distribution of expected NPVs—as in the previous case, the costs of the risk-management program significantly reduces this return because those costs are deducted from the numerator. Thus, venture capitalists are even less likely to show interest in a venture with a left-skewed distribution of expected NPVs than they will in one with a normal distribution.

2.3 Right-Skew-Shaped Beta Distribution
A venture that has a high risk of large reductions in NPV and a small chance of large increases in NPV exhibits a distribution of expected NPVs that is skewed to the right. A right-skew-shaped Beta-curve is generated by setting parameters “a” and “b” to (respectively) 2.00 and 3.00 so that eqns (1), (2), (3), and (4) simplify to:
\[ B(2,3) = \frac{1}{12} \]
\[ I(2,3) = 0.50x^2 - \frac{2x^3}{3} + 0.25x^4 \]
\[ P(x) = 12x(1-x)^2 \]
\[ \int_0^x P(n)dn = 12(0.50x^2 - \frac{2x^3}{3} + 0.25x^4) \]

Figure 4: Effect on a Venture’s Market Value of Eliminating the Lower Third of the Right-Skewed Distribution of Its Expected NPVs
The values in Figure 4 provide a means to estimate the gross benefit accruing to a venture capitalist from eliminating the lower third of the distribution of expected NPVs in that venture. Specifically, a venture capitalist could buy the unadjusted venture for 0.3857 and sell the risk adjusted venture for 0.4863. Assuming the venture is held for six years, and a normal annual return is eight percent, the venture capitalist earns:

A Gross Exit Price of \((0.4863 \times 1.08^6)\) = 0.7717
Less: The Entrance Price of = 0.3857
Gross Gain of = 0.3860
IRR on 0.4863 = 12.25 %

This gross gain can be notionally separated into:
A Pure Capital Gain \((0.4863 - 0.3857)\) = 0.1006
A Normal Return on the:
• Initial Investment \((0.3857(1.08^6 - 1.00))\) = 0.2264
• Capital Gain \(((0.7717 - 0.4863)(1.08^6 - 1.00))\) = 0.0590
Gross Gain of = 0.3860

The gross gain is a 12.25 % \(((1.1243/0.6143)^{1/6} - 1)\) gross IRR, or 4.25 percentage points above the normal return of 8.00%. The costs of implementing the risk-management program reduce this return (the costs are deducted from the numerator) but the return on the venture supports a 3.00 % venture capital charge and still returns 1.25 %, above the normal return of 8.00 %. Thus, venture capitalists are likely to show more interest in ventures with a right-skewed distribution of expected NPVs than in ventures with normal or left-skewed distributions of expected NPVs.

2.4 A Big Return for Managing a Big Risk
The use of Beta distributions for illustrative purposes kept the venture risk moderate. The use of a lognormal distribution allows for almost infinite risk bounded only by the sensible requirement that the venture capitalist can only lose up the amount invested (i.e. \(x > -0\)).

The standard lognormal distribution is adapted from von Seegern (p.252, 1983), NIST (2003) and Holton (2003):
\[
P(x) = \frac{1}{\sqrt{2\pi}x} e^{-\frac{1}{2}(\ln(x) - \mu)^2/s^2}
\]
\[
\mu = \text{mean of the normal distribution} = 0.00
\]
\[
s = \text{standard deviation}
\]

Risk in a lognormal distribution varies inversely with the degree of kurtosis (i.e. the peakedness of the distribution—a flat distribution has a lot of variance/risk). The three expected NPV distributions illustrated in Figure 5 were generated using eqn (5) with \(\mu\) set at nil and \(s\) set at (respectively from highest to least Kurtosis) 0.20, 0.40, and 1.20.

Figure 5: Three Lognormal-Probability Densities of Venture NPVs
Visually, Figure 5 shows, in terms of potential gains from risk management, opportunity varies with the risk and the highest opportunity goes with the highest risk (flattest) distribution. Thus, high-risk ventures offer lucrative opportunities to profit from managing that risk. However, given their risk-management role and the rule of large numbers (the insurance effect), mentoring high risk ventures does not necessarily pass the risk on. Thus, being a venture capitalist and/or investing in venture capital funds does not have to be particularly risky.

A one-time, risk-averse investor would tend see the mode of the Figure 5 distributions (respectively, from highest to lowest Kurtosis, .96, .85, and .24) as being the best measure of central tendency and would set a price at that level. A risk-neutral institutional investor with a large portfolio of investments may be willing to bid the price up, closer to the arithmetic mean. Thus, the price of the investments will tend to settle between those values, depending on the makeup of the market.

Tables 1 and 2 examine the returns to the venture capitalist if the venture entrance price settles at (respectively) the arithmetic means and modes of the pre-adjustment distributions of expected NPVs.

Figure 6 and Tables 1 and 2 show that to make a reasonable return, venture capitalists have to work with high-risk ventures—low- and medium-risk ones just lack the capacity to provide a venture capitalist with a fair net return on his/her costs and effort. The next section looks at what skills and attributes a venture capitalist brings to the marketplace.

### Table 1: Returns Earned on the Three Distributions of Venture NPVs illustrated in Figure 5 if the Purchase Price is the Arithmetic Means of the Pre-adjustment Distributions

<table>
<thead>
<tr>
<th>DESCRIPTION OF RETURNS</th>
<th>LOW RISK</th>
<th>MEDIUM RISK</th>
<th>HIGH RISK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exit price at the time of Sale</td>
<td>1.7216</td>
<td>1.8773</td>
<td>2.6529</td>
</tr>
<tr>
<td>Return of original investment</td>
<td>0.9950</td>
<td>0.9950</td>
<td>0.9950</td>
</tr>
<tr>
<td>Gross gain (unadjusted for time value of money)</td>
<td>0.7266</td>
<td>0.8823</td>
<td>1.6579</td>
</tr>
<tr>
<td>Annual IRR over the 6 years of investment</td>
<td>9.57%</td>
<td>11.16%</td>
<td>17.76%</td>
</tr>
<tr>
<td>IRR less normal return and venture-capital charge</td>
<td>(1.43)%</td>
<td>0.16%</td>
<td>6.76%</td>
</tr>
<tr>
<td>Pure capital gain (PV adjusted exit price – entry price)</td>
<td>0.0899</td>
<td>0.1880</td>
<td>0.6768</td>
</tr>
<tr>
<td>Normal return (8.00 %) on original investment</td>
<td>0.5839</td>
<td>0.5839</td>
<td>0.5839</td>
</tr>
<tr>
<td>Normal return (8.00 %) on pure capital gain</td>
<td>0.0528</td>
<td>0.1104</td>
<td>0.3972</td>
</tr>
<tr>
<td>Gross gain (unadjusted for time value of money)</td>
<td>0.7266</td>
<td>0.8823</td>
<td>1.6579</td>
</tr>
</tbody>
</table>

### Table 2: Returns Earned on the Three Distributions of Venture NPVs illustrated in Figure 5 if the Purchase Price is the Modes of the Pre-adjustment Distributions

<table>
<thead>
<tr>
<th>DESCRIPTION OF RETURNS</th>
<th>LOW RISK</th>
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<tbody>
<tr>
<td>Exit price at the time of Sale</td>
<td>1.7216</td>
<td>1.8773</td>
<td>2.6529</td>
</tr>
<tr>
<td>Return of original investment</td>
<td>0.9600</td>
<td>0.8500</td>
<td>0.2400</td>
</tr>
<tr>
<td>Gross gain (unadjusted for time value of money)</td>
<td>0.7616</td>
<td>1.0273</td>
<td>2.4129</td>
</tr>
<tr>
<td>Annual IRR over the 6 years of investment</td>
<td>9.83 %</td>
<td>14.12 %</td>
<td>49.25 %</td>
</tr>
<tr>
<td>IRR less normal return and venture-capital charge</td>
<td>(0.67) %</td>
<td>3.12 %</td>
<td>38.25 %</td>
</tr>
<tr>
<td>Pure capital gain (PV adjusted exit price – entry price)</td>
<td>0.1249</td>
<td>0.3330</td>
<td>1.6718</td>
</tr>
<tr>
<td>Normal return (8.00 %) on original investment</td>
<td>0.5634</td>
<td>0.4988</td>
<td>0.1408</td>
</tr>
<tr>
<td>Normal return (8.00 %) on pure capital gain</td>
<td>0.1248</td>
<td>0.1955</td>
<td>0.0840</td>
</tr>
<tr>
<td>Gross gain (unadjusted for time value of money)</td>
<td>0.7266</td>
<td>1.0273</td>
<td>2.4129</td>
</tr>
</tbody>
</table>
3.0 VENTURE CAPITALIST SKILL SET

The previous sections discussed the attributes that make a venture worth a venture capitalist's time, this section lists and discuss what skills and resources venture capitalists need to work their magic on a venture—Four attributes help a venture capitalists function well:

- **Entrepreneur** - specializing in risk management,
- **Actuary/Monitor** - knowing the effect of numbers on risk and uncertainty and when to exit from a loosing venture,
- **Handicapper** - knowing what makes for a winner, in a given race.
- **Reputation as a great, infallible leader** - investors, creditors, and follow-up venture capitalists are pack animals forming into syndicates to follow proven leaders (Lerner, 1994). Like the wolf-pack leader Akela in The Jungle Book (Kipling, p.225, 1956), venture capitalists must constantly prove themselves worthy to lead.

While the first attribute differentiates venture capitalists from all other investors, it is the last that makes them successful. Thus, in the following review, the last attribute is made first, and so forth.

3.1 Reputation

In the same way that (as marketers often note) "restaurants sell the sizzle not the steak", a reputable venture capitalist can capitalize on his/her reputation of producing "a silk purse from a sows ear" to draw resources to their portfolio of firms at a lower cost than would otherwise be available (Rosenstein, et al. 1993).

Bankers, even commercial bankers, (Fried and Hirsch, 1994; Magginson and Weiss, 1991) are very conservative in their lending practises and tend to lend somewhat less than what they think is a safe and secure amount. In terms of the venture shown in Figure 6, bankers would lend, at most, 80
percent of the modal expected NPV (i.e. 0.1920 = (0.240)0.80). After a reputable venture capitalist agrees to mentor the venture the perceived risk shifts such so that the bank will consider loaning up to 80 percent of the new lower limit of expected NPVs (i.e. 0.4728 = (.591)0.80). In the case of the venture in Figure 6, the involvement of a reputable venture capitalist increases the access to credit from banks and other creditors by nearly 250 percent (e.g. 2.4625 = 0.4728/0.1920). Given that inadequate financing is a major cause of new firm failure, the mere involvement of a reputable venture capitalist can significantly reduce a firm’s risk of failure—even before the venture capitalist commits funds and other resources.

There is a similar, but stronger, effect with investors. A completely risk-neutral investor would be willing to invest in a venture up to its mean average expected NPV. In the venture in Figure 6, this investment would be up to 0.995. However, many investors tend to be risk averse because they are so small they cannot afford to diversify their portfolios sufficiently to use the rule of large numbers to benefit from central tendency. Involvement in a large investment pool may not offset this problem because of increased administration costs and moral-hazard issues. The reputation of the venture capitalist allows them to access this large pool of risk-averse investors at a relatively low cost. In terms of the venture in Figure 6, the access to investor capital is increased from the modal expected NPV to the adjusted arithmetic mean—roughly 697 percent (e.g. 6.9658 = 1.6718/.2400). Reputable venture capitalists could access those investor funds for only a few points (fractions of a percent) over the normal rate. However, by offering the outside investors up to 80 percent of the venture capital gains, a venture capitalist can persuade them to provide up 99 percent of the venture capital fund (Clark, 1987)—typically, such funds invest in a handful of ventures and are wrapped up (i.e. the assets sold and the creditors and the investors paid out) after five to seven years.

A reputation for picking winners is a prized asset among venture capitalists and contributes greatly to their ability to gain from amassing funds and other resources to commit to the firms in their portfolio of ventures. However, it is not the essence of the venture capital process.

### 3.2 Handicapper

A handicapper assesses the strengths and weaknesses of each participant in a field of contestants and, in so doing, provides a means to assess their expected performance. Good handicapping is an essential part of how venture capitalists develop the reputation (Nash, 1988; Maier and Walker, 1987) that (as discussed in the previous subsection) allows them to access funds and other inputs from creditors and investors. After a rigorous screening process of hundreds of possible projects, only few are selected (Hall and Hofer, 1993, Marriefield, 1987).

Those who are good at handicapping recognize that many of their rules of thumb work only as long as they are not widely known and applied. As a result, handicapping is not only an arcane art but those who are good at it have reason to be secretive. Thus, much of what is known of handicapping is more myth than science and/or is sadly dated. The Economist (p.5, 6 September, 2003) drew from Franklin (2003) to list some rules as examples of how winners are picked among the innovations in technology:

“Successful innovations had all or some of the following features: they were moderately new to the market, based on tried and tested technology, saved money, met customer needs and supported existing practises. [In contrast, failed products] were based on cutting-edge or untested technology, followed a me-too approach, or were created with no clearly defined solution in mind.”

<table>
<thead>
<tr>
<th>IDEA FACTOR</th>
<th>DESCRIPTION</th>
<th>SUCCESS/Failure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Need Spotting</td>
<td>Actively looking for an answer to a known problem.</td>
<td>2:1</td>
</tr>
<tr>
<td>Solution Spotting</td>
<td>Looking for a new way to apply existing technology.</td>
<td>7:1</td>
</tr>
<tr>
<td>Mental Inventions</td>
<td>Dreamed up with little or no reference to outside world.</td>
<td>1:3</td>
</tr>
<tr>
<td>Random Events</td>
<td>Spotting the value in a serendipitous event.</td>
<td>13:1</td>
</tr>
<tr>
<td>Market Research</td>
<td>Questionnaires – asking the market what it wants.</td>
<td>4:1</td>
</tr>
<tr>
<td>Trend Following</td>
<td>Forecasting where market is going and getting there first.</td>
<td>1:3</td>
</tr>
</tbody>
</table>

The actual processes used in handicapping are closely guarded secrets - e.g. the innovation-idea factors in Table 3 lost much of their handicapping utility when they became widely known. Thus, while
handicapping is well-known process, its secrets will tend to remain obscure.

Good handicapping is an important part of being profitable as a venture capitalist, but again it is important to note that it is not the essence of the venture capital process.

3.3 Actuary/Monitor – Many are called, but few are chosen

"While you can't win them all" (Chandler's Law—Rawson, pp.47-48, 1997), venture capitalists know that to maintain their access to funds they must win often enough and well enough to retain, or if possible enhance, their reputation of picking and mentoring winners.

The venture capitalists' need to maintain their reputation means that they must understand what makes a loser well enough to have few if any losers in their portfolio of firms—such firms must be weeded out early (the first loss, is the best loss) and in such a way that blame and loss falls mostly on strangers (especially newly-created strangers) and that those who continue entrusting wealth with the venture capitalist suffer little or no loss. Thus, monitoring, set ground rules, and understood consequences are an important part of the venture capital process.

Actuarial skills feed into handicapping and help the venture capitalist carefully pick a few ventures, from hundreds reviewed, to add lustre to his/her reputation, however, again it is not the essence of the venture capital process.

3.4 Entrepreneur

The essence of the venture-capital process is the skill to enter into a highly risky venture and to so manage its risk that more desirable outcomes become so much more likely than less desirable outcomes that the venture value increases in the eyes of actual and potential creditors and investors.

The two most common causes of venture failure involve shortfalls in financing and in the quality of management skills available to the venture. Thus, the venture-capital process involves managing a venture's financing and its management—direct ownership, in whole or in part, is not necessary. However, taking an ownership stake in the ventures it mentors is a signal to creditors and outside investors of commitment and sincerity.

Venture capital firms need to maintain the following inventories:
- A portfolio of ventures that need access to the following pools to succeed,
- Access to a pool of funds from creditors and investors,
- Access to a pool of management skills—to pinch-hit in ventures, and
- A pool of contacts—political, business, and consultant.

Ideally a venture capitalist minimizes the actual use of these inputs by a given venture—the idea is to reduce risk by having key resources available to ventures in the event of a crisis. While there will be an expected number of such crises, actual use of resources is costly, reduces the net return from mentoring the venture, and their excessive use is an indication of problems either with the selection of ventures in the venture portfolio or with the venture mentoring. Specifically, the venture-capital process is one of reducing the venture risk through cost-effective involvement.

In this model, venture capitalists triage the firms in their venture portfolio into:

- The Dead and Dying - good handicapping and mentoring minimizes the number of these firms to few or none and the few that do occur are disposed of quickly and quietly in a way that minimizes losses to those who continue to associate with the venture capitalist.
- The Living Dead and Successes – are a large portion of the portfolio (> 75 percent) and provide decent but unspectacular returns. A lot of effort is put into mentoring these firms, especially to prevent them from joining the ranks of the dead and dying.
- The Super Stars - most venture capitalists take credit for such successes. However, the appearance of a super star is more a matter of luck and good handicapping than skill in mentoring (i.e. good mentoring focuses more on preventing failure than fostering success).

4.0 THE VENTURE-CAPITAL STRATEGY

The venture-capital process produces a venture portfolio that will tend to contain a few big winners, some successes, no losers, and a lot of living dead. This distribution occurs because the venture-capital process reduces the risk of failure but usually does little to make a winner more of a winner. Further, the venture-capital process produces the highest returns if the venture capitalist chooses a selection of ventures from those with high-risk-lognormal distributions of expected NPV (e.g. per Figure 6).
Another way of looking at this is to say that the venture capital process, by careful selection and mentoring, converts ventures that were seen as having an unacceptable risk of failure into ventures that are seen as having some chance of being a spectacular success, a high risk of mediocre returns (i.e. living dead), a good chance of being successful, and little or no risk of failure. These ideas are illustrated in Figure 7, where the Zombie Zone (i.e. mediocre returns of a living-dead firm) is where ventures return less than mean expected NPV of the risk adjusted firm, the Success Zone is where ventures return more than the mean expected NPV but less than twice that amount, and the Zone of Great Success is where ventures return more than twice the mean expected NPV. In Figure 6, these zones represent 50.0, 26.4, and 23.6 percent for (respectively) the Zombie Zone, the Success Zone, and the Zone of Great Success. While the actual distributions will vary with how the zones are defined, the model predicts that the largest measure of a venture capitalist’s portfolio of ventures will be living-dead firms and the smallest measure will be the great successes—the more stringent that definition, the smaller will be the number of great successes (e.g. when great success is defined as more than 5.0 times the expected NPV then, in Figure 7, only 5.8 percent of the venture portfolio will be great successes and 44.2 percent will be successes).

Figure 7: Zones of Expected Selling-Value Outcomes for a Portfolio of High-Risk Ventures Mentored by a Venture Capitalist
As an interesting side note, excessive fiddling with ventures by a venture capitalist is unlikely to produce more great successes and is probably a sure sign of future trouble as resources are diverted from reducing the risk of firms in the Zombie Zone. Thus, while venture capitalists should be proud of their great successes, they make their money by assuring the investors and creditors that, for the ventures they mentor, the Zombie Zone is as bad as it gets.

5.0 MANY HAPPY RETURNS
Venture capitalists proudly display their history of great successes when seeking to sway a venture entrepreneur to become a client, and/or a consultant to join the pool of management resources, and/or creditors, outside investors and follow-up venture capitalists to provide funds. However, venture capitalists earn their living on the average performance of their venture portfolio.

The following example, assumes that the venture illustrated in Figures 6 and 7 is representative of the average venture. The following values and simplifying conditions were adapted and combined from Clark (1987), Joeseph, et al. (2001), and work developed previously in this paper.

1) The present value of the investment required to start up the average venture is the pre-adjusted mean NPV and the venture period is six years.

2) The pre-tax cost of credit is 10.0% resulting in a 6.0% after-tax cost of credit. However, 1/4 of the credit is in the form of interest-free payables (salaries payable, accounts payable, taxes payable, etc.) and this effect reduces the after-tax cost of credit from 6.0% to 4.5%.

3) Creditors will only loan 80.0% of the lowest perceived possible expected NPV (i.e. the lower 1/3 boundary of the pre-adjustment cumulative distribution of NPVs).

4) The venture capital fund provides 80.0% of the net funding of the portfolio venture (i.e. the amount in item (1) less the item (3) creditor amount) and receives 75.0% of the net gain in the portfolio venture (e.g. venture exit value less its entry value).

5) The venture entrepreneur provides the remaining 20.0% of the net funding of the portfolio venture plus management and receives 25.0% of the net gain in the portfolio venture.

6) The outside investors provide 99.0% of the venture capital fund and receive 80.0% of its net gain.

7) The lead venture capitalist (there are no follow-up venture capitalists) provides 1.0% of the venture capital fund and receives 20.0% of its net gain.

8) The ratio of venture capital fund invested in ventures varies depending on the fund’s age, but 50.0% is a reasonable average (Asian Venture Capital Journal, 2003). The remaining funds are held in short-term, low-risk investments at 8.0%.

9) Risk management costs are 3.0% of the capital fund—that amount is capitalized at 8.0% per annum until the venture is sold.

10) The credit costs and risk-management costs are paid before the portfolio venture gain is calculated and distributed.

In terms of the venture in Figures 6 and 7, the venture capitalist will use credit (cheapest source of funds) to its maximum of 0.4728. At the end of six years, a (0.4728(1.06^6)3/4 =) 0.5030 payment is made to Creditors.

The venture-capital fund invests (.80(.995-.4728)=) 0.4178 = (.99x.4178=) 0.4136 from the outside investors and .0042 from the venture capitalist. The risk-management costs at exit need a 0.1838 payment (=FV_{a}(.030(.4178)2,.08,6}) from the venture capital fund to cover the risk-management costs. The venture entrepreneur invests 0.1044 (.2x.995-.4728).

<table>
<thead>
<tr>
<th>Table 3: Venture Net Return after Year Six Disposal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross Gain of Venture (per Table 1)</td>
</tr>
<tr>
<td>Less: Creditor Share</td>
</tr>
<tr>
<td>Outside Investor Investment</td>
</tr>
<tr>
<td>Venture Capitalist Investment</td>
</tr>
<tr>
<td>Venture Entrepreneur Investment</td>
</tr>
<tr>
<td>Net Gain Distributed</td>
</tr>
<tr>
<td>Less: Venture Entrepreneur Share (25%)</td>
</tr>
<tr>
<td>Net Gain to Venture Fund</td>
</tr>
<tr>
<td>Plus: Other Income (8.0% x (.4136+.0042))</td>
</tr>
<tr>
<td>Less: Risk Management Costs</td>
</tr>
<tr>
<td>Total Gain to Venture Fund</td>
</tr>
<tr>
<td>Outside Investor Share (80%)</td>
</tr>
<tr>
<td>Venture Capitalist Share (20%)</td>
</tr>
<tr>
<td>$0.9214</td>
</tr>
</tbody>
</table>


Table 4: Pe-tax IRRs for the Venture and its Players

<table>
<thead>
<tr>
<th>Player</th>
<th>Calculation</th>
<th>IRR</th>
<th>Relative Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Venture</td>
<td>(([(.7371+.4136)/.4136/2] - 1)) = 16.24 %</td>
<td>n.a.</td>
<td></td>
</tr>
<tr>
<td>Normal Return</td>
<td>Given</td>
<td>8.00 %</td>
<td>Very Low</td>
</tr>
<tr>
<td>Creditors</td>
<td>Given</td>
<td>10.00 %</td>
<td>Very Low</td>
</tr>
<tr>
<td>Entrepreneur</td>
<td>(([(.3573+.1044)/.1044]^{1/k} - 1)) = 28.12 %</td>
<td>Very High</td>
<td>Moderate</td>
</tr>
<tr>
<td>Outside Investor</td>
<td>(([(.7371+.4136)/.4136/2] - 1)) = 11.20 %</td>
<td>Moderate</td>
<td>Low</td>
</tr>
<tr>
<td>Venture Capital</td>
<td>(([(.1843+.0042)/.0042/2]^{1/k} - 1)) = 68.56 %</td>
<td>Very Low</td>
<td></td>
</tr>
</tbody>
</table>

5.1 Risk and Return
Creditors are by nature risk averse, will not loan money into even moderately risky ventures, and often demand that loans be secured with real assets or personal guarantees. Credit is the lowest-cost source of funds because interest is deductible for tax purposes and some payables have no interest charge. As a result, the effective after-tax cost of credit is very low \((.10(1.00 - .40)3/4 = 4.5 \% )\).

As the number of ventures in a portfolio rises, the effect of the central limit theory rapidly reduces the average risk of the portfolio. However, the venture entrepreneur, unlike the venture capitalist and outside investors, is involved with only one venture and, therefore, experiences the highest risk.

The level of risk experienced by outside investors depends on the nature of their investment. In the preceding example, outside investors participated in a fund used to finance several ventures and the expected risk of such funds could easily be tailored by the venture capitalist to the risk/return needs of groups of outside investors. Only rarely would outside investors be exposed to the full risk of single venture investing—the venture capitalist has little to gain from encouraging such behavior.

The high return and low risk of venture capitalists occurs because: 1) they create and manage the opportunities for venture participants; 2) they are involved in multiple funds and receive even more benefit from the central-limit theorem; 3) however, they may suffer horrific and non-recoverable consequences from a run of bad luck.

6.0 CONCLUSIONS
Venture capitalists are new-venture midwives. In its purest form, venture capitalists reduce the risk of a new venture by providing access to key resources (financing, management skills, experience, lawyers, contacts, etc.), monitoring progress toward pre-set goals with understood sub-lethal consequences for failure, and providing timely feedback.

Venture capitalists leverage their time by focusing only on risk-management and monitoring aspects of the ventures they mentor and leaving its day-to-day management to the venture entrepreneur. Time leverage allows venture capitalists to reduce their risk by expanding their involvement to dozens of ventures. However, involving venture entrepreneurs creates monitoring issues. Future research is should examine the monitoring/control needs, procedures, and processes of venture capitalists.

Venture capitalists leverage their funds by creating/managing a venture-capital fund where the outside investors provide most of the investment funds in return for a right to participate in the value increase that is created by mentoring the venture. Thus, reputation (track record and trustworthiness) is a venture capitalist’s most important asset—it allows leveraging by increasing access to viable ventures and low-cost access to credit, equity funding, etc. Financial leveraging process can give the erroneous impression that venture capitalists act similar to a commercial banker. However, a venture capitalist (unlike a banker) creates value by getting involved in managing the ventures they mentor.

The venture-capital risk reduction process works best with ventures exhibiting expected NPVs with a high risk and a pronounced lognormal skew to the right. However, this tendency toward risky ventures is offset with the need of venture capitalists to maintain their reputation as winners who pick and mentor winning ventures. While it appears that returns to venture capitalists vary with the initial risk of the ventures they mentor, little of the down-side risk carries forward to them—future research should look to establishing/proving a more rigorous risk-return relationship for venture capitalists.

The timing of the value created by a venture capitalist mentoring a venture was a contentious issue between the authors—future research should seek to establish and prove how much of this value is created at the time of entry, at the time of exit, and as a continuous process during mentoring. Theory (signaling, moral hazard, agency, etc.) and mathematics (Bernoulli process, set theory, time value of money, etc.) indicate that this is a much more complex issue than it might at first appear.

In summary, venture capitalists create value by reducing venture risk—once a venture becomes a success, there tends to be little that they can do to make it more of a success. Venture capitalists that
expend time, effort, and funds trying to increase their proportion of great successes are likely starving ventures that need those resources and, as a consequence, the average performance of their portfolio will suffer, along with their reputation. The venture capitalists’ stock and trade is creating value by reducing the risk of failure—not creating winners.

7.0 REFERENCES


IS THE SARBANES OXLEY ACT OF 2002 SUFFICIENT TO ENSURE RELIABLE FINANCIAL INFORMATION TO THE INVESTING PUBLIC?

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ABSTRACT

Given the number of corporate bankruptcies, restatement of financial statements and re-audits within the last few years, this paper discusses the problem of reliability with the current financial reporting system of the United States.

The Sarbanes-Oxley Act (The Act) of 2002 attempts to address this problem principally through the creation of the Public Company Accounting Oversight Board (PCAOB). This paper explores how The Act affects the reporting system. The authors first examine how the financial information reporting system was operating. Then they review how The Act changed the reporting system. Finally, the authors propose changes to the current
system that increase investor confidence in financial statements issued by corporate America.

BACKGROUND

In December, 2001, Enron filed for bankruptcy protection. Half a year later WorldCom filed for the same protection. With $100 billion in assets, this was the largest bankruptcy case in U.S. history. At the same time, a substantial number of other companies were restating their earnings. Further, some were actually having their financial statements re-audited. The reliability of the financial information demanded by our capital markets came into question and even under attack. Creditors and especially investors, the providers of corporate assets, were loosing confidence in the financial information system that they had relied upon in making proper decisions.

Partially due to the lack of reliable information, the capital markets eroded in excess of one trillion dollars. WorldCom's loss in market value was $180 billion from its peak (Weinberg 2003). This erosion caused many corporate pension plans to become dangerously underfunded. This corporate pension plan liability is estimated at $350 billion and has resulted in many corporations deferring expansion (Naughton 2003). Individuals experienced a loss in value in their personal retirement plans, sizable enough to have them rethink their retirement options. Many foreign investors exited the American capital market in search of other more reliable markets.

This has been a black period for the American capital markets. Indeed, even capitalism itself has suffered. The Sarbanes-Oxley Act (The Act), which was signed into legislation on July 30, 2002, attempts to address this problem. The stated purpose of The Act is “to protect investors by improving the accuracy and reliability of corporate disclosures made pursuant to the securities laws, and for other purposes.” There are 11 titles in the contents of The Act:

- Title I – Public Company Accounting Oversight Board
- Title II – Auditor Independence
- Title III – Corporate Responsibility
- Title IV – Enhance Financial Disclosures
- Title V – Analyst Conflicts of Interest
- Title VI – Commission Resources and Authority
- Title VII – Studies and Reports
- Title VIII – Corporate and Criminal Fraud Accountability
- Title IX – White-Collar Crime Penalty Enhancements
- Title X – Corporate Tax Returns
- Title XI – Corporate Fraud and Accounting

THE FINANCIAL INFORMATION SYSTEM PRIOR TO SARBANES-OXLEY

Prior to the enactment of The Act, the financial information system primarily involved corporate management, auditors, and the S.E.C. Corporate management prepared the financial reports intended for distribution to the investing public. These reports were audited by CPAs and then filed with the S.E.C. as required under U.S. securities laws. Financial institutions also are the recipients of these financial reports, and their actions and relationships with corporate management could have a significant impact on the reports themselves. Further, the independent CPAs often became involved in consulting activities for the firm. This financial information system flow is depicted in Figure 1 below.
Each of the parties involved in the financial information system can impact system’s integrity. A number of the weaknesses in the above system are as follows:

1. Corporate management: There is constant pressure on corporate management to consistently increase the corporate earnings. Not only are their bonuses tied, directly or indirectly to this, but also quite often their jobs. One way to increase earnings is by “cooking the books” (George 2003).

2. Financial institutions: The investing public relies upon financial institutions, not to audit the financial statements, but to be an integral part of this information system, to enhance its reliability. Too often, rather than being a safeguard to this structure, the banks and brokerage houses became part of the problem (Pacelle 2003).

3. The independent auditor: The major problem of this primary safeguard was the consulting arrangements with the corporations. Mr. Levitt, as commissioner of the S.E.C., tried to eliminate these consulting engagements recognizing the impairment of independence. The accounting profession, to its own detriment, lobbied Congress effectively defeating Mr. Levitt’s proposal.

4. The S.E.C.: Ultimately, the S.E.C., through Congressional acts, is responsible for maintaining the integrity of the capital market. It came as some surprise to many investors to learn that the S.E.C. quite often doesn’t even read the financial statements filed by companies with them. The reason the S.E.C. cited for this perceived oversight was the lack of staff. There are approximately 17,000 filings. Had these filings been read, the lack of understandability and transparency of many financial statement footnote disclosures would have been discovered.

5. The investing public: While this information is ultimately for the investing public, they too also have their share of responsibility under the system. Much of the pressure on corporate management comes from mutual fund managers who control large percentages of the voting shares. It is often due to the pressure from these managers that corporate management will seek out creative ways to increase the earnings. Ultimately, it is the investing public who is responsible for overseeing the work of corporate management. This is most commonly accomplished through by electing boards of directors and creating extensive contracts with the principle officers of the firm. These are the contracts which then place pressure on corporate management.
SARBANES-OXLEY

One of the major effects of The Act was the creation of the Public Company Accounting Oversight Board (PCAOB). Some of the key sections under the Act are as follows:

Title I – Public Company Accounting Oversight Board:
- Section 101: This establishes the PCAOB whose proclaimed mission is “to oversee the audits of public companies in order to protect the interests of investors and further the public interest in the preparation of informative, fair and independent audit reports.”
- Section 103: This allows the PCAOB to set auditing, attestation, quality control, and ethics standards for those CPA firms which issue audit reports to the S.E.C. Prior to The Act, the American Institute of Certified Public Accountants set those standards.
- Section 104: This requires annual quality control inspections for firms which audit more than 100 companies who are required to file with the S.E.C.
- Section 105: This section grants the PCAOB the power to implement sanctions against accounting firms who are in violation of The Act.

Title II – Auditor Independence:
- Section 201: This section limits non-audit services that a firm can provide to companies they are auditing. This section greatly limits the consulting services a firm can provide to audit clients.

Title III – Corporate Responsibility:
- Section 301: This gives guidelines to audit committees of corporate boards of directors. It also makes the audit committee of the board responsible for appointing the accounting firm to perform the audit.
- Section 302: This section requires the company’s principle executive officer and principle financial officer to certify the annual and quarterly reports.

Title IV – Enhanced Financial Disclosures
- Section 404: This requires management assessment of internal controls in the annual report. Management must state its responsibility for establishing and maintaining an adequate internal control structure and procedures for financial reporting. In addition, management must assess, as of the end of the issuer’s fiscal year, the effectiveness of the internal control structure and procedures for financial reporting. Each issuer’s auditor shall also attest to and report on the assessment made by management. Additionally, this section directs the S.E.C. to require each issuer to disclose whether it adopted a code of ethics for its senior financial officers and the contents of that code.

Title V – Analyst Conflicts of Interest
- Section 501: This section deals with the treatment of securities analysts by registered securities associations and national securities exchanges.

THE FINANCIAL INFORMATION SYSTEM AFTER SARBANES-OXLEY

A diagram of the financial information system after The Act is presented below in Figure 2.

The main differences in this system are as follows:
1. The audit committee is now interfacing with the CPA firms rather than corporate management. This will enhance the independence.
2. The CPA firms are very limited to the types of consulting engagements they can provide to companies they audit. Indeed, three of the “Big 4” accounting firms have divested themselves of their consulting divisions. This will enhance independence.
3. The PCAOB was created, as mentioned above. Many of the sections of The Act will enhance the quality of the information reporting system.
FIGURE 2

Corporate Audit Committee

Independent Auditors CPAs

S.E.C.

Investing Public Stock Markets

Financial Institutions
Banks & Brokers

FIGURE 3

Corporate Audit Committee

Independent Auditors CPAs

Independent Reviewers CPAs

S.E.C reads all filings

Investing Public, Stock

Financial Institutions
Banks & Brokers

PCAOB

Consulting
A PROPOSED REVISION IN THE INFORMATION REPORTING SYSTEM

A diagram of the proposed financial information system is presented in Figure 3. There are three major differences in the proposed system. The new system would require an independent review of the audit. The SEC would be required to actually read the statements filed by firms. Finally, there would be an increased emphasis on integrity. Each of these areas is discussed below.

An Independent Review of the Audit

This review would be performed by a non-“Big 4” firm. It could be a national or regional firm having adequate S.E.C. experience necessary to conduct such a review. The review and the firm would be subject to the standards as set forth by the PCAOB. It would be recommended that the reviewing firm be rotated every three years. The selection of the reviewing firm is open, but some possibilities could be by the corporate audit committee, by the PCAOB, or perhaps at random. The review would be similar to other reviews performed by the profession and would be based upon inquiry and analytical procedures. A review program would be utilized and would include such areas as, but not limited to:

- A careful reading of the financial statements, disclosures, discussions and reports
- A review of the board of directors meetings, especially the audit committee
- A review of all memos, correspondence or other communications between management, the audit firm, and the board of directors and its committees regarding the financial statements and audit
- A review of all adjustments both proposed and made to the financial statements
- A review of the audit program and GAAP checklist used by the audit firm
- A review of the consolidation procedure. Both the entities being consolidated as well as those that are not.
- A review of complex accounting estimates and transactions
- Other procedures as considered necessary

The review would both enhance independence and address some of the problems existing in the current accounting information reporting system.

a. The review would enhance independence. An audit firm knowing their audit was going to be reviewed by independent professionals at the conclusion would only improve the reliability of financial information. The reviewing firm, since they will be rotated off after three years and the fees for such a review would be substantially less than the audit fee, would have a tendency of being more independent both in fact and in appearance. It is also recommended that the firm be from the private sector to avoid any potential political repercussions.

b. Problems addressed by The Act could be resolved.

Section 207 under Title II states: The General Accounting Office (GAO) will do a study on the potential effects of requiring the mandatory rotation of audit firms. With the above proposed revisions, this should no longer present a problem.

Section 701 under Title VII of The Act states: The GAO will conduct a study to identify the factors that have led to the consolidation of accounting firms since 1989, the impact of the consolidation on capital formation and securities markets, and solutions to any problems identified, including ways to increase competition and the number of firms capable of providing audit services to large business organizations subject to securities laws.

The G.A.O. report dated June 30, 2003, concluded that the largest firms had the potential to exercise market power. These proposed revisions should provide such a solution.

A Careful Reading of all Financial Reports Filed With the S.E.C.

The S.E.C.’s defense why this was not happening was because of the number of filings (in excess of 17,000). If the S.E.C. does not have adequate staff to perform this important
function then perhaps some of it could be outsourced to other qualified independent CPA firms.

**Integrity**

The final and most elusive proposal: The real estate industry has a mantra that the three most important things in real estate are: location, location, and location. The business mantra should be: integrity, integrity, and integrity. Statement of Auditing Standards No. 99, as issued by the A.I.C.P.A., lists three factors to be considered in assessing the risk of fraud. The fraud triangle they present is as follows (Ramos 2003):

![FIGURE 4](image)

The first factor, motive, will always be with us. There will always be pressures on management to improve earnings. And the related bonus incentives will probably remain. We can only be aware of that situation.

The second factor, opportunities, we can do something about. Enhanced internal control systems are one measure which could help reduce the opportunities. The proposal for a better financial reporting is another, “Lead us not into temptation,” by removing some of the opportunities we are also reducing the temptation.

The third factor, attitudes and rationalization, can be addressed by framing our actions with a strong sense of integrity. This starts at home and in the schools but continues on throughout the individual’s life. A strong ethic or code of conduct is addressed by The Act. This should be furthered by seminars stressing the cost of unethical behavior (Heintz 2003).

**COSTS OF THE PROPOSED FINANCIAL ACCOUNTING REPORTING SYSTEM**

The two major costs incurred by such proposed system would be the independent review and the S.E.C. reading, both of which can only be approximated.

a. The independent review: An estimate of the accounting and audit fees for the “Big 4” based on information provided from *Accounting Today*:

<table>
<thead>
<tr>
<th>Company</th>
<th>Estimated accounting and auditing fees ($billions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PricewaterhouseCoopers</td>
<td>$ 3.0</td>
</tr>
<tr>
<td>Ernst &amp; Young</td>
<td>$ 2.6</td>
</tr>
<tr>
<td>Deloitte &amp; Touches</td>
<td>$ 2.1</td>
</tr>
<tr>
<td>KPMG</td>
<td>$ 1.5</td>
</tr>
<tr>
<td>Total</td>
<td><strong>$ 9.2</strong></td>
</tr>
</tbody>
</table>

As reported in *Fortune Magazine*, Hamilton of the Public Accounting Report estimates that audit fees will rise by 50% this year alone. A reasonable estimate of the proposed review fees might be five to ten percent of the audit fees. Thus, the charge for review services might be in the range of $400 million to $900 million.

b. S.E.C. reading: An estimate of the cost of reading financial reports filed with the S.E.C. might be around $50 million to $100 million.
This is based on 17,000 filings at 20 to 30 hours per filing at $200 per hour.

The total estimated cost of this proposal would be in the area of $500 million to $1 billion. This additional cost to the system should be cost justifiable. The other cost is timeliness. While there would be additional time required to complete the process, it would not interfere with management coming out with their earnings estimates.

These costs, though not at all insignificant, will be offset by the benefits realized from the improved system. These benefits would include a more reliable information system, increased confidence in our capital markets and an enhancement of overall value to the public at large. Information quality would be improved. Investors and creditors would also perceive that improvement in quality. This will lead to more efficient capital markets.

**SUMMARY**

Under the old system of financial reporting, the corporation quite often, with the assistance of the independent audit firm, would prepare the financial statements. These statements would then be audited by that CPA firm and filed with the SEC who may or may not read them. The Sarbanes-Oxley provides no real substantive change, only somewhat minor cosmetic ones.

Under this paper’s proposed solution, the financial statements would continue being prepared by the corporation, audited by an independent CPA firm, reviewed by another independent CPA firm and carefully read by the S.E.C. Obviously this proposed solution would ensure the most reliable financial information being disseminated to the investing public.

**CONCLUSION**

There is a specter haunting our capital markets; it is the specter of greed. Michael Douglas, playing a character in the movie, Wall Street, stated that “Greed is good”. Greed is not good; it is one of the seven deadly sins. If the parties involved in our financial system “did the right thing” then there would be no need for the Sarbanes-Oxley Act or the PCAOB. However, instead of making their decisions based on moral or ethical grounds, they have made decisions based upon the avarice in their own minds. The only reason there was no systemic breakdown in our financial markets was that regulators did not pursue the bankers and brokers with the same zeal with which they pursued Arthur Andersen.

While this paper cannot solve the lack of integrity which our financial structure has experienced, it suggests a possible solution to the lack of reliability in the financial statements by proposing both a review of the audit and a careful reading by the S.E.C.

If something isn’t done soon to reinstate the faith and confidence that our capital markets once enjoyed and required, then “Alas! Alas! That wonderful City of Babylon has been destroyed.” (Marx 1959)
REFERENCES

Accounting Research Using Intervention Analysis: An Introduction and Illustrative Example

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ABSTRACT

First proposed by Box and Tiao, Intervention Analysis uses as its model a special case of the rational form of the linear transfer function model. The time series for a single intervention is represented by two separate components: an underlying stochastic disturbance term, and the deterministic intervention term. The model takes the form

\[ Y_t = C + \frac{\Phi(B)\delta(B)}{\delta(B)} + N_t \]

where \( C \) is a constant term and \( I_t \) is a binary indicator vector which defines the intervention period. The term \( N_t \) represents the noise term. The rational term \( \frac{\Phi(B)\delta(B)}{\delta(B)} \) characterizes the effect of the intervention. Use of the rational polynomial term allows the impact of the intervention to be characterized along two different dimensions: (1) Onset (or speed), which can be either abrupt or gradual, and (2) Duration, which can be either permanent or temporary. Intervention Analysis is used to examine the market response to a set of firm-specific Superfund announcements which occurred during the first fifteen years of the enforcement of Superfund. This paper makes contributions by both briefly explaining the use of Intervention Analysis in accounting research and also by illustrating a situation where the firm-specific market response for firms in the sample did take more than one form.

I. INTRODUCTION

The question of whether information has value is an important one in accounting research. Disclosures of a variety of information in a variety of ways can all have an impact on a firm or groups of firms. The most common approach in accounting event studies has been the Cumulative Abnormal Return methodology. An alternative approach used in many other fields is Intervention Analysis. The use of Intervention Analysis in accounting research has been limited, most likely due to a lack of familiarity with the concept on the part of accounting researchers. It is particularly useful in researching situations where the reaction to a particular disclosure event can take more than one form. The purpose of this methodology paper is to provide researchers with a useful brief introduction to the theory behind Intervention Analysis and then to illustrate its use as a research tool to examine an actual disclosure event. The paper illustrates successful use of Intervention Analysis in examining firm-specific Superfund events and revealing that firms in the sample did experience more than one type of market reaction.

II. RESEARCH METHODOLOGY

Interrupted Time Series Analysis

Using the standard Cook and Campbell (1979) notation the interrupted time series quasi-experimental design is diagramed as discrete intervention. The intervention thus splits the time series into two segments, one preintervention and one postintervention. This research design tests the conventional null hypothesis of “no difference” between the preintervention and postintervention levels.
of the series. Rejection of the null hypothesis supports the conclusion that there was a statistically significant impact produced by the intervention. In the early days of interrupted time series research it was standard for researchers to use Ordinary Least Squares (OLS) Regression estimates of the pre and post levels of the series to test the null. It has since been seen that such a test is invalid because an important assumption required for the proper use of OLS is violated. OLS “assumes” that the adjacent regression error terms are uncorrelated, i.e., covariance(e_{t-1})=0 but, realistically, this is seldom true with respect to time series data. The existence of correlated error terms produces OLS parameter estimates that are biased because of understated variance. As a result, the t-statistic used to test the null hypothesis will overstate the statistical significance of the impact. (McDowall et al. 1980).

Intervention Analysis takes a different approach in dealing with the existence of correlated errors. Instead of simply ignoring the existence of the errors, the IA approach is to model empirically any existing serial dependence as a time series process. Thus, the confounding serial dependence is statistically controlled by modeling, and the difference between the pre and post levels can then be tested in the conventional manner. The next section discusses the transfer function model and then introduces Intervention Analysis as a special case of the transfer function model.

**Transfer Function Models**

A transfer function model is a multivariate extension of the univariate ARIMA model. It is designed to examine the dynamic relationship between two time series processes, i.e., the effect of series “X” that is “transferred” as an impact on series “Y.” For notational simplicity, consider a transfer function model with two variables, Y_t and X_t. Assuming that both Y_t and X_t are stationary, the general form of the transfer function model can be expressed as

\[ Y_t = C + \frac{\phi(B)X_t + N_t}{d(B)} \quad (eq. 1) \]

or

\[ Y_t = C + \frac{\phi(B)X_t + N_t}{d(B)} + \theta(B)I_t \quad (eq. 2) \]

The deterministic component of the model, \( I_t \), is not identified using statistical techniques. Instead, it is postulated based on knowledge of the timing of the intervention being examined. The stochastic component, \( N_t \), is assumed to be measured with error and this component is used to filter out the noise present in the stochastic series due to imperfect measurement. \( N_t \) is modeled as an ARIMA process using the well-known three-step search heuristic developed by Box and Jenkins (1970) for model identification. Successful identification seeks to produce an appropriate, parsimonious model.

Although Intervention Analysis can seem procedurally and notationally obtuse to those uninitiated in the intricacies of ARIMA modeling, conceptually it is quite simple to describe. First, the preintervention portion of the series is modeled separately, using the conventional iterative three-step ARIMA modeling approach. This model then serves as the “steady state benchmark” or “counterfactual” in the analysis. That is, the preintervention series, as modeled, is assumed to continue through the postintervention period. This “what-would-have-happened-otherwise” postintervention series (the assumed “no treatment” series) is then compared to the actual postintervention series to statistically test for a difference, i.e., an impact (Mohr 1992).

**Impact Characterizations for an Intervention**

There are two general types of interventions that can be...
represented by the intervention function. First is an exogenous intervention that occurs for a single period only, e.g., the effect of an eighteen-hour power-outage on a time series of daily factory output. Second is the intervention that takes effect starting at a particular point in time and remains in effect, e.g., the effect of a new restrictive import law on a time series of imports of a raw material. Either type of intervention can be easily modeled using a binary indicator vector.

The binary vector representing an intervention that takes place for only a single period is commonly referred to as a Pulse Function. It is usually presented notationally as \( P(t) \), where \( T \) represents the point in time in which the intervention occurs. Such a pulse function time series would have the following appearance:

\[
\ldots O O O O O O O O O \ldots
\]

A vector representing an intervention that remains in effect is referred to as a Step Function. It can be represented as \( S(t) \), with \( T \) representing the period over which the intervention occurs. The step function time series would have the following appearance:

\[
\ldots O O O O O O O O O \ldots
\]

Pulse and step functions are the most common characterizations for exogenous interventions. Note that there is an exact relationship between the pulse function and the step function representation. The transformation is

\[
(1 - B)S(t) = P(t)\tag{4}
\]

which establishes that the binary indicator vector representing a step function can always be converted to a vector representing a pulse function through the process of "first differencing." Simply put, a pulse function is a differenced step function.

As a practical matter, McDowall et al. (1980) note that category (4) cannot be easily modeled since the demarcation between a "very gradual, very temporary impact" and "no impact" is difficult to establish. Therefore, classification category (4) is merged with the null classification of "no impact" and, in practice, a series that fails to be appropriately classified into one of the first three categories is assigned a "no impact" classification.

**Empirical Testing of "Competing" Intervention Models**

If a researcher could always be assured of working from a well-established body of theory then the theory would define the type of intervention impact to be expected. Thus, the theory itself would direct the choice of intervention component. In new research areas, however, adequate theory may be lacking. McDowall et al. (1980) offer a sequential approach for testing "rival" impact hypotheses in the absence of established theory.

**Step 1--An abrupt, temporary impact is hypothesized.** The

Recall that the response to an intervention is characterized by the rational polynomial \( d(B) \). The operator in the numerator, \( b(B) \), represents the impact of the intervention and the "delay" or length of time it takes for the impact to be reflected in the time series.

For example, the effect of a production worker strike on shipments of finished goods may not be seen for several days if the factory already has a large quantity of finished goods on hand. If the intervention has a contemporaneous effect, i.e., the effect occurs at the same time, then the effect is characterized as \( b(B) = 1 \). \( b(B) \) is an effect not "seen" until the next period, and \( b(B) = b_0 + b_1B \) is an effect that occurs in both the current period and the following period.

The operator in the denominator, \( d(B) \), represents the manner in which an impact dissipates or "fades away." Operator \( d(B) \) of an intervention model can often be represented by a low order polynomial such as, \( d(B) = 1 - d_1B \). If the intervention has a longer residual effect, then the value of \( d_1 \) will be "large." In contrast, if the effect is of short duration, then the value of \( d_1 \) will be "small." When the intervention has zero residual effect then \( d_1 = 0 \).

Use of the rational polynomial form allows the impact of the intervention to be characterized along two different dimensions: (1) **Onset** (or speed), which can be either abrupt or gradual, and (2) **Duration**, which can be either permanent or temporary. Thus, intervention analysis allows a researcher to categorize an intervention into one of four different impact classifications:

1. Abrupt, Temporary impact
2. Abrupt, Permanent impact
3. Gradual, Permanent impact
4. Gradual, Temporary impact

intervention function is modeled as a first-order transfer function applied to a differenced \( I_t \) as

\[
f(I_t) = \frac{b(B)(1 - B)I_t}{d(B)} \tag{5}
\]

Upon analysis if the \( d \) value is "too large," i.e., not significantly different from 1 or greater than 1, then the existence of a temporary impact is rejected.

**Step 2--A gradual, permanent impact is hypothesized.** The intervention function is modeled as a first-order transfer function only

\[
f(I_t) = \frac{b(B)I_t}{d(B)} \tag{6}
\]

Upon analysis if the \( d \) value is now "too small," i.e., not significantly
Step 3--An abrupt, permanent impact is hypothesis. The intervention function is modeled as simply a zero-order transfer function

$$f(t) = \gamma(B)[t]$$

(eq. 7)

Upon analysis if the \(\gamma\) value is not significant, then the existence of an abrupt, permanent impact is rejected.

Step 4--Any series which fails to be appropriately classified in one of the first three categories is then classified as "no impact" (McDowall et al. 1980).

Expert System
In the past much time was consumed in using time series modeling in simply identifying the model which best modeled the data under examination. With advances in computing power and speed sophisticated time series software now offers automatic ARIMA model identification. The system used in this study was part of commercially available time series package produced and sold by Scientific Computing Associates, Incorporated (SCA). The standard SCA system has been commercially available since 1981 and the expert system module for automatic model identification has been in commercial use since 1992. The SCA expert system was developed by several principals within that organization and captures their expertise. The experts include statisticians George E. P. Box (of Box and Jenkins fame), George C. Tiao, Ruey S. Tsay, and Lon-Mu Liu. All are well-known experts in the field of time series analysis.

III. SUPERFUND

Crucial to business management and other parties with an interest in financial disclosure is the following fact: "Because Superfund imposes retroactive liability, all companies that have at any time in the past disposed of hazardous waste in landfills have a potential liability on their balance sheets" (Bloom and Scott-Morton 1991). [emphasis added] One corporate general counsel expressed the problem: "One can of paint which can be traced to a business can expose that business to millions of dollars of liability, even if [it] was legally dumped" (Lavelle 1993). To further compound the problem, Superfund liability is easily transmitted to other parties. Corporate parents are held liable for actions of subsidiaries and successor corporations are held liable for their predecessors' acts (Lyons 1989). Dealing with the uncertainty of Superfund liability at the firm-specific level is not a trivial problem and the impact on U.S. businesses could be devastating. In a report to Congress the independent Office of Technology Assessment projected total costs for cleanup of existing hazardous waste sites in the United States to be 500 billion dollars with businesses paying 400 billion of the total (Acton 1989).

Superfund Liability
The legal basis for Superfund's liability scheme is formed by three doctrines (Acton and Dixon 1992):

(1) Strict Liability --the Environmental Protection Agency (EPA) must only prove the Principally Responsible Party's (PRP's) involvement with the waste site, thus, there is no requirement for the EPA to prove negligence.

(2) Joint and Several Liability--any party that was or is involved with the site in any way may be held responsible for the cost of cleaning the entire site, regardless of the party's actual degree of involvement.

(3) Retroactive Liability--parties can be held liable for past actions, even those that may have been legal at the time.

EPA Notice Letters
Formal communication between the EPA and those parties believed to be statutorily liable for Superfund cleanup costs begins with a letter from the EPA. This initial letter is called the General Notice Letter (GNL). Letter recipients are known as Potentially Responsible Parties (PRP's). The purpose of the letter is to inform PRP's of their potential liability for future response costs, to begin or continue the process of information exchange, and to initiate the process of informal negotiations" (Steinberg and Mays 1993).

At a later point in time the EPA will issue a Special Notice Letter (SNL). This letter is used "to invoke the statutory moratorium on certain EPA actions and to initiate the process of formal negotiations. The purpose of the moratorium is to provide for a formal period of negotiation between the EPA and PRP's, during which the PRP's will be encouraged to conduct or finance response activities" (Ibid.). Before cleanup can begin the EPA conducts a Remedial Investigation to gather information on the site and a Feasibility Study is performed. The result of that process is the announcement of the Record of Decision (ROD), which identifies the particular cleanup method to be used at the site.

Each of these events identifies a possible risk to a firm. The firm-specific risk is dependent on a variety of factors, including the size of the site, the number of other principally responsible parties (and their financial strength), and the cost for the cleanup of the site. If this new risk information is important to the market then an effect will be seen in the firm stock return.

This study explores environmental information by using Intervention Analysis within the event study paradigm to empirically examine the market response to firm-specific Superfund information. Intervention Analysis is especially appropriate for this study because the uncertainty surrounding potential Superfund liability makes it likely that the market response could take more
than one form. The study examines three key information events in the early stages of a Superfund cleanup. The three events are the release of the (1) General Notice Letter, (2) Special Notice Letter, and (3) Record of Decision.

The research questions explored in the study are: (1) Did the market respond to initial Superfund information releases during the first fifteen years of the program? (2) Because of the uncertainty surrounding Superfund are there different types of responses?

IV. DATA AND SAMPLE

The sample for the study consists of randomly selected firms meeting the following criteria:
(1) The firm is listed in the CRSP database.
(2) The firm is named a potentially responsible party (PRP) at least once in the EPA Superfund Enforcement Tracking System (SETS), available within the Lexis/Nexis database.
(3) The firm has complete data available for each required event returns series.

For this paper only the first time a firm has been designated a PRP is examined. The sample selection process began with the firms present in the CRSP database. The selection process was each sample firm's daily return with dividend was calculated. The market return index used was the equally-weighted market index (including dividends) contained within the CRSP database. This market return index has been widely used and accepted in previous event studies (Peterson 1989).

In criticizing a paper by Cheng (1986) which used Intervention Analysis, Thompson (1986) emphasized the importance of controlling for the confounding influence of aggregate market movements on the firm-specific ARIMA model. This study adopts a control used by Tsay, Alt, and Gordon (1993). They describe their procedure as:

"We analyzed a scaled return series rather then a raw series in conducting the intervention analysis. A scaled series is defined as the return series divided by the corresponding market returns (defined as the equally weighted average of the returns on all stocks listed on the NYSE and AMEX) series for each time ‘t’. In other words, a scaled series is an indexed series relative to market returns. The rationale for this approach is similar to that of performing a general price-level adjustment to nominal financial data. That is, a jump up or down in a security’s return could be caused by a general market factor, which should not be interpreted as a reaction to a particular firm event (intervention)” (Tsay, Alt, and Gordon 1993).

V. EMPIRICAL RESULTS

Table 1 reveals, for each firm in the sample, whether the firm experienced each event. It also indicates for each event whether there was a detectable reaction. Table 2 further bifurcates the reaction group into Abrupt, Temporary and Abrupt, Permanent classifications. A summary of the reactions per event is the final item presented in Table 2. Note that 17 of the 79 sample firms, almost one-fourth, experienced some type of reaction for one of the three events, but none of the sample firms had a reaction for more than one event, although 69 of the 79 firms, almost ninety percent, experienced either two or three of the three possible events.

In the typical event study the selection of study period length is an arbitrary decision. For this study some guidance was offered in the time series literature. In a simulation study Lorek and McKeown (1978) confirmed the optimality of a 50 (quarterly) observation series. This study uses a 50 daily observation series for the preintervention estimation period and a 50 daily observation series for the postintervention event impact period. This gives a total span of 100 consecutive daily observations.

The first research question explored by this study was: Did the market respond to initial Superfund information releases during the first fifteen years of the program? As might have been anticipated, the answer was “Yes” for some firms and No for others. The next question was: Because of the uncertainty surrounding Superfund are there different types of responses? The answer to that question was also “Yes”, illustrating the value of Intervention Analysis as a research tool in accounting research.

**TABLE 2**

**Responses Per Event Type**

<table>
<thead>
<tr>
<th>Category Totals:</th>
<th>GNL</th>
<th>SNL</th>
<th>ROD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abrupt, Temporary</td>
<td>6</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Abrupt, Permanent</td>
<td>4</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>No Response</td>
<td>62</td>
<td>8</td>
<td>58</td>
</tr>
<tr>
<td>No event</td>
<td>4</td>
<td>61</td>
<td>12</td>
</tr>
<tr>
<td>Unmodelable</td>
<td>3</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>79</strong></td>
<td><strong>79</strong></td>
<td><strong>79</strong></td>
</tr>
</tbody>
</table>
The study examined three information events: (1) GNL, (2) SNL, and (3) ROD. In the GNL dataset, 10 of the 72 firms were found to have a detectable intervention. Of these ten interventions, six were of the Abrupt, Temporary type and four were of the Abrupt, Permanent type. In the SNL dataset, 4 of the 12 firms were found to have a detectable reaction. All four were of the Abrupt, Permanent type. In the ROD dataset only 3 of the 61 firms were found to have a detectable intervention. Of these three interventions, one was of the Abrupt, Temporary type and two were of the Abrupt, Permanent type. The results of the Intervention Analysis would suggest that the GNL and SNL events are both useful sources of information to investors, with the SNL event producing the largest proportion of reactions. The ROD event seems to be the least useful to investors and it may not be useful at all since the proportion of ROD firms with a reaction is less than that which would be expected to occur by chance at the conventional .05 level of significance.

The empirical results of this research study seem to offer several implications. First, it provides further evidence that Intervention Analysis exists as a useful tool for empirical use in accounting research of the event study type. Second, specifically in terms of Superfund research, it suggests that both the GNL and particularly the SNL announcements are viewed as important by the market. In marked contrast, however, the ROD announcements produce little, if any, statistically significant market reaction. Only three interventions were detected in the ROD dataset, fewer than could be expected to have occurred by chance.

Where a market reaction occurred for firms in the study in was an Abrupt response; either an Abrupt, Temporary response or an Abrupt, Permanent response. No firms in the study were found to have a Gradual response.

Examination of Table 1 reveals the existence of a small number of firms with a "U" classification for a particular event. This "U" identifies a returns series that was Unmodelable by the SCA expert system software used for automatic model identification. This type of result can occur when the analysis is attempting to fit the data into a prespecified model. In a comparative study Jarrett (1990) notes that the use of prespecified models can result in series that are unmodelable. The analysis in this paper resulted in 9.4% of the individual series analyzed being unmodelable, a result similar to that found by Jarrett when using prespecified models.

VI. CONCLUSION

The empirical results of this research study seem to offer several implications. First, it provides further evidence that Intervention Analysis exists as a useful tool for empirical use in accounting research of the event study type. Second, specifically in terms of Superfund research, it suggests that both the GNL and particularly the SNL announcements are viewed as important by the market. In marked contrast, however, the ROD announcements produce little, if any, statistically significant market reaction. Only three interventions were detected in the ROD dataset, fewer than could be expected to have occurred by chance.
Figure 1–Impact Types
Accounting Information Presentation Format--
Can a High “Lie Factor” Influence a User’s Prediction?

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ABSTRACT

This study investigates the use and abuse of graphs in the presentation of accounting information. Drawing on modern theories of graphical perception, a survey instrument is used to test empirically the question of whether graphs intentionally prepared with a high “Lie Factor” (Tufte 1983) can influence a user’s prediction of a revenue or expense number for the next period. The study results are not consistent with the conventional wisdom in this area.

I. INTRODUCTION

Accounting information for a firm may be disclosed in a variety of ways: financial statements, notes, management discussion and analysis, and other forms of disclosure. One of the other forms commonly found is the use of graphs. As Steinbart (1989) points out “When properly constructed, such graphs highlight and clarify significant trends in the data. Improperly constructed graphs, however, distort the trends and can mislead the reader.” Such intentionally distorted graphs are examples of what can be described as Disclosure Management or Impression Management (Arunachalam, et al. 2002). Other accounting researchers have also considered the problems associated with the presentation of financial information in graph form. Beattie and Jones (1992) outlined a theoretical framework for the study of the use and abuse of graphs. They later conducted a behavioral study (Beattie and Jones 2002) examining graph abuse as used in disclosure management. One measure of the extent of distortion present in a graph is the “Lie Factor” proposed by Tufte (1983). The purpose of this study is to conduct a behavioral experiment to investigate the degree to which graphs prepared with a high Lie Factor can influence the predictions of the users of the graphs.

II. LITERATURE REVIEW AND HYPOTHESES

One of the earliest papers in the accounting area to address the issue of misleading graphs was by Taylor and Anderson (1986). In their paper they discussed evaluation of graphs using the “Lie Factor” first proposed by Tufte (1983). The original Tufte formula for computing the factor is:

\[
\text{Lie Factor} = \frac{A}{B}
\]

where

- \( A \) = percentage change depicted in the graph
- \( B \) = percentage change in the actual data

percentage increase between the two. The numerical change in the actual data is also computed and converted into a percentage, then the two change percentages are inserted into Tufte’s formula.
A graph which is consistent with the actual data would have a Lie Factor of 1.00. A data series with an actual increase of 50% which is visually depicted in a graph showing a 200% increase would have a calculated Lie Factor of 4.00. In their paper Taylor and Anderson adapt the Tufte formula to the financial reporting context and call their computed factor the Graph Inconsistency Coefficient.

Steinbart (1989) addressed the use of misleading graphs in accounting disclosure and the auditor's responsibility in judging their degree of distortion. He examined a sample of graphical annual report disclosures by firms and found distortions to be present. He too adapts Tufte's formula and calls his evaluative statistic the Graph Discrepancy Index. Both the Graph Inconsistency Coefficient and the Graph Discrepancy Index are computed in the same manner. Both are simply the computation of Tufte's Lie Factor with the added step of subtracting the number one from the calculated factor. Thus, the distinction between the Coefficient or Index and the Lie Factor is the value computed when there is no distortion present. That computed value is 1.00 for the Lie Factor, indicating a one-to-one correspondence between the change in the actual data and the graphical presentation change. When using either the Coefficient or the Index, if no distortion is present, then the computed value is 0.00 indicating zero degree of distortion present. The real difference seems to be that the word “lie” as a descriptive term is much more inflammatory than the more neutral terms “inconsistency” or “discrepancy.” Also in his paper Steinbart calls for controlled experiments on graph user perception to determine how large the graph distortion must be before it begins to influence the user. Our paper answers that call by conducting a controlled behavioral experiment which tests for influence in user predictions.

Beattie and Jones (1992) outlined a theoretical framework for the study of the use and abuse of graphs. They then examined the annual report disclosures of a sample of firms and found graphical distortion to be present. The distortion present was calculated using the Graph Discrepancy Index. Ten years later they revisited the topic in a paper (Beattie and Jones 2002) which again examined a sample of firm annual reports and found graphical distortion still to be present. The paper also included a behavioral experiment where subjects were asked for a perceptual analysis of the rate of change being portrayed in a set of graphs. Subjects were found to be influenced by distortions in the graphs. The graphs in the experiment were presented with no Y axis shown and no axis labels present. The subjects were then asked to use a five point ordinal scale to indicate their judgment regarding the rate of increase portrayed, e.g., “slightly increasing” or “sharply increasing.”

The purpose of our paper is to extend the Beattie and Jones experiment by presenting subjects with graphs which do have a Y axis and do have axis labels. Thus subjects will have actual trend numbers available and can then be asked to predict what the next number in the series is most likely to be. The distortion present in the graphs will be measured using Tufte’s Lie Factor, and the influence of the Lie Factor on subject predictions can then be examined. Also of interest is the question of whether the subject predictions would be more or less conservative in predictions of Revenue trends versus Expense trends. The final question of interest in our study was whether there would be detectible differences between genders in the predictions. The formal alternate hypotheses to be tested in this experiment are:

\[ H_1: \text{User predictions are influenced by graphs containing a high Lie Factor.} \]

\[ H_2: \text{There are differences in graph user revenue predictions versus expense predictions.} \]

\[ H_3: \text{There are differences in graph user predictions between genders.} \]

III. SURVEY INSTRUMENT

results were used to improve the clarity of the instructions in the survey. Those instructions were worded in a neutral manner in order to reduce the potential for a Demand Effect.

Citing Cleveland and McGill (1987), Beattie and Jones narrowed the focus of their experiment to graphs with increasing trends. Our study follows that Beattie and Jones approach. The construction of our survey graphs began with a twelve week series containing a linear trend. This base series begins at one hundred and increases in linear increments of five for each week during the quarter, ending at 155. A random number generator was then used to alter this initial straight line trend with weekly “noise” consisting of a total of twelve random deviations between one and five. The deviations were both plus and minus, and the mean of
the twelve deviations added to each series was zero. Each of the twelve week series presented as a graph in the survey was constructed by adding the twelve noise components in random order to the original linear base series. Each of the six resulting series was then further altered by multiplication by a unique factor, e.g., 287, to produce a final group of six graphs which all appear to be numerically different from each other. In fact each graph is really the same original base series, altered with random noise, and then further altered by a unique factor. As a result, each graph appears to be an independent sequence of dollar amounts but, in fact, each is actually a variation of the same base linear trend. Since all data series are the same noisy linear trend, then ceteris paribus the predictions for each of the graphs, after being converted back into base terms, would be expected to be the same. Significant differences between the base term predictions for the individual graphs would indicate an influence due to the Lie Factor. Since each series is simply a straight line base trend with added noise, the best prediction for week thirteen is an extension of the original linear trend. This best prediction value of 160 can then be used as the benchmark prediction against which the subject predictions are compared.

The Lie Factor for each chart in the survey instrument was computed. The computation began by measuring the increase between the low and high values presented on the chart, measured in centimeters. The actual increase in the data was also computed. Both these increases were then converted into Analysis began with the conversion of all survey instrument predictions back into common dollars, i.e., in terms of the original base series starting at 100 and ending at 155. Thus the responses to a graph showing a series that had been originally multiplied by 287 were first divided by 287 to convert the responses back into base series terms. The SAS statistical software program was then used to perform ANOVA calculations on the mean predictions for each of the six graphs. The ANOVA model was significant with an F-Value of 4.83 and a P-Value of 0.0002. Surprisingly, when expressed in base series terms the means of the six graphs were relatively close to one another. Figure 2 presents the prediction means for each of the three Revenue graphs and the three Expense graphs. Multiple comparisons using the Tukey Studentized Range Test SAS procedure were also performed. The Minimum Significant Difference was calculated to be 3.9522. The Tukey Test found no significant difference between the subject predictions for all three chart types in the Expense set.

In the Revenue set Graph Type 1 was significantly different from Graph Type 2 but not from Graph Type 3. Comparisons between all six graphs found Revenue Graph Type 1 to be significantly different from Expense Graph Types 1 and 2. The results for Revenue Graph Type 1 appear to be an anomaly. Although the graph was presented with a Lie Factor of 1.00 and thus presented no intentional distortion, it is the graph which produced the prediction farthest from the most likely value and is also the one graph which yielded a prediction which was significantly different from the others. A closer examination of the series in Graph Type 1 reveals that the random noise added to that series resulted in a graph line which appears to be angled slightly downward in week twelve. As a result, there may have been some “anchoring and adjustment” (Tversky and Kahneman 1974) from the week twelve value on the part of the subjects which resulted in the lower prediction value for that particular graph.

The comparisons among the three Expense graphs produced an interesting result. Although the Lie Factor is increasing through each of the three graphs, the subject predictions remain quite close to each other and quite close to a value of 160 (i.e., the best prediction for the Week Thirteen value). Graph Type 3 for both Revenue and Expense produced an interesting prediction. Although the Lie Factor was approximately 20, the subjects as a whole were not deceived and actually predicted a value slightly less that 160 in both cases.

To test for the existence of any gender difference in the perception of graphical data ANOVA was also performed on the means of the six graph types after sorting the male and female predictions into separate groups. The ANOVA model was significant with an F-Value of 2.57 and a P-Value of 0.0033. Statistically significant

IV. RESULTS AND ANALYSIS

The subjects for this study were students in all four sections of the Business Law 201 course taught at an AACSB accredited university. That course was selected because, as a required course in the business core, it would contain a wide range of majors, including nonbusiness majors. A total of 121 complete survey instruments were obtained in the experiment and used in the analysis. Table 1 presents descriptive statistics on the experimental subjects.
differences at the 0.05 level were detected between the male Revenue Graph Type 1 predictions and the female Graph Type 2 predictions for both Revenue and Expense. Figure 3 presents the prediction means for the three Revenue graphs, by gender, and Figure 4 does the same for the Expense graphs. The females as a group were influenced when there was some degree of distortion present, i.e., a Lie Factor of 4.00, while the males were not. Neither gender was influenced by the more extreme Lie Factor of 20.00.

V. CONCLUSIONS

Returning to the three research hypotheses listed earlier, the study results provide the following:

H$_{a1}$: User predictions are influenced by graphs containing a high Lie Factor.

Overall, graphs prepared with a high Lie Factor did not influence the subject predictions in this study. The one prediction which was significantly different from the others was a low prediction for Revenue Graph Type 1, a graph with a Lie Factor of 1.00, i.e., no distortion present. Even the graphs with the highest Lie Factor of 20.00 did not produce predictions significantly different from the best prediction value.

H$_{a2}$: There are differences in graph user revenue predictions versus expense predictions.

The subjects in this study did not appear to be deceived by a significant Lie Factor presented in the graphs used in this study. The subjects as a whole did not produce predictions that were significantly distorted from the most likely prediction. The subjects were resistant to being misled even when significant distortion was present in the graphs. The results of our experiment suggest that concern relative to the degree of Lie Factor present in graphical presentation is less warranted when the graph provides a numerical scale for the trend.

H$_{a3}$: There are differences in graph user predictions between genders.

A gender difference was detected, therefore the null was rejected for this hypothesis. Statistically significant differences at the 0.05 level were detected between the male Revenue Graph Type 1 prediction and the female Graph Type 2 prediction for both Revenue and Expense. The Female Graph Type 2 is higher for both Revenue and Expense predictions. This result suggests that the overall difference found in the Revenue Graph Type 1 prediction, discussed in Hypothesis 1 above, is being driven by the difference generated by the Female subjects. For both Revenue and Expense the Graph Type 2 Female predictions were higher than those of the Males. Thus, the Female subject predictions were more influenced than the Male subject predictions when the Lie Factor was 4.00. When the Lie Factor was the extreme value of 20.00 neither gender was influenced and, in fact, both made predictions that were slightly under the most likely value of 160, indicating a resistance by both groups to being misled by the deceptive presentation.

The differences between Revenue and Expense predictions were generally not significant. Although a significant difference did result between some graph types, it was due to the low prediction for Revenue Graph Type 1, an anomalous result. The predictions for Graph Type 2 and Graph Type 3 (the graphs with visual distortion present) were not significantly different from each other and were not significantly different from the best prediction value.

### Table 1

<table>
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<tr>
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<td>Mean GPA</td>
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</table>

The subjects in this study did not appear to be deceived by a significant Lie Factor presented in the graphs used in this study. The subjects as a whole did not produce predictions that were significantly distorted from the most likely prediction. The subjects were resistant to being misled even when significant distortion was present in the graphs. The results of our experiment suggest that concern relative to the degree of Lie Factor present in graphical presentation is less warranted when the graph provides a numerical scale for the trend.
Figure 1–Survey

Graphs
ABSTRACT

This paper demonstrates, via a short interactive case analysis, an effective method for teaching Theory of Constraints (TOC) using Excel's Solver tool. Southern Frozen Foods produces prepared frozen foods in three product lines and is concerned about how the current product mix consumes its fixed resources. Management wants to determine how to more efficiently utilize its capacity and improve profitability. What is Southern's most profitable product mix? Do they have the capacity to meet demand? What is the value of adding capacity?

Excel's Solver Tool is an extremely powerful yet simple to use tool, providing the accountant with the ability to explore the relationships between product mix, profitability, and resource utilization. The basic steps in setting-up the spreadsheet are to create a contribution margin income statement, specify standard operating data, establish resource utilization, and identify the firm's constraints.

The fundamental concept of Theory of Constraints (TOC), articulated by Eliyahu M. Goldratt and Jeff Cox in their 1984 book The Goal, is actually quite simple. TOC states that every organization is faced with at least one factor that limits the firm's ability to earn profits. Given this core concept, the manager who wants more profits must manage the constraint(s) faced by the enterprise. Students are asked to play the role of assisting the controller for Southern Frozen Foods in the evaluation of several internal and external constraints.

Although the case is very concise, numerous analyses can be explored in a reasonable time period. The case can be used in any managerial accounting course once students have a fundamental understanding of contribution margin and cost-volume-profit analysis. Complete resources, including teaching notes for the case are available at http://ssbea.mercer.edu/weisel/frozen.
Cointegration between International Short-Term Interest Rates

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ABSTRACT

This paper examines cointegration for a sample of eight short-term international interest rates. We also test for the presence of short-run relationships between interest rates by conducting Granger-causality tests. The results suggest a statistically significant long-run relationship between at least two of the international interest rates. However, the presence of two cointegrating vectors in the series of eight interest rates suggests a common trend does not affect these rates during the sample period. Moreover, the results suggest U.S. short-term rates have a statistically significant impact on interest rates in France, Japan, and the United Kingdom. Reverse causality is not detected between U.S. rates and international rates in the first lag order. In general, the results are consistent with Kleimeier and Samder (2000) since there is only weak evidence of cointegration for international interest rates of similar maturities.

INTRODUCTION

In this paper we examine the extent of cointegration in a sample of eight short-term international interest rates. Meese and Singleton (1982) and Mougoue (1992) suggest testing for a unit root is important in constructing interest rate determination models. Moreover, Mougoue (1992) argues cointegration is an important consideration when modeling interest rate behavior. In particular, Mougoue suggests the divergence of risk-adjusted returns on similar securities should be minimal because arbitrage by participants in efficient markets should eliminate profit opportunities if returns diverge. Thus, securities are expected to follow the same temporal pattern, i.e., be cointegrated or bound together, in the long run.

Many previous studies investigate the presence of unit roots in economic and financial time series, particularly interest rate series. For example, Campbell and Shiller (1987), Engle and Granger (1987), and Stock and Watson (1988) report U.S. short-term rates and long-term rates are cointegrated.

Hall et al. (1992) show yields to maturity of U.S. Treasury bills are cointegrated and spreads between yields of different maturity define the cointegrating vectors when the Federal Reserve (Fed) targets short-term interest rates, implying a single non-stationary common factor underlies each yield's time series behavior. Ewing et al. (1998) find the prime rate, one-month certificate of deposit (CD) rate, and the S&P Financial Stock Index share a long-run cointegrating relation.


Several previous studies also test for the presence of unit roots in international interest rate series. Hendershott (1967), Kwack (1971), and Levin (1974) suggest governments can pursue independent economic policies because international interest rate linkages are low. Alternatively, Kaen and Hachey (1983), Hartman (1984), Swanson (1988), Mougoue (1992), and Arshanapalli and Doukas (1994) present evidence showing international interest rates have rapidly become integrated. For example, Mougoue (1992) examines the term structure of interest rates in Canadian dollars, German marks, Japanese yen, Swiss francs, U.K. pounds, and U.S. dollars and argues that Eurocurrency interest rates form a cointegrated system. Specifically, Mougoue’s results imply interest rate series in each Eurocurrency are tied together in a long-run equilibrium relationship and Eurocurrency interest rates of similar maturities are cointegrated across all six currencies. However, Kleimeier and Samder (2000) investigate the degree of integration in retail lending in six core European Union (EU) countries and conclude European lending rates are not fully integrated.

Many of these previous studies investigate interest rates in pairs. In contrast, Engsted and Tanggaard (1994) expand on previous results by testing for cointegration in a system of interest rates. Specifically, Engsted and Tanggaard suggest that such a system should have one common trend driving interest rates; i.e., in a system with p interest rates, there should be p-1 cointegrating vectors. Engsted and Tanggaard’s results suggest that the cointegration implications of the expectations hypothesis of the term structure hold for the period from 1952 to 1987.

The objective of this paper is to expand on previous studies by testing for cointegration in a system of short-term international interest rates. We use the Johansen (1988) procedure to examine the long-run relationship between short-term interest rates. Moreover, we use both the Trace test and the Maximum Eigenvalue test in our empirical procedures.

We attempt to provide additional insight on the relationship between U.S. monetary conditions and short-term international market returns by examining the results of Granger-causality tests for short-term interest rates from the United States, Canada, France, Germany, Japan, the Netherlands, Switzerland, and the United Kingdom. Our results suggest that there are statistically significant long-run relationships between at least two of the short-term international interest rates. However, the results are not consistent with the hypothesis that a common trend affects the sample of eight international interest rates during the sample period. Moreover, we find evidence of Granger (1969) causation from U.S. rates to five international rates. We find no statistically significant reverse causality from international rates to U.S. rates at the usual confidence intervals. In general, we suggest our short-term international interest rate results are consistent with the evidence presented by Kleimeier and Samder (2000). Specifically, we find weak evidence of cointegration for short-term international interest rates of similar short-term maturities.

The next section of the paper describes the sample and empirical methodology. Then, the results are described. A summary of results concludes.

**DATA AND METHODOLOGY**

The short-term international interest rate data consists of weekly rates from the United States (US), Canada (CAN), France (FRA), Germany (GER), Japan (JAP), the Netherlands (NET), Switzerland (SWI), and the United Kingdom (UK) in the 1990s. The international interest rate sample consists of 216 weekly observations.

Cointegration analysis is used to examine long run relationships between short-term interest rate series. According to Engle and Granger (1987), if two variables are cointegrated, then there is an underlying long-run relationship between them. If the two variables $X_t$ and $Y_t$ are nonstationary in levels but stationary in first differences, then $X_t$ and $Y_t$ are integrated of order one, I(1), and their linear combination would be:
If there is an \( \phi \) such that \( Z_t \) is integrated order of zero, I(0), the linear combination of \( X_t \) and \( Y_t \) is stationary and the two variables are said to be cointegrated. These variables may drift apart in the short run but they have a tendency to move toward a long-run equilibrium.

The first step in cointegration analysis is the test for the presence of unit roots in variables. This involves conducting the Augmented Dickey-Fuller (ADF) and Phillips-Perron (P-P) tests. The Augmented Dickey-Fuller test uses a regression of the first differences of the series against the lagged series and lagged difference terms. It may include a constant term and a trend term. The ADF test is specified as:

\[
\Delta X_t = \alpha + \beta X_{t-1} + \gamma_1 \Delta X_{t-1} + \delta t + \epsilon_t \tag{2}
\]

The test for a unit root has the null hypothesis that \( \beta = 0 \). If the coefficient is statistically different from zero, the hypothesis that \( X_t \) contains a unit root is rejected. The Phillips-Perron (1988) test corrects the test statistic for possible time dependencies in the series by using non-parametric techniques.

Phillips-Perron (1988) developed a generalized version of the Dickey-Fuller test:

\[
X_t = \beta_0 + \beta_1 X_{t-1} + \beta_2 (t-T/2) + \mu_t \tag{3}
\]

Here \( T \) is the number of observations and the error term \( \mu_t \) is such that \( E(\mu_t) = 0 \). The critical values used in the Dickey-Fuller tests are also employed in the Phillips-Perron test.

The two main approaches used to test for the existence of cointegration relationships are the Engle-Granger (1987) methodology and the Johansen (1988) procedure. Essentially, both approaches test the series for the presence of a unit root and determine the order of integration. This paper employs the Johansen (1988) procedure to test the cointegration relationship between series. This procedure avoids the use of two-step estimation as used in the Engle-Granger methodology and tests for the presence of multiple cointegrating vectors. By avoiding two-step estimation, an error term introduced in first step estimation would not be carried into the error correction mechanism.

The Johansen (1988) approach relies on the relationship between rank of a matrix and its characteristic roots and estimates long-term relationships between nonstationary variables using a maximum likelihood procedure. The Johansen tests are on the rank of the coefficient matrix \( \Pi \) of the equation (Johansen and Juselius, 1990):

\[
\Delta X_t = \Gamma_1 \Delta X_{t-1} + \ldots + \Gamma_{k-1} \Delta X_{t-k+1} + \Pi X_{t-k} + \mu + \epsilon_t \tag{4}
\]

To test the main hypothesis of \( r \) cointegration vectors, the null hypothesis is specified as:

\[
H_0: \Pi \text{ has a reduced rank, } r<k
\]

where \( X_t \) is a \( k \times 1 \) vector of I(1) variables and \( \Gamma_1, \ldots, \Gamma_{k-1}, \Pi \) are \( k \times k \) matrices of unknown parameters \( \Pi \). The coefficient matrix contains information about long-term relationships. The reduced rank condition implies that the process \( \Delta X_t \) is stationary and \( X_t \) is nonstationary. Three cases are possible. First, if \( \Pi \) is of full rank, all elements of \( X \) are stationary, and none of the series has a unit root. Second, if the rank is of \( \Pi = 0 \), there are no combinations which are stationary and there are no cointegrating vectors. Finally, if the rank of \( \Pi \) is between \( r \) and \( k \), then the \( X \) variables are cointegrated and there exist \( r \) cointegrating vectors.

The presence of distinct cointegrating vectors can be obtained by determining the significance of the characteristic roots of \( \Pi \). Both the Trace test and the Maximum Eigenvalue test are used to test the significance of the number of characteristic roots that are not different from unity, i.e.,

\[
\lambda_{\text{trace}}(r) = -T \Sigma \ln(1-\lambda_i) \tag{5}
\]

and

\[
\lambda_{\text{max}}(r, r+1) = -T \Sigma \ln(1-\lambda_{r+1}) \tag{6}
\]

Here \( \lambda_i \) is the estimated values of the characteristic roots obtained from the estimated \( \Pi \) matrix, \( r \) is the number of cointegrating vectors, and \( T \) is the number of observations. The critical values for these tests are tabulated in Johansen and Juselius (1990) and Osterwald-Lenum (1992).

In addition, we examine Granger-causality to test for the presence of short-run relationships among the short-term international interest rate series.
Essentially, the Granger-causality technique aims to determine how much of a current variable, Y, can be explained by the past values of Y, and whether adding lagged values of the other variable, X, can increase the explanatory power. Given two variables Y and X, Y is said to be Granger-caused by X if X helps predict Y, that is if the coefficients on the lagged Xs are statistically significant. F-statistics can be used to measure statistical significance at the usual confidence intervals. A Granger-causality test has the following form (Granger 1969):

\[ Y_t = \beta_0 + \sum \beta_i Y_{t-i} + \sum \delta_j X_{t-j} + \epsilon_t \]  

(7)

and

\[ X_t = \delta_0 + \sum \delta_i X_{t-i} + \sum \gamma_j Y_{t-j} + \mu_t \]  

(8)

RESULTS

The first step in investigation of the long-term relationships among the short-term international interest rate series is to test the stationarity of the series. The tests of unit roots are performed using the Augmented Dickey-Fuller (ADF) and the Phillips-Perron (P-P) tests. The null hypothesis is that the short-term interest rate series have a unit root against the alternative that they do not. The models used in the unit root analysis include a constant and a trend term due to the presence of an increasing trend in all series. The results of unit tests for short-term international interest rates are conducted, but are not presented in the tables. Both the ADF and the P-P test results for stationarity in the levels and first differences of the series are conducted. The critical values of the test statistics are tabulated in MacKinnon (1991). The ADF and P-P tests show the null hypothesis of a unit root cannot be rejected at the 5% confidence level for the levels of short-term international interest rates. However, there is no evidence of the presence of a unit root in first differences of the series, i.e., the null hypothesis of a unit root in first differences is rejected for all series.

The difference transformation of series lead to stationary series. The presence of unit roots in the series indicates that all of the series are integrated of order 1, I(1). Since the time series are stationary in first differences, i.e., integrated of order one, we can proceed to the Johansen cointegration tests.

Tables 1 and 2 present results of tests for the number of cointegrating vectors in a sample of eight short-term international interest rates. We expect the cointegration implications to hold for the entire sample period and not just in periods of stable monetary policy. Although standard practice is to test for cointegration in sub-samples determined by changes in monetary operating procedures, cointegration implications should be robust to these changes unless risk premiums are affected by changing attitudes about risk. Since the one-to-one low frequency relationship between interest rates should not be dependent on the specific process generating short-term rates, we expect the cointegration implications to hold for the whole period and not just in periods of stable monetary policy.

The relationships between short-term international interest rates are investigated by employing the Johansen (1988) procedure with intercept in the equation. The results for bivariate cointegration tests between short-term international interest rates are reported in Table 1. Both the Trace test and the Maximum Eigenvalue test are used. The critical values for the test statistics are tabulated in Osterwald and Lenum (1992). The null hypothesis of no cointegration is rejected for US-JAP, CAN-GER, CAN-NET, and FRA-JAP. The Maximum Eigenvalue tests for these pairs are 22.55, 25.13, 30.06, and 21.44 respectively, statistically significant at the 5% level. Moreover, the results suggest a weak cointegrating relationship between the CAN-JAP, FRA-GER, FRA-NET, GER-JAP, and JAP-SWI pairs at the 10% level of statistical significance. The results are not statistically significant at the usual confidence intervals for the remaining 19 pairs.

Table 2 presents the results of multivariate Johansen cointegration tests for eight short-term international interest rate series. The null hypothesis of no cointegrating vector, \( H_0: r = 0 \), is rejected at the 5% level of statistical significance with both the Trace and Maximum Eigenvalue tests. The Trace test has a value of 134.82. The critical value for the Trace test is 131.70 at the 5% level of statistical significance. The Maximum Eigenvalue test has a value of 58.64. The critical value for the Maximum Eigenvalue test is 52.00 at the 5% level of statistical significance. In addition, the null hypothesis of \( H_0: r = 1 \) is rejected by the Maximum Eigenvalue test. These results suggest there are two cointegrating vectors (less than three) among the short-term international interest rates, implying there are statistically significant long-run relationships between at least two of these rates. However, a system of eight interest rates should have seven cointegrating vectors if a common trend affects the sample interest rates. The presence of two
cointegrating vectors in the series of eight interest rates suggests that a common trend does not affect these rates during the sample period.

We check the directional interaction among the interest rates by using Granger-causality tests (1969). A causal relationship exists if the prices in one market are determined by the prices in another market. If there is no causality, then lagged values of the prices in the first market should be of no use in predicting the prices in the second market once the past history of prices in the second market has been considered. We use first differences for each
Table 1: Bivariate cointegration test results for short-term international interest rates

Johansen (1988) test is used to examine the long-run relationship among the short-run international interest rates. The co-integration equation includes intercept term. Both the Trace test and the Maximum Eigenvalue test are used. The critical values for the test statistics are tabulated in Osterwald-Lenum (1992). The data includes the weekly short-term interest rates of US (US), Canada (CAN), France (FRA), Germany (GER), Japan (JAP), Netherlands (NET), Switzerland (SWI), and UK (UK).

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<th>Critical Value at 10%</th>
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<td>US-FRA</td>
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* indicates statistical significance at 10%
** indicates statistical significance at 5%
Table 2: Johansen cointegration test results for short-term international interest rates

Johansen (1988) test is used to examine the relationship among the short-run international interest rates. The co-integration equation includes intercept term. Both the Trace test and the Maximum Eigenvalue test are used. The critical values for the test statistics are tabulated in Osterwald-Lenum (1992). The data includes the weekly short-term interest rates of US, Canada, France, Germany, Japan, Netherlands, Switzerland, and UK.

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** indicates statistical significance at 5%
* indicates statistical significance at 10%
of the interest rates and conduct Granger causality tests in six lag orders, but do not report the results in tabular form.

The results suggest U.S. short-term rates have a statistically significant impact on interest rates in France, Japan, and the United Kingdom in the first lag order. Furthermore, there is evidence that U.S. short-term rates have a statistically significant impact on interest rates in Canada and the Netherlands in the fourth lag order. No significant impact is detected on interest rates in Germany and Switzerland. Results of tests for reverse causality from international interest rates to U.S. interest rates are also conducted. Statistically significant reverse causality is not detected between U.S. and international short-term interest rates in the first lag order. However, reverse causality is detected from Japanese interest rates in the third lag order and from Dutch interest rates in four of the lag orders. In general, the results document the existence of Granger causation from U.S. rates to international rates. However, the results document weak evidence of reverse causality between U.S. rates and international rates of similar maturity.

**SUMMARY**

We expand on previous interest rate studies by testing for cointegration in a system of short-term international interest rates. We test for stationarity of the individual time series using the Augmented Dickey-Fuller (ADF) and Phillips-Perron (P-P) tests. Since the results suggest the time series are stationary in first differences, we use the Johansen (1988) procedure to examine the long-run relationship between eight international interest rates. The results provide evidence of cointegration for at least two of the international short-term interest rates. When we include more than two rates in our tests, we do not find one common trend driving interest rates. We interpret the results as consistent with the evidence of Kleimeier and Samder (2000) since there is only weak evidence of cointegration for international interest rates of similar maturities.

We also present Granger-causality results to test for the presence of short-run relationships among international interest rates of similar maturities. The results document evidence of Granger-causation from short-term U.S. interest rates to five international short-term rates and are consistent with previous studies that suggest a relationship between monetary environment and market returns. However, there is only weak statistical evidence of reverse causation between interest rates.

**REFERENCES**


INTRODUCTION

The purpose of this paper is to describe the design and delivery of an MBA course in corporate valuation that is suitable for teaching by properly motivated and prepared accounting faculty. The topic and the course are linked closely to the change process currently underway in both accounting education and accounting practice. Accounting faculty also fill a service role in addition to their role in educating majors. The vast majority of MBA students are not undergraduate accounting majors. For those students, delivery of an applied course requiring a heavy dose of accounting and finance is a challenge and provides great rewards.

This paper describes the structure, content, delivery, and outcomes of the course. The course uses the Economic Profit (EP) and Free Cash Flow (FCF) models to estimate firm value. The course focuses on applying textbook knowledge to the valuation of an actual publicly held company. Attributes of the course include a significant emphasis on team work, oral presentation of arguments, role playing (in the form of consulting teams and boards of directors), applied research on the company under study, application of a spreadsheet model to organize data and calculate results, and some written reflective thoughts in the form of a paper. The course has no written exams.

There is a philosophic “edge” to the course in that the fundamental premises of both the EP and FCF valuation models present alternatives to the focus on GAAP income and EPS that currently dominate our financial accounting curriculums and the business news. Indeed, one of the required readings for the course directly confronts the current accounting measurement system as a major contributing factor in the ethical deterioration of managers and auditors that have received so much recent attention.

CHANGE PROCESS IN THE ACCOUNTING CURRICULUM

The publication of the joint project on accounting education (Albrecht 2000) painted a dire picture of the state of accounting education. Subsequently backed up by the AICPA (AICPA 2000b), the report charges that accounting education is based on old models of pedagogy, relies on fact memorization, encourages a “silo” mentality, and produces too many graduates ill suited for the new business environment. The suggested result of the collective failure of creativity and lack of focused response to environmental change by accounting faculty is lower enrollment, diminished resources, and a perilous future. Other publications critiquing accounting education include (AAA 1986, Accounting Education Change Commission 1990, Ainsworth 1993, Albrecht 1994, AICPA 2000a). Other researchers question some of the reasons for the decline cited by Albrecht (Nelson (2002), Boone (2002).
The Institute of Internal Auditors (IIA 1999, McNamee 1998) and The Institute of Management Accountants (IMA 1994, 1999a, 1999b) issued strong calls for change in the skill sets that their professionals need in the current environment. The IIA focus on risk management requires a broader view of business than the control approach habitually used in curriculums. The IMA has also identified more broadly based skill sets than we traditionally associate with management accounting. The IMA renamed its journal *Strategic Finance*. Not a word about accounting in that title. The three major professional organizations that represent the vast majority of employment settings desired by graduating accountants all recognize that a changed business environment requires different skills of our graduates.

Spurred by the need for change expressed by the various professional bodies, accounting researchers proposed several forms of curriculum renewal (Porter (1999), Catanach (2000), Lancaster (2001), Walker (2001). I was unable to find a valuation course relying heavily on accounting information taught as a required course in an MBA or MS in accounting curriculum. It is interesting that Albrecht (2000) cites an integration of accounting with finance as one possible option for curriculum reform. The course described here could be taught by either Accounting or Finance faculty and cross-listed between the two departments.

**CHANGING THE FOCUS OF FINANCIAL STANDARD SETTING**

We generally acknowledge that the value of the firm is equal to the present value of future cash flows discounted at an appropriate rate. However, the acknowledgement seldom finds its way into the accounting model in practice. Rappaport (1986) notes that in “both corporate reports and the financial press, there is an obsessive fixation on earnings per share (EPS) as the scorecard of corporate performance”. Since 1986 things have only gotten worse. Stewart III (2002) quoted a law professor testifying at the hearings before the US Senate Committee on Governmental Affairs who had in turn quoted the Enron risk manual as follows:

Reported earnings follow the rules and principles of accounting. The results do not always create measures consistent with underlying economics. However, corporate management’s performance is generally measured by accounting income, not underlying economics. Risk management policies are therefore directed at accounting rather than economic performance.

Stewart claims that the underlying accounting model, at times at odds with economic reality, motivates managers to undertake actions that are destructive of firm value. Such actions may include pricing out acquisitions at the cost of debt with resulting overly leveraged balance sheets, paying out huge compensation awards to managers who have failed to earn economic return for shareholders, and blinding managers to the wisdom of disinvestments because of large reported book losses. These are but a few of the problems attributed to the earnings model. If in fact these claims are valid, then what is really required is to educate all business students about the economic basis for value.

Rappaport (1986, 1998), Stewart III (1991), and Copeland (2000) have written comprehensive coverage of the applied theory and techniques for measuring the creation of shareholder value in the economic rather than accounting sense. None are written as textbooks but rather as trade books. In the first generation of the course described here, I used the Stewart book. I currently use the Copeland book. Domodoran (1994) summarizes and gives examples of a wide range of valuation techniques. However, the structure and currency of Copeland’s book

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1 There are several examples of course designs within the Finance area, usually aimed at Finance majors. The author is currently conducting a search for these additional models.
as well as the authors’ extensive experience with McKinsey & Co. supports the semester-long project that energizes the course. ²

RELEVANCE TO ACCOUNTING STUDENTS AND FACULTY

Valuation and litigation support services rank among the top several niche services in the large professional services firms. Additionally, CPAs in small firms can also establish a valuation practice. See, for example, Pratt (1996, 1998) describes the special circumstances surrounding the valuation of privately held firms. The AICPA supports the ABV certification. The National Association of Certified Valuation Analysts (NACVA) supports the CVA certification. Internal auditors seeking to implement the new risk management paradigm must be able to understand, explain, and implement strategic risk in the context of economic value preservation and growth. Management accountants must live up to the title of their new journal, Strategic Finance. So there are career-oriented reasons for accountants to learn the principles and techniques of valuation. There also exists a professional rationale based on the use of accounting data in valuation that legitimizes the interest of accounting faculty in teaching valuation topics. Lee (1999) notes that valuation research, “which focuses on the use of accounting information to estimate shareholder value, has emerged as a central theme in the accounting research of the 1990s”*. For examples, see Myers (1999), Halsey (2001), and Christensen (2002) for examples of research focused on the residual income model and cost of capital topics.

COURSE HISTORY

The course was designed and offered the course for the first time in 1993 in an AACSB accredited graduate MBA program of moderate size. The course was cross-listed as accounting and finance and offered as an elective. Students seeking an accounting or finance concentration could use the course to satisfy either. Students could also elect to take the course as a free elective. In 2000, at an AACSB-I candidate graduate MBA program of moderate size, I updated the course, adopted Copeland (2000) in place of Stewart (1991), and designed a spreadsheet to structure the students’ analytical work. The course was accepted as part of the curriculum review process as a required course. I have taught seven sections of the course with the current design. The results in both settings have been professionally fulfilling. It is feasible to teach a project and team-oriented, demanding course to general MBA students that results in mastery of fundamental concepts like cost of capital, free cash flow, economic profit, and value creating strategies.

Figure 1 illustrates the positioning of the course in the MBA curriculum. The course is designed for students to take in the later stages of the MBA curriculum. I depend on prerequisite courses in financial accounting, managerial accounting analysis, and corporate finance as the technical underpinning for the course. Additional courses in operations, leadership and team

² Two reports, the AICPA sponsored Improving Business Reporting - A Customer Focus (The Jenkins Report, 1994) and the AIMR sponsored Financial Reporting in the 1990s and Beyond (1992) made recommendations based on the priorities of users of financial statements. The reports’ recommendations, if implemented, could have guided published reporting practice to focus on issues and to use formats more suitable to economic value analysis than current reports. The reports are of fundamental importance to the direction of financial accounting because they focus on providing hard information about business operations - in a way that users can understand and apply in valuing a company or assessing its strategies. The reports’ major recommendations included: 1) greatly strengthening segment disclosures, 2) protecting and enhancing quarterly financial reporting, and 3) requiring more forward-looking information and discussion. In the case of the AICPA report, disclosure and discussion recommendations extend to operational measures used at the segment level.
building as well as persuasive communication and negotiation provide some of the supplementary skills that both reduce practical problems and raise the general level of team and communication skills. The valuation course strengthens the ability of the student to analyze strategies from the value perspective in the capstone strategy course that follows it.

**PHILOSOPHICAL APPROACH AND DELIVERABLES**

There are several artifacts developed to enhance and enliven the learning and applications of the philosophy, strategy, and methods of corporate value creation.

*Teams assume responsibility* for effectively completing their tasks. Teams self organize on the first night. Most students have already caucused and have teams ready to go. The teams select a team name. Teams submit weekly management reports. At the end of each of the two presentations, teams complete a self-assessment on five dimensions of their work.

The essential conceit for the semester is that the MBA *teams role play consultants* competing to be hired by the subject firm’s board of directors. The two presentations to the board are done formally. Class members not currently presenting are in the role of board members and ask questions of the consulting teams in that role.

Teams and individuals deliver the following: PowerPoint slides, completed spreadsheet model, weekly management reports, self assessments after each presentation, and an end of semester twenty page paper.

**OUTCOMES**

Apostou (1999) in her essay on outcomes assessment quotes the American Accounting Association’s Outcomes Assessment Committee (AAA 1993, 1) definition of outcomes assessment as “an assessment of learning outcomes, and provides information on the question: What has been the learning achievement produced by the intervention in meeting particular goals?” I believe that the classes have met the learning goals set out in the syllabus. Formal and informal feedback from students in both settings has been very positive. I personally have found the course to be highly challenging and very fulfilling. There is of course no way to generalize. There have been only ten sections taught, approximately 250 students, and all by one instructor. Any measure of success in the course can be caused by the enthusiasm of the instructor and the perceived newness or importance of the new model or design to both instructor and student (Jensen 1998).

**SUMMARY**

In The Goal (Goldratt 1992), Jonah reveals the purpose of business – to make money. Goldratt uses the Theory of Constraints to critique traditional measures of efficiency such as standard costing systems as antithetical to that goal, and to propose operational measures and processes that are superior to the accepted methods. So too at the firm level, the currency we

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3 The course syllabus, and files (PowerPoint and Excel) that contain the presentations and the supporting work for an MBA team in Fall 2003 are available from the author as an example of the course process and outcomes. The files are also illustrative of the kinds of concepts that the course teaches. Each new class receives a completed valuation for another company so that they have a full model to study. Thus, the class for the Spring 2004 semester that will value Advanced Micro Devices receives the finished product from one of the teams that valued McGraw-Hill. Other elements of outcomes are represented by student course evaluations.
need to learn is economic profit and free cash flow. Emphasis on earnings alone sends the wrong signals to management in terms of appropriate strategy and policy, confounds attempts to link compensation to value creation, and enforces a myopic view of the value creation process. We ought to treat the process of value creation in the firm as a whole with at least as much rigor as we pay to the acquisition of a machine in one of its plants. This course provides a way to do just that.

**REFERENCES**


Evaluating Personal Finance Tools and Software

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Professor Ricardo Ulivi has been teaching personal financial planning for over 15 years at California State University-Dominguez Hills. In addition, he has a successful consulting practice, Ulivi Wealth Management, in Orange County.

Professor Prakash L Dheeriya has been teaching corporate and international finance for over 10 years at California State University-Dominguez Hills. Professor Dheeriya consults with small businesses, high net worth individuals and Los Angeles County through his practice, Fintelligence. In addition, he conducts seminars for Los Angeles Society of Financial Analysts.

Evaluating Personal Finance Tools and Software

ABSTRACT

There are several commercially available financial tools at the disposal of advisors to determine if a client will meet his/her goals. The major drawback of most of these tools is that they require a steep learning curve and data inputting is time-consuming. Also, some of these tools do not cover all the areas necessary for a good financial evaluation. A more important problem is that most of these tools lack a quick way of evaluating personal finances. Having this ability would be particularly important during the initial meeting where an advisor gets to meet the prospective client. In other words, wouldn’t it be helpful is there were a tool that could quickly and without much effort diagnose someone finances? This paper introduces such methodology.

References:

Using Educational Technology in the AIS Curriculum: Guidance from the Accounting Profession and its Scholars

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Abstract

Bryant and Hunton (2000) provide a review and analysis of research relating to educational technology (ET). They draw from the body of research in the academic domains of education and psychology. Bryant and Hunton summarize and classify the ET studies by type and theoretical perspective. The studies they examine have largely been developed based on one of two alternative approaches, either behavioral or cognitive theory. The studies also differ in their emphasis on attributes of ET media, attributes of learners, and the interactions among those attributes.

As an important product of their work, Bryant and Hunton (2000) suggest a set of 7 guidelines based on the implications of their findings. Their guidelines provide a framework for the delivery of accounting instruction. Unlike most of the individual ET studies they examined, their guidelines reflect a broad focus and a synthesis of behavioral and cognitive theory. In addition to the guidelines, they also suggest that in selecting technology appropriate to an accounting class or assignment, educators consult the International Federation of Accountants (IFAC) International Education Guideline No. 11, Information Technology in the Accounting Curriculum (IFAC 1995).

The AICPA has endorsed the development of The AICPA Core Competency Framework for Entry into the Accounting Profession. This document also offers guidance for accounting educators in the implementation of curriculum change. It reflects current and future needs for basic competencies identified in the AICPA vision process, and should be considered along with the earlier IFAC/AICPA recommendations.

The focus of this paper is the use of ET in the undergraduate AIS course. The goal of the paper is to provide further synthesis of prior research and professional recommendations and to use Bryant and Hunton’s (2000) guidelines to provide additional suggestions for the use of ET in the undergraduate AIS course. Our suggestions are compiled and presented primarily in the context of:

- Bryant and Hunton’s (2000) guidelines and suggestions
- The Rebele et al. (1998) classification model of ET by type
- The IFAC’s recommended core IT knowledge and skills
- The strategies and issues identified by the AICPA’s task force for implementing IFAC’s core content
- The AICPA Core Competency Framework for Entry into the Accounting Profession.
- The AICPA’s literature pertaining to the Computerized Uniform CPA examination to be launched in 2004.
Accounting education has been changing during the past two decades to accommodate the advance of technology in the world. The growing use of technology in all aspects of our lives has affected educational programs in accounting in several ways. Business today is rarely conducted without the assistance of computer systems and related devices. An accountant’s basic education must include general knowledge of and the ability to use general-purpose computing hardware and software. In addition, educators have adopted computing technology as a means of delivery of educational experiences and content. This paper builds on prior research to propose a framework for AIS educators connecting AIS content and educational technology (ET) using related research as a backdrop.

In their recent paper, Bryant and Hunton (2000) provide a review and analysis of research relating to educational technology. They draw from the body of research in the academic domains of education and psychology. Bryant and Hunton (2000) summarize and classify the ET studies by type and theoretical perspective. The studies they examine have largely been developed based on one of two alternative approaches, either behavioral or cognitive theory. The studies also differ in their emphasis on attributes of ET media, attributes of learners, and the interactions among those attributes.

As an important product of their work, Bryant and Hunton (2000) provide guidance for accounting educators. They suggest a set of 7 guidelines based on the implications of their findings. These guidelines provide a framework and set of related suggestions to guide the delivery of accounting instruction. Unlike most of the individual ET studies they examined, their results reflect a broad focus and a synthesis of behavioral and cognitive theory.

In addition to their guidelines, Bryant and Hunton (2000) suggest that in selecting technology appropriate to an accounting class or assignment, educators consult the International Federation of Accountants (IFAC) International Education Guideline No. 11, Information Technology in the Accounting Curriculum (IFAC 1995). This document is currently published by the IFAC, as is a report of the AICPA Technology Curriculum and Competency Model Task Force of its Academic and Career Development Executive Committee and Information Technology Executive Committee. That report is entitled Strategies of the American Institute of CPAs for the Implementation of International Education Guideline 11, Information Technology in the Accounting Curriculum.

The IFAC/AICPA documents provide Information Technology (IT) educational requirements for professional accountants at both the “prequalification” and “postqualification” levels. The prequalification requirements reflect “entry level” IT knowledge. The AICPA document suggests that these requirements can be met with, at a minimum, two college courses (with the caveat that the material might be integrated across a number of courses.) Traditionally, accounting majors have been required to earn credit for at least one undergraduate course in Accounting Information Systems (AIS), and to learn additional IT skills in other courses. In many programs, a systems-based “service course” in which basic IT skills and/or theory are learned is a prerequisite to the AIS course in the accounting sequence.

The AICPA has endorsed the development of the AICPA Core Competency Framework for Entry into the Accounting Profession. This document also offers guidance for accounting educators in the implementation of curriculum change. It reflects current and future needs for basic competencies identified in the AICPA vision process, and should be considered along with the earlier IFAC/AICPA recommendations.

Although the works described and compiled by Bryant and Hunton (2000) are focused on ET in general, and the use of ET should be growing across the accounting curriculum, the focus of this paper is the use of ET in the undergraduate AIS course. This focus must still be narrowed considerably owing to the multitude of accounting-related IT skills and issues that are important to success for entry-level accountants, and the applicability of ET for teaching so many of them.

The content of the AIS course varies, probably more than in most courses in the accounting curriculum, from program to program. The emphasis may be on theory, with practical application used as an accompaniment, or perhaps focus on teaching the use of software skills and packages or use service learning as the primary vehicle for learning about information systems.
The process of learning AIS concepts and skills is inseparable from learning IT concepts and skills. It also overlaps skills needed to successfully use ET. To further complicate matters, candidates for the Uniform CPA examination will need personal IT skills in order to successfully handle the exam itself, which will be computerized beginning in 2004. Spreadsheet skills and the ability to navigate the professional literature electronically will be required in the new “simulation” portions of the exam.

The goal of this paper is to provide further synthesis of prior research and professional recommendations and to use Bryant and Hunton’s (2000) guidelines to provide additional suggestions for the use of ET in the undergraduate AIS course. Our suggestions are compiled and presented primarily in the context of:

- Bryant and Hunton’s (2000) guidelines and suggestions.
- The Rebele et al. (1998) classification model of ET by type.
- The IFAC’s recommended core IT knowledge and skills.
- The strategies and issues identified by the AICPA’s task force for implementing the IFAC’s core content.
- The AICPA Core Competency Framework for Entry into the Accounting Profession.
- The AICPA’s literature pertaining to the Computerized Uniform CPA examination to be launched in 2004.

Prior to addressing each of these areas, we consulted prior studies and our own experiences with AIS courses in order to expand the list of ET methods and tools reported by Bryant and Hunton (2000). We have also assembled a list of AIS concepts and skills. These two lists provide examples and provide a basis for discussion in the remainder of the paper. The list of ET methods and tools is classified in keeping with Rebele et al. (1998) and expands upon that of Bryant and Hunton (2000). It is shown below. As noted above, we also compiled a list of AIS concepts and skills. The source of items for the primary portion of this list is the International Federation of Accountants (IFAC) International Education Guideline No. 11, Information Technology in the Accounting Curriculum (1995). IFAC’s suggested series of core IT knowledge and skill areas for professional accountants are classified primarily by professional role. They include General Information Technology Education Requirements and the Professional Accountant as User, Manager, Designer, or Evaluator of Business Systems. The last three roles are dependent upon the work domain of a particular professional. For example, accountants preparing to work in industry or commerce would need a different set of basic skills than those preparing for careers in public practice or the public sector. IFAC (1995) also suggests that as an entry-level professional (the “prequalification” level) an accountant should be able to “operate in at least two roles, the user role and one of the other three roles,” depending on their work domain. This means that the undergraduate AIS course(s) have a great deal of content to cover! Since IFAC suggests that content designated for the manager, designer, and evaluator roles should each constitute an additional AIS course, we limit our attention in this paper to the General IT and User requirements. Many of the topics included in the material suggested for the specialized roles are also included at a more elementary level for the General IT and User roles. The IFAC (1995) suggests that coverage of the General IT material requires the equivalent of two college-level courses. Like the AICPA (1996), they acknowledge, however, that some of the topics may be integrated into other courses in the accounting curriculum. Some (such as basic spreadsheet and word-processing skills) are generally covered in a prerequisite “service” course. The IFAC (1995) list of AIS concepts and skills at the general IT and user levels is shown in Table 2.
### Table 1
Educational Technology – Types of Methods and Tools

<table>
<thead>
<tr>
<th>Educational Technology Types</th>
<th>Methods and Tools</th>
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<tbody>
<tr>
<td><strong>Computer-based learning (CBL)</strong></td>
<td>Drill and practice</td>
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<tr>
<td>Computer-assisted Instruction (CAI):</td>
<td>Tutorials (traditional CAI) and Intelligent Tutorials</td>
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<td></td>
<td>Simulations</td>
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<td></td>
<td>Game-Playing</td>
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<td>Computer-assisted Teaching (CAT):</td>
<td>Electronic Transparencies</td>
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<td></td>
<td>Multimedia Presentations</td>
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<td></td>
<td>Virtual Reality (3 dimensional display) Presentations</td>
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<td>Electronic Blackboards</td>
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<td></td>
<td>Labs allowing for electronic observation/change of student work</td>
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<td></td>
<td>GroupWare-supported lessons</td>
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<td>Computers for Research:</td>
<td>CD-ROM research databases</td>
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<td></td>
<td>Internet-based research</td>
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<td></td>
<td>Company intranet research (e.g. Database/Data warehouse queries)</td>
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<td></td>
<td>Statistical research (see also CCP), Data mining</td>
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| Computers for Computing and Processing (CCP): | Spreadsheets |
| Software tools (e.g. Word Processing, Database, Graphics, Presentation, Telecommunications, Desktop Publishing) |
| Accounting Packages |
| Statistical Analysis Packages |
| Generalized Audit Software, Audit Program Generators, CAATs |
| Utility Programs (sort, format, copy, etc.) |
| Workflow Technologies |
| CASE (Computer-assisted systems engineering) tools |

**Other Technologies**

<p>| Audio | Computer-assisted language learning |
| Audio tapes, cassettes, CDs |
| Internet-based streaming audio (see multimedia) |
| <strong>Still Pictures (non-computer-based technologies)</strong> | Overhead transparencies |
| Drawings |
| Photos |
| Filmstrips |
| Specimens or documents in Document Camera |
| <strong>Television &amp; Film</strong> | Traditional Videotapes |
| Instructional film |
| One-way instructional TV (live or taped) |
| Centralized cable network delivery to classrooms |
| <strong>Distance learning</strong> | Interactive TV |
| Virtual Classroom |
| Satellite Classroom |
| Web-based: |
| Interactive chat (synchronous) |
| Asynchronous delivery (Multimedia, Video Lectures, see CAI) |</p>
<table>
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<tr>
<th>Hypermedia (also incorporated in other categories above)</th>
<th>HyperCard</th>
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<tbody>
<tr>
<td>Interactive Multimedia</td>
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<td>World Wide Web</td>
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<td>Role-playing</td>
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<tr>
<td>Applet-based lessons and games</td>
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<td>Email links</td>
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<td>File sharing</td>
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<td>Web-delivered textbooks</td>
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</table>

**Table 2**

**AIS Concepts and Skills for the Undergraduate Accounting Student - IFAC (1995)**

<table>
<thead>
<tr>
<th>General IT Education</th>
<th>Information technology concepts for business systems</th>
</tr>
</thead>
</table>
| IFAC items: professional accountants must have at least a general level of knowledge of each of these content areas for prequalification. | • General systems concepts  
• Management use of information  
• Hardware  
• System software  
• Application software  
• Data organization and access methods  
• Networks and electronic data transfer  
• Transaction processing in typical business and accounting applications  
Internal control in Computer-based business systems (special emphasis here)  
  • Control Objectives  
  • Control Environment  
  • Risk Assessment  
  • Control Activities  
  • Monitoring of control compliance  
Development standards and practices for business systems  
  • Role of information in organization design and behavior  
  • System design techniques  
  • System acquisition/development life cycle phases, tasks, and practices and maintaining control over system development processes  
Management of IT adoption, implementation, and use  
  • Strategic considerations in IT development  
  • Administrative issues  
  • Financial control over IT  
  • Operational issues  
  • Management of system acquisition, development and implementation  
  • Management of system maintenance and change  
  • Management of end-user computing  
Evaluation of computer-based business systems  
  • Legal, ethical, auditing and information system control standards  
  • Evaluation objectives  
  • Evaluation methods and techniques  
  • Communicating results of evaluations  
  • Following up  
  • Specific types of evaluations  
  • Computer-assisted audit techniques |
We have also compiled additional items that we believe to be widely represented in AIS courses. Our beliefs are based on our own experiences in teaching, ongoing review of conference materials and the media, continuing professional education experiences, involvement in accounting-related service activities, and upon our familiarity with topics generally covered in standard AIS texts that we have used or reviewed during the past several years. We have added these items as an update because the IFAC list was compiled 5 years ago in an environment that is changing rapidly. We also added items that are specific to accounting students in the United States, but not addressed by IFAC because it is an international organization. Still other items were added because they appear either as a part of The AICPA Core Competency Framework for Entry into the Accounting Profession, or as a part of the AICPA’s (1996) list of strategies for implementing IFAC’s recommendations. Our list has also been classified according to the system used by IFAC (1995) and are listed in Table 3 below.
<table>
<thead>
<tr>
<th><strong>General IT Education</strong></th>
<th><strong>AIS Concepts and Skills for the Undergraduate Accounting Student – Additional Suggestions</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AIS Accounting Cycles</strong></td>
<td>Database – basis of enterprise information systems</td>
</tr>
<tr>
<td></td>
<td>Object-oriented programming and databases</td>
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<td>Information Systems Audit concepts beyond Internal Control</td>
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<td></td>
<td>• System security</td>
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<td>• Viruses</td>
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<td></td>
<td>• Hackers</td>
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<tr>
<td><strong>IT department/function structure</strong></td>
<td>Attest vs. Assurance services</td>
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<td></td>
<td>Professional service initiatives</td>
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<td></td>
<td>• WebTrust</td>
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<td></td>
<td>• SysTrust</td>
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<td></td>
<td>• Eldercare</td>
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<tr>
<td><strong>e-commerce – general knowledge</strong></td>
<td>• EDI</td>
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<tr>
<td></td>
<td>• Regulatory Environment</td>
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<tr>
<td></td>
<td>• Internet Security Standards</td>
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<td></td>
<td>• Cryptography/Authentication/Digital Certificates</td>
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<tr>
<td></td>
<td>• Firewalls and security issues</td>
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<tr>
<td></td>
<td>• Web-based marketing</td>
</tr>
<tr>
<td><strong>Other Web-based issues:</strong></td>
<td>• Privacy rights/regulation</td>
</tr>
<tr>
<td></td>
<td>• Intellectual property rights</td>
</tr>
<tr>
<td><strong>Knowledge of one high-end/Enterprise Software system</strong></td>
<td>Strategic, conceptual understanding of information technology as a resource to enable achievement of business objectives.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>User Role</strong></th>
<th><strong>Presentation software</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Design tools/development software (flowcharts, entity relationship diagrams, data flow diagrams, unified modeling language)</td>
</tr>
<tr>
<td></td>
<td>Generalized Audit Software</td>
</tr>
<tr>
<td></td>
<td>Computer-assisted audit tools</td>
</tr>
<tr>
<td></td>
<td>Database – design and basic data modeling</td>
</tr>
<tr>
<td></td>
<td>Database queries</td>
</tr>
<tr>
<td></td>
<td>Web-related topics</td>
</tr>
<tr>
<td></td>
<td>• Web research</td>
</tr>
<tr>
<td></td>
<td>• Technology of the Web</td>
</tr>
<tr>
<td></td>
<td>• XBRL (Extensible Business Reporting Language)</td>
</tr>
<tr>
<td></td>
<td>• Intelligent Agents</td>
</tr>
</tbody>
</table>
Having compiled sets of both educational technologies and of AIS concepts and skills that might be taught using those technologies, our next step is to suggest matches between the two sets. The remainder of the paper represents our attempt to suggest applications of ET for teaching AIS that conform to the guidelines suggested by Bryant and Hunton (2000). Their seven guidelines are quoted below. For each of them, we have identified a set of educational technologies and a corresponding set of AIS concepts and skills that we suggest are an appropriate fit with regard to the selected guideline. Where possible we begin with or add notes about Bryant and Hunton’s (2000) specific recommendations for implementation of the guideline.

<table>
<thead>
<tr>
<th>“Guideline #1: For learning to be most effective, students should be both cognitively and physically engaged in the task.”  (interaction or active involvement facilitates cognitive engagement)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AIS Concept or Skill</strong></td>
</tr>
<tr>
<td>Any general IT Education topic</td>
</tr>
<tr>
<td>Any general IT Education topic</td>
</tr>
<tr>
<td>Legal environment, risk assessment, viruses, hackers, professional service initiatives, cryptography etc., web-based marketing, web-related user topics</td>
</tr>
<tr>
<td>Any general IT Education topic</td>
</tr>
<tr>
<td>Internal control activities</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>“Guideline #2: Students should know a priori what the objectives of the assignment are, and they should be able to determine ex post whether they met those objectives.”</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AIS Concept or Skill</strong></td>
</tr>
<tr>
<td>E-mail</td>
</tr>
<tr>
<td>Database design/modeling</td>
</tr>
<tr>
<td>Hardware/networks &amp; data transfer</td>
</tr>
<tr>
<td>Any general IT Education topic</td>
</tr>
<tr>
<td>Risk analysis, hardware controls, (examine a computer room and identify physical risks)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>“Guideline #3: Feedback should be given to students to monitor their progress and reinforce positive behavior.”</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AIS Concept or Skill</strong></td>
</tr>
<tr>
<td>Any objective topic</td>
</tr>
<tr>
<td>Any general IT Education topic</td>
</tr>
<tr>
<td>Organization design &amp; behavior</td>
</tr>
<tr>
<td>Using basic accounting packages</td>
</tr>
<tr>
<td>Ethics, internet privacy rights, intellectual property</td>
</tr>
</tbody>
</table>
“Guideline #4: Individual characteristics of the learner should be taken into account in instructional design, e.g. the prior knowledge of the student; the student’s level of motivation and, relatedly, mental effort; and the learning style of the student.”

<table>
<thead>
<tr>
<th>AIS Concept or Skill</th>
<th>Educational Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Legal environment, risk assessment, viruses, hackers, professional service initiatives, cryptography etc., web-based marketing, web-related user topics</td>
<td>Guided web searches with detours (for more background information) and shortcuts (for those with greater prior knowledge) as needed</td>
</tr>
<tr>
<td>Any general IT Education topic</td>
<td>Presentations (multimedia, web lectures, etc.), tutorials with detours and shortcuts, web-based textbooks with supporting links to additional content as needed</td>
</tr>
<tr>
<td>Hackers/Viruses/security threats/risk assessment</td>
<td>GroupWare – interaction with peers of different experience levels</td>
</tr>
<tr>
<td>Any general IT Education topic</td>
<td>Frequent online quizzes with feedback and explanations of errors and correct answers</td>
</tr>
<tr>
<td>Any general IT Education topic</td>
<td>Use a variety of ET to accommodate more &amp; different learning styles</td>
</tr>
<tr>
<td>Learning software packages</td>
<td>Labs allowing for electronic observation/change of student work</td>
</tr>
</tbody>
</table>

“Guideline #5: Tasks using ET should be organized from simple to complex.”

<table>
<thead>
<tr>
<th>AIS Concept or Skill</th>
<th>Educational Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operational issues (e.g. choosing strategies), ethical issues, legal issues, regulatory issues</td>
<td>Applet-based lessons and games that start simple and rather obvious but become increasingly difficult</td>
</tr>
<tr>
<td>Database design &amp; basic data modeling, queries</td>
<td>Begin with a single table, add design concepts progressively until the design can be implemented and tested</td>
</tr>
<tr>
<td>Hackers/Security</td>
<td>Tutorials with web links to content (Begin with interesting “war stories” on the web, progress to elements/design of security provisions.)</td>
</tr>
<tr>
<td>Legal, ethical, auditing standards</td>
<td>Begin with rules that are clearly interpretable (tutorials, CAI), proceed to questions with no easy answer (GroupWare, chats, submit essay via email or web page)</td>
</tr>
</tbody>
</table>

“Guideline #6: Where possible, learners should progress through the lesson at their own pace.”

<table>
<thead>
<tr>
<th>AIS Concept or Skill</th>
<th>Educational Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any general IT Education topic</td>
<td>Computer Assisted Instruction (CAI) – tutorials with multiple choice quiz questions interspersed, Asynchronous web-delivered courses, web presentations (e.g. PowerPoint-based), online (streaming audio &amp; video) lectures that can be stopped and restarted.</td>
</tr>
<tr>
<td>Risk analysis, hardware controls, (examine a computer room and identify physical risks)</td>
<td>Photos or virtual-reality scenes with interactive feedback, no time limits &amp; student controls view of scene</td>
</tr>
<tr>
<td>Objective/procedural topics (rules, control objectives)</td>
<td>Multimedia presentations, one-way video, online textbooks, drill and practice</td>
</tr>
</tbody>
</table>
Guideline #7: The instructor should attempt to match higher-order learning objectives with ET that is more conducive to higher-order thinking, and lower-order learning objectives with ET that is more conducive to lower-order thinking.

<table>
<thead>
<tr>
<th>AIS Concept or Skill</th>
<th>Educational Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Procedural learning (e.g. rules of data modeling)</td>
<td>Drill &amp; practice tutorials, online textbook, presentations or online lectures with frequent quizzes</td>
</tr>
<tr>
<td>Practical data modeling</td>
<td>Simulation, building a properly designed database and using it to produce prescribed results</td>
</tr>
<tr>
<td>Legal, ethical, auditing and information system control standards</td>
<td>Drill &amp; practice tutorials, online textbook, presentations or online lectures with frequent quizzes</td>
</tr>
</tbody>
</table>

It is clear that the number of potential combinations of AIS topics and educational technologies is endless. Our goal was to provide a greater number of examples than Bryant and Hunton (2000) included with their guidelines as an aid to AIS course developers. In addition, we have compiled a comprehensive list of both educational technologies and AIS concepts and skills for consideration. Clearly, none of these are definitive. Educational technology is constantly and rapidly advancing. We have arrived at a time in which ET is not only available, but must be used and taught in order to give accounting students the basic skills they need for entry to the profession. In this paper, we have tried to add to the general dialog about how this can be done by offering some practical suggestions.

References


ABSTRACT

This article compares COSO’s enterprise risk management framework with a proposed model from the American Association of Fraud Examiners (AAFE). The AAFE is stressing a more proactive audit along with other innovative techniques to improve an organization’s ability to counteract fraudulent activities. Enterprise risk management focuses on the entity itself in lessening the likelihood of a fraud occurring; management has a central role in the internal control component. By adopting one of the new systems, companies can expect to see an increase in the value assigned to their share prices. Organizations which have a strong control structure and are relatively free from fraud will most likely be viewed as a more prosperous investment than those companies which do not have an effective method to deal with fraud.
INTRODUCTION AND THE FRAUD EXAMINER’S MODEL

The American Association of Fraud Examiners (AAFE) has proposed a model for an organizational fraud deterrence program, because of the audit’s expectation gap. There is a difference between what the auditor assures investors with regard to the absence of fraud in financial statements and what investors perceive to be the case. Investors and other users of financial statements expect financial statements to be free of material misstatements including fraud. The proposed model would increase the transparency of an organization’s fraud prevention capabilities; which would allow stakeholders to better identify the risk involved in an investment in the entity (Wells 2003, 23).

In addition the AAFE suggests the proactive approach to reduce fraud as opposed to the detective approach which requires reasonable assurance by the auditor that their procedures will detect material misstatement due to fraud.

Using this new model to prevent fraud, the associations’ approach, auditors would turn their task from fraud detection to fraud prevention. The association uses a best practices concept that emphasizes processes for prevention to deter the potential fraudster. Fraud prevention is viewed as the most cost-effective method to minimize actual financial losses due to fraud. An actual fraud investigation can be quite costly, thus focusing on fraud prevention is a necessity. A proactive fraud detection program is a value adding activity; preventing a fraud before it occurs is more cost effective then dealing with the ramifications of fraudulent activities after they have been committed (Albrecht 2003, 66). In the model the best practices are
The COSO Enterprise Risk Management Framework

The COSO enterprise risk management framework suggests common terminology and principles that can be used by management as a guide in developing effective risk management architecture. John J. Flaherty, the chairman of COSO, expressed, "Although a lot of people are talking about risk, there is no commonly accepted definition of risk management and no comprehensive framework outlining how the process should work, making risk communication among board members and management difficult and frustrating." (Chapman 2003, 30). Each individual enterprise's risk management system will be somewhat unique; while there are commonly accepted guidelines that each organization should adhere to. A main objective of the COSO initiative is to provide guidance for entities to develop or benchmark enterprise risk management processes. Entities exist to provide value to their stakeholders. Uncertainty in the business environment has the potential to either erode or enhance value by being able to create risk or opportunity. A properly installed Enterprise Risk Management system "facilitates management's ability to both create sustainable value and communicate the value created to stakeholders." (COSO 1992, 2).

Management decisions can range from strategy setting to day-to-day operations overview. While enterprise risk management enables entities to align risk appetite and strategy, it also links growth, risk and returns. In addition risk response can be quickened and operational surprises while implementing risk management techniques can reduce losses as well as cross-enterprise risk. Also, response to multiple risks and the ability to seize opportunities and assess capital needs and improve capital allocations are possible.

Although enterprise risk management is a process effected by people, applied in strategy setting and applied at every level and business unit, the researchers are interested in top managements' perception of the reasonable assurance that the enterprise has achieved its objective and returned value to its stakeholders.

The objective of the enterprise as defined by COSO in its exposure draft is to enhance the strategic, operations, reporting and compliance of entities policies. Internal control processes are emphasized by COSO because of its orientation from Treadway. In addition, the components of enterprise risk management; internal environment, objective setting, event identification, risk assessment, risk response, control activities, information and communication and monitoring are juxtaposed in a matrix that integrates the relationship of the objectives with the components or enterprise risk management.
COMPARISON OF MODELS

The basic goal of any fraud prevention or detection model is to effectively eliminate material fraud in an entity; each model also needs functional information and communication systems in order to report fraud occurrences or to increase awareness (Cafferty 2003, 24). Both models require innovative procedures in order to be successful; ERM and the AAFE Model will each alter the way in which audits are conducted. While fraudulent financial statements are part of what enterprise risk management is trying to anticipate, how an enterprise goes about reporting in the two systems is critical.

An audit is widely regarded as a “value adding” activity; one whose benefits greatly exceeds its costs. Therefore, the main reward an organization will receive from adopting either one of these new systems is a noticeable increase in value attributable to the company as a whole. In a study conducted by KPMG, an impressive 80 percent of money managers would pay a premium for a company which has a noticeably strong governance structure. The premium assigned to companies which possess a solid fraud prevention program reaches approximately 11 percent (Watts 2003, 42). Financial performance is no longer the sole factor in determining whether a company is a solid investment opportunity. This survey also concluded that nearly half of the money managers questioned, “now consider that non-financial disclosure is as important as the financial statements when making their investment decisions, and around two thirds believe both regular appraisal of both the board and individual board members to be relevant. Equally, over 90 percent said that third party assurance over a company’s corporate governance practices would be helpful.” (Watts 2003, 42). Based on the study conducted by KPMG, it is evident that organizations will enjoy a monetary benefit if they adapt one of the new models.
### FIGURE 3

<table>
<thead>
<tr>
<th>AAFE MODEL</th>
<th>COSO-ERM</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Impact on Auditors</strong></td>
<td><strong>From Compliance to risk based</strong></td>
</tr>
<tr>
<td>- Huge change, not in standards</td>
<td>(Shenkin 2003, 51)</td>
</tr>
<tr>
<td>- Must judge the level of fraud prevention in an organization</td>
<td></td>
</tr>
<tr>
<td><strong>Advantages</strong></td>
<td><strong>Forward looking</strong></td>
</tr>
<tr>
<td>- Reduce audit liabilities</td>
<td>- Links organizational goals throughout the entity</td>
</tr>
<tr>
<td>- Increases financial statement transparency</td>
<td></td>
</tr>
<tr>
<td>- Decreases pass/fail audit bias</td>
<td></td>
</tr>
<tr>
<td><strong>Disadvantages</strong></td>
<td><strong>Takes learning curve and full entity participation</strong></td>
</tr>
<tr>
<td>- Must change culture and standards</td>
<td></td>
</tr>
<tr>
<td><strong>Similarities</strong></td>
<td><strong>Best practices approved by both models</strong></td>
</tr>
</tbody>
</table>

### REFERENCES


This study investigates the factors influencing variations in the accrual intensity and conservatism among firms whose financial statements are governed by the accounting regimes of nine industrial countries. Four of the countries have a common law legal heritage: Australia, Canada, the United Kingdom, and the United States. Five of the countries have a code law heritage: France, Germany, Japan, the Netherlands, and Switzerland.

The dependent variables in the study are accrual intensity and conservatism. Accrual intensity is measured as the absolute value of a firm’s total income accruals deflated by the firm’s average total assets. Conservatism is measured by the degree to which a firm’s accruals are income decreasing or increasing relative to its net cash flows from operations. This is merely the signed value of the firm’s total accruals deflated by average total assets.

The explanatory variables are the common or code law heritage of the firm’s accounting regime, the degree to which the firm’s home country affords legal protection for shareholder rights (La Porta et al. 1997), the degree to which the firm’s accounting regime mandates accruals (Hung 2001), the relative importance of bank-based versus market-based financing in each firm’s home country (Demirguc-Kunt and Levine 1999), and the country’s tolerance for risk as measured by Hofstede’s (1980) cultural measure of tolerance for risk.

After eliminating the firms in the top or bottom one percent in terms of deflated net income and cash flow from operations, 34,069 firm-year observations from the years 1994 through 2000 were used to test the associations between the dependent and explanatory variables.

Highly significant statistical test results support hypotheses that both accrual intensity and conservatism are greater in common law than in code law countries. In addition, firms from jurisdictions with relatively more mandated accruals, greater protection of shareholder rights, and relatively more market-based than bank-based financing have significantly larger total accruals (in absolute magnitude), and total accruals that are significantly more conservative (income decreasing).
FINANCIAL CALCULATORS AND THE TEACHING OF BUSINESS FINANCE

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ABSTRACT

Financial Calculators are well established as an important tool in the teaching of Business Finance. However, this was not always true. Reasonably priced financial calculators were introduced in the mid-70s. About a decade later in the mid-80s, financial calculators started being discussed in Business Finance textbooks. In this paper, a brief review of the history of financial calculators is given. Next, a discussion of how they are currently used is given.

INTRODUCTION

It almost goes without saying that financial calculators are an important part of any finance class, especially Business Finance. However, this was not always true. Some that are currently teaching finance can remember when finance was taught without financial calculators, or, for that matter, without microcomputers. Actually, it was not that long ago. I first taught Business Finance in the spring of 1974. The textbook used in my class was Essentials of Managerial Finance, 2nd edition, by Weston and Brigham. This was the leading undergraduate Business Finance book at that time. We worked the time value of money problems with the interest rate tables that came with the textbook. Calculations were made by hand. However, reasonably priced handheld financial calculators were just around the corner.

The first part of the paper will present some historical notes on the use of the financial calculator in Business Finance. In the second section of the article, some observations are given on how financial calculators are currently used in Business Finance. The paper ends with some concluding remarks.

SOME HISTORICAL NOTES

My first experience with reasonably priced handheld calculators was the TI-30 by Texas Instruments (TI). The TI-30 was one of the first fairly cheap scientific handheld calculators when it came out in 1976. It cost around $25. However, it was not long before TI came out with one of the first cheap (around $40) handheld financial calculators, the Money Manager. This calculator was impressive for the money. For example, you could solve all the time value of money problems quite easily without tables. In addition, linear regression could be done with the calculator. I used the Money Manager for several years (until around 1980). In the late 70s the Money Manager became the Business Analysts (BA) I. Then, in the early 80s, TI came out with the BA 35. During this period of time, students were instructed on how to use the financial calculator in my classes but were not required to have one for the Business Finance class.
In 1980, I purchased a Hewlett-Packard (HP) 38C financial calculator. This was an amazing calculator for the money (about $75). The 38C would not only do everything the BA I would do but much more. For example, the NPV and IRR could be calculated for uneven cash flows. Another useful feature of this calculator was that it was programmable. Programs could be written to solve some fairly complicated financial formulas. For example, I wrote some programs that could solve the Black-Scholes option model and the Molodovsky three-phase stock valuation model. The 38C was one of the first calculators with continuous memory. This meant that the calculator could be turned-off and the information stored in the calculator’s memory would not be lost as long as the battery was charged. With the Money Manager (or BA I), when you turned the calculator off all the stored information was lost.

HP came out with the HP-12C in 1983. This slim line calculator was a replacement for the fatter 38C. The 12C would easily fit in ones shirt pocket. The 12C was very popular with the financial community. As a matter of fact, it is still used today. It is one of the calculators that can be used on the current Chartered Financial Analysts (CFA) exam. Since the 12C is programmable like the 38C, some complicated finance formulas can be made easy to solve with the calculator. For example, the Molodovsky three phase stock valuation model can be solved with the 12C (Taylor, 1984). In addition, the Black-Scholes option model can be calculated with the 12C (Taylor, 1987).

During the mid 80s financial calculators were first introduced in Business Finance textbooks. Brigham introduced financial calculators with the 4th edition of Financial Management: Theory and Practice when it came out in 1985. This is one of the leading Business Finance textbooks at the MBA level. In the Preface (p. x) to this edition the following statement about financial calculators is made:

- In the third edition, we offered only the traditional approach to time value of money. In this edition, we have expanded that discussion to show how financial calculators can be used to solve most compound interest problems.

The following comment was also made at the beginning of the time value of money chapter, Chapter 4 (p. 90):

- This chapter and indeed the entire book, is written on the assumption that many students do not have financial calculators. The cost of these calculators is falling rapidly, however, so the assumption is becoming increasingly questionable. As a result, financial calculator solutions are set forth in footnotes to each of the major sections. Students are urged to obtain financial calculators and learn how to use them, for they—and not clumsy rounded and incomplete tables—are used exclusively in well-run, efficient businesses.

Weston and Brigham included a discussion of financial calculators with the 7th edition of Essentials of Managerial Finance, which also came out in 1985. This was one of the leading undergraduate Business Finance textbooks at that time. I started requiring students to use a financial calculator in my Business Finances classes in 1985. TI’s BA-35 (Business Analyst) was the first calculator I required in my classes. When the HP-10B came out in the late 80s, this financial calculator was required. Even though the 10B was $10 more than BA-35, the 10B was worth the extra $10. For example, the 10B would solve the NPV and the IRR for uneven cash flows, whereas the BA-35 would not do this. When the TI BAII-PLUS came out in the early 90s, I started requiring this financial calculator in my classes, and the BAII-PLUS is still required today.

**CURRENT USE**

One of the most widely used Business Finance textbooks at the undergraduate level is the 10th edition of Fundamentals of Financial Management by Brigham and Houston. This text strongly endorses the use of a financial calculator in teaching Business Finance. For example, the following comment was made at the beginning of the time value of money chapter, Chapter 6, p. 217:
This chapter was written on the assumption that most students will be using a financial calculator. Calculators are relatively inexpensive, and business students who cannot use them are often deemed obsolete and uncompetitive before they graduate.

Calculator applications are given throughout the text and a technology supplement on calculators is available to guide students in the use of several calculators. All the major basic financial management textbooks encourage or assume that students can use a financial calculator. This widespread use of financial calculators in the teaching of Business Finance is compelling evidence that they play an important role in financial education.

Which financial calculator is the most widely used in the teaching of Business Finance? White (2004) in his guide to financial calculators discusses the HP-10BII, the BAII-PLUS, and the Sharp EL-733A. In her calculator guide, Pamela Hall discusses the BAII-PLUS, the HP-10B, and the HP-17BII. Based on my observations, the two that seem to be mentioned the most are the HP-10B or currently the HP-10BII and the BAII-PLUS. Both can be purchased for about $30 at a Wal-Mart store.

I favor the BAII-PLUS over the 10BII. As I note in a recent paper (Taylor, 2002), discrete probability analysis is much easier on the BAII-PLUS. In addition, the BAII-PLUS is easier to use than the 10B and has some features that the 10B does not have. The menu approach with the BAII-PLUS makes it easier to enter and correct data, and the bond menu of the BAII-PLUS will value bonds between interest payment dates. The BAII-PLUS is one of two calculators that can be used on the current CFA exam. The other calculator, as mentioned above, is the HP-12C.

A useful financial calculator described by Brigham in his Technology Supplement is the HP-17BII. This is a great calculator for the money (about $80). It will do everything the 10BII (or 12C) will do and a lot more. Brigham and Houston suggest that finance and accounting majors might find the 17BII more useful than the 10B.

One of the unique features of the 17BII is the equation solver. This makes solving complicated financial equation fairly easy. One can literally take every major equation used in an intermediate financial management textbook and place it in the equation solver for easy retrieval. For example, the following equations have been placed in the author's 17B for easy retrieval:

1. Black-Scholes model for puts and calls (Taylor, 1999)
2. 2 and 3 stage dividend discount model (Taylor and Brown, 2001)
3. 2 and 3 asset standard deviation
4. 3 phase Molodovsky stock valuation model (Taylor and Brown, 2001)
5. Gordon Model
6. Bond duration and convexity
7. Minimum variance for two assets
9. Bond discount equation
10. Bond equivalent yield equation
11. 3-phase Wells Fargo stock valuation model.

To illustrate the usefulness of the equation solver, two versions of a two stage earnings model will be developed along with some examples.

A two stage earning model is given by the following equation:

\[
P = \frac{N \ E(1+G1)(1-B1)}{t=1} + \frac{E(1+G1)^N(1+G2)(1-B2)}{(1+K)^t} \]

A two-stage finite earnings model is given by the following equation:

\[
P = \frac{N \ E(1+G1)(1-B1)}{t=1} + \frac{E(1+G1)^N P}{(1+K)^t} \]

In both of the above models, P is the price, K is the required return, N is the number of years of above normal growth in earnings, E is the current earnings per share, G1 is the above normal earnings growth rate, G2 is the normal earnings growth rate, B1 is the retention rate for stage I, B2 is the retention rate for stage II, and P/E is the ending price-earnings ratio.
The models given by Eqs (1) and (2) can be combined into the following SOLVER equation:

\[ TSEM: P = S \left( T \left( N(1+G1)^{T-1} - B1) / (1+K)^{T} + Ex(1+G1)^{N} \right) \right) + Ex(1+G1)^{N} \left( IF(Z = 1 : (1+G2)^{N} / (1+K)^{N} - (K-G2)(\text{PE}(1+K)^{-N})) \right) \quad (3) \]

TSEM is the name of the equation. When Eq. (3) is entered into the calculator, the following menu is created:

<table>
<thead>
<tr>
<th>P</th>
<th>N</th>
<th>E</th>
<th>G1</th>
<th>B1</th>
<th>MORE</th>
</tr>
</thead>
<tbody>
<tr>
<td>23.785</td>
<td>6</td>
<td>2.50</td>
<td>.26</td>
<td>.90</td>
<td></td>
</tr>
</tbody>
</table>

With input Z, you can use both equations. When Z = 1, Eq. (1) is used, and when Z = 0, Eq. (2) is used. Any variable can be solved if the other variables are known.

**Example Problem One**

Jim Evans, a financial analyst for the 2nd National Bank, is trying to determine the value for the Orleans Company’s common stock, a rapidly growing trucking company. Jim has estimated that Orleans earnings will continue to grow for the next six years at a rate of 26%. After six years, he expects earnings to level-off to a long term rate of 6%. The current dividend-payout per share is only 10%. However, Jim expects the dividend-payout to increase to 50% in year seven and remain at that level.

(a) If the estimated required rate of return for the stock is 16% and its current earnings per share are $2.50, determine the price of Orleans using Jim’s inputs.

(b) If the current price of Orleans is $21, should Jim recommend buying the stock?

In order to solve for the price (part a), enter SOLVE Eq. (3) into the calculator and then enter the inputs. The solution of $23.79 is given below:

<table>
<thead>
<tr>
<th>P</th>
<th>N</th>
<th>E</th>
<th>G1</th>
<th>B1</th>
<th>MORE</th>
</tr>
</thead>
<tbody>
<tr>
<td>23.785</td>
<td>6</td>
<td>2.50</td>
<td>.26</td>
<td>.90</td>
<td></td>
</tr>
</tbody>
</table>

Since we are using Eq. (1), Z is set equal to 1. Remember that the dividend-payout is equal to the following: (1 – retention rate).

In part (b) since the calculated value is greater than the current price, the stock is undervalued and should be purchased.

**Example Problem Two**

Using Eq. (2), determine the value of the Jones Company’s stock given the following inputs:

E = $2.00, G1 = 22%, N = 5, P/E = 35, K=18%, and B1 = 90%.

Use SOLVER Eq. (3) and set Z = 0 so Eq. (2) can be used.

<table>
<thead>
<tr>
<th>P</th>
<th>N</th>
<th>E</th>
<th>G1</th>
<th>B1</th>
<th>MORE</th>
</tr>
</thead>
<tbody>
<tr>
<td>83.80</td>
<td>5</td>
<td>2</td>
<td>.22</td>
<td>.90</td>
<td></td>
</tr>
</tbody>
</table>

When P is pressed, a value of $83.80 is quickly determined as indicated above.

**CONCLUDING REMARKS**

As indicated above, financial calculators are widely used in the teaching of finance today.
They are fairly cheap, easy to use, and can be carried in ones shirt pocket. It is hard to imagine someone taking a finance exam without a financial calculator. Will spreadsheets eventually replace calculators in the classroom? This is a difficult question to answer. At the present time, both appear to have an important role to play in the teaching of finance.

The teaching of finance has changed a lot since I started teaching finance in 1974. The use of financial calculators has improved the efficiency of solving problems. It has allowed calculator users to spend more time teaching finance and less time on mechanics.

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PRINCIPLES VERSUS RULES-BASED ACCOUNTING

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ABSTRACT

This paper describes the pros and cons of a principles versus rules-based accounting system. A principles-based approach sets standards at a broad level and requires that the preparers use judgment to determine if the spirit of the principle is followed. The International Accounting Standards Board (IASB) uses a principles-based approach. The FASB has released a proposal on the adoption of a principles-based approach and is working with the IASB in an effort to converge U.S. and international accounting standards.

Moving to a principles-based system for adopting standards may aid progress on the consolidation project. The basis for consolidation lies in the definition of control. Historically, control has been defined using the “bright-line” of 50% or more ownership. However, the recent debacles such as with Enron have proven that a broader, more comprehensive definition of control is needed. Therefore, the definition of control is a prime example of a rules versus principles issue. This paper describes how the pros and cons of principles-based accounting apply to a principles-based definition of control.
THE INFLUENCE OF WEBTRUST™ ON PURCHASES

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Abstract

We investigate the effect of the AICPA’s WebTrust seal on a company’s web site on the decision to purchase a product from a traditional store or on-line via the Web. We also assess the effect of providing training about web certification on subject’s decisions to purchase via a traditional store or on-line. In this study, we find that the presence of a WebTrust seal is not associated with more on-line purchases than when the WebTrust seal is not present. Further, we find that providing training about web certification does not increase the likelihood of a purchase being made on-line rather than through a traditional store.
THE IMPACT OF INSTITUTIONAL OWNERSHIP ON THE REINSURANCE DECISION

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ABSTRACT

This paper empirically examines the influence of institutional ownership on the reinsurance decisions made by insurers. Because institutional investors are generally well diversified, we hypothesize that insurers with higher levels of institutional ownership purchase less reinsurance. Results from our sample of 43 publicly-traded property-liability insurers during 1996 and 1997 confirm our prediction. This suggests that the diversification of the owners' portfolios is a determinant of the insurers' reinsurance decisions. We also examine if the level of reinsurance utilization changes as the level of institutional ownership increases. These results indicate that an increase in institutional ownership results in a reduction in the level of reinsurance.

INTRODUCTION

The purpose of this study is to empirically examine the influence of institutional ownership on the reinsurance decisions made by insurers. Institutional investors are comprised of organizations with at least $100 million of assets under management, including banks, insurance companies, mutual funds, brokerage firms, and university endowments. Because institutional investors are generally well diversified, we hypothesize that insurers with higher levels of institutional ownership purchase less reinsurance. We also examine if the level of reinsurance utilization changes as the level of institutional ownership increases.

We test the first hypothesis by estimating an ordinary least squares model (OLS) for a sample of 43 publicly-traded property-liability insurers from 1996 to 1997. Consistent with our prediction, we demonstrate that the utilization of reinsurance decreases as the level of institutional ownership increases. This suggests that the diversification of
the owners' portfolios is a determinant of the insurers' reinsurance decisions. Our result is robust to controlling for the economic determinants of reinsurance identified in prior literature as well as managerial holdings of stock and stock options that may affect the managers' incentive to purchase reinsurance. We also estimate a model in which the change in reinsurance is a function of the lagged change in institutional ownership. These results indicate that an increase in institutional ownership results in a reduction in the level of reinsurance over two years.

**PRIOR LITERATURE**

An important role of reinsurance is to reduce downside risk (i.e., bankruptcy risk) of an insurer. Mayers and Smith (1990) argue that reinsurance purchases should be negatively associated with the diversification of the owners' portfolios since reinsurance is costly. They find that widely held property-liability insurers (essentially insurers with greater than 100 shareholders) purchase less reinsurance than closely held, single-owner, and association-owned property-liability insurers. Hoerger, Sloan and Hassan (1990) have an alternative view. They argue that even if equityholders are risk neutral because they own a diversified portfolio, insurers may demand reinsurance because the associated reduction in the risk of bankruptcy increases the value of the insurance policies to policyholders.

Hoyt and Khang (2000) examine property insurance data to empirically test the factors for corporate demand for insurance. Their results suggest that insurance helps to reduce bankruptcy costs and various agency costs associated with stakeholder conflicts, provides real services, and reduces taxes. Yamori (1999) finds that size, leverage, and regulation are important factors in determining insurance purchases by large non-financial Japanese firms.

Our study extends and contributes to the stream of literature that addresses the determinants of corporate demand of insurance by examining the influence of institutional ownership on reinsurance for a sample of widely held property-liability insurers. In addition, we contribute to the institutional ownership literature. Institutional investors play a significant role in equity markets. In 1997, institutional investors controlled 55 percent of U.S. equities (Hubbard, Houminer, and Downes 1999) yet we know little about their effect on firm behavior. Most research (see Karpoff, 1988; and Black, 1998) in this area focuses on the effect of institutional ownership on performance and governance structure. Demers (1999) examines the role of blockholders on the reinsurance decisions in publicly-held property and liability insurers. She finds that the percentage of common stock owned by blockholders (i.e., shareholder who individually hold 5% or more of the outstanding common equity) is positively associated with the level of reinsurance. This study does not, however, consider blockholder type (i.e., individuals versus large institutions).

**HYPOTHESIS DEVELOPMENT**

When an insurer, referred to as the ceding insurer, transfers some of its underwriting exposure to another insurer, referred to as the reinsurer, the transfer is a purchase of reinsurance. A common type of reinsurance contract is an excess of loss treaty. Under this type of reinsurance, the reinsurer is paid a premium by the ceding insurer and in return pays all claims of the ceding insurer above a specified level. As discussed by Phifer (1996), reinsurance (1) increases capacity by allowing the ceding insurer to write large limit exposures; (2) reduces the exposure of the ceding insurer to catastrophes; (3) allows the ceding insurer to write adequate volume to capture market share; and (4) stabilizes underwriting results of the ceding insurer from year to year. These characteristics demonstrate that an important role for reinsurance is to reduce the downside risk of the insurer. Consistent with the idea of downside risk reduction, previous studies (e.g., Hoerger, Sloan, and Hassan 1990) have demonstrated that reinsurance increases as the default risk of an insurer increases.

As discussed in the introduction, Mayers and Smith (1990) argue that firms with well-diversified owners will purchase less reinsurance. Large institutional investors tend to hold well-diversified portfolios as diversification is often required by government regulators. For example, the Investment Company Act of 1940 prohibits diversified investment companies from investing more than 5% of their assets in securities issued by one issuer. Insurance and bank regulators also require investments in diversified portfolios. Empirically, Bushee (1998) finds that most of the institutional investors in his sample during 1983-94
are well diversified (see also Hansen and Lott 1996).

Since large institutional investors generally have well-diversified portfolios and because reinsurance is costly, we hypothesize that there should be a negative relationship between the use of reinsurance and institutional holdings. Consistent with our argument, Falkenstein (1996) finds that mutual funds are averse to investing in stocks with very low idiosyncratic volatility. In addition, in a study of gold-mining firms, Tufano (1996) finds that the presence of large outside blockholders, including well-diversified large institutions, is negatively associated with the management of gold price exposure.

**SAMPLE AND DESCRIPTIVE STATISTICS**

Our sample consists of all publicly traded companies that primarily write property-liability insurance during 1996-1997. Using the 1997 Compustat active database, we identified all U.S. companies with a primary SIC code of 6331 (fire, marine, and casualty insurance). Further, we required each company to derive at least 90% of its revenues from property-liability insurance operations, to be less than 75% owned by another sample insurer, and to have financial statements on EDGAR with all of the data necessary to calculate the variables of interest. The final sample includes 43 insurers with 81 insurer-years.

<table>
<thead>
<tr>
<th>Panel A</th>
<th>ASSETS (millions)</th>
<th>REINS</th>
<th>INST</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>4,247</td>
<td>19.7</td>
<td>43.3</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>11,867</td>
<td>15.3</td>
<td>23.6</td>
</tr>
<tr>
<td>100%</td>
<td>74,508</td>
<td>54.8</td>
<td>86.1</td>
</tr>
<tr>
<td>75%</td>
<td>2,462</td>
<td>29.7</td>
<td>63.8</td>
</tr>
<tr>
<td>50%</td>
<td>817</td>
<td>14.9</td>
<td>42.9</td>
</tr>
<tr>
<td>25%</td>
<td>228</td>
<td>7.8</td>
<td>24.9</td>
</tr>
<tr>
<td>0%</td>
<td>33</td>
<td>0.3</td>
<td>0.4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Panel B</th>
<th>Variable</th>
<th>Mean</th>
<th>Median</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SPRATIO</td>
<td>0.86</td>
<td>0.67</td>
<td>0.73</td>
</tr>
<tr>
<td></td>
<td>SDLOSS</td>
<td>0.19</td>
<td>0.13</td>
<td>0.18</td>
</tr>
<tr>
<td></td>
<td>HERF</td>
<td>0.26</td>
<td>0.22</td>
<td>0.16</td>
</tr>
<tr>
<td></td>
<td>STATES</td>
<td>35.7</td>
<td>46</td>
<td>17.1</td>
</tr>
<tr>
<td></td>
<td>INOWN</td>
<td>16</td>
<td>11</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>OPTIONS</td>
<td>651</td>
<td>342</td>
<td>1015</td>
</tr>
</tbody>
</table>

Descriptive statistics for our sample are reported in Table 1. As reported in Panel A, the average insurer in our sample has assets of $4.2 billion. The smallest insurer has assets of only $33 million and the largest has assets of $74.5 billion. Importantly, there are observed differences in the level of reinsurance utilized and the level of institutional ownership across our sample insurers. The utilization of reinsurance, denoted REINS, is measured as the total reinsurance ceded divided by gross premiums written. This is the most common utilization measure applied in the literature (e.g., Mayers and Smith 1990 and

1Data source: NAIC, by permission. The NAIC does not endorse any analyses or conclusions based on the use of these data.

Financial accounting data, including the amount of reinsurance both assumed and ceded, and the management ownership percentages were obtained from Compustat and EDGAR. Data on the lines of business was collected from the NAIC Property/Casualty Annual Statement Database. Data on institutional ownership was obtained from CDA/Spectrum.
Hoerger, Sloan, and Hassan (1990). The mean (median) insurer reinsures 20% (15%) of gross premiums written. The range is quite large with one insurer reinsuring less than 1/2% and another insuring 55% of gross premiums written. The level of institutional ownership, denoted INST, is the percentage of the common stock outstanding that is held by large institutional investors at the beginning of the year. For the average (median) insurer, large institutions own 43% (43%) of the outstanding common stock. The range varies from less than 1/2% to 86%.

We report descriptive statistics on the remaining variables used in our study in Panel B. The calculation of these variables and their role in our tests are discussed in a later section.

EMPIRICAL MODEL AND TESTS

We hypothesize that insurers with higher levels of institutional investors purchase less reinsurance. We test this hypothesis by estimating the following OLS regression for each insurer $i$ in year $t$:

$$REINS_{i,t} = \alpha + \beta_1 INST_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 SPRATIO_{i,t} + \beta_4 SDLOSS_{i,t} + \beta_5 HERF_{i,t} + \beta_6 STATES_{i,t} + \beta_7 LINES_{i,t} + \beta_8 \text{INOWN}_{i,t} + \beta_9 \text{Y97} + \beta_{10} \ln(\text{OPTIONS})_{i,t} + \varepsilon_{i,t}.$$  

As previously discussed, INST is the percentage of the common stock outstanding that is held by large institutional investors at the beginning of the year. SIZE, measured as the log of total assets, is included to control for firm size. Prior literature has shown that reinsurance utilization is negatively associated with insurer size (see, e.g., Hoerger, Sloan, and Hassan 1990). Accordingly, we expect SIZE to have a negative coefficient. SPRATIO, measured as stockholders’ equity at the beginning of the year over total premiums earned in the prior year, is included in the reinsurance equation to capture the default risk of the insurer. As demonstrated by previous studies (e.g., Hoerger, Sloan, and Hassan 1990) we expect the utilization of reinsurance to increase as the default risk of the insurer increases; therefore, the coefficient on SPRATIO should be negative.

Similar to Hoerger, Sloan, and Hassan (1990), SDLOSS is the standard deviation of the first annual differences of losses divided by the mean annual premiums written over at least the previous five-year period. It is used to capture the influence of the volatility of the insurer’s business on the reinsurance decision. Because the volatility of the insurer’s losses should increase the demand for reinsurance, we predict that the coefficient on this variable will be positive.

HERF is measured as the Herfindahl index for the lines of business written by the insurer. The Herfindahl index is commonly used to measure the concentration of an insurer’s business and is calculated as the sum of the squares of the percentage of premiums written in each of the different lines of business. Consistent with the findings in Mayers and Smith (1990), we expect the coefficient on HERF to be negative.

Reinsurers have more experience with a wide range of low probability events; therefore, they can provide valuable information on rating different lines of business. Thus, as insurers become less concentrated across lines of insurance (i.e. the lower the value of HERF), reinsurance services become more valuable.

STATES is measured as the number of states in which the insurer operates. Based on the findings in Mayers and Smith (1990), we expect the coefficient on STATES to be positive. Reinsurance services become more valuable as an insurer becomes more geographically dispersed because reinsurers can provide information on claim adjustment services across multiple states. Thus, as a firm becomes more geographically dispersed (i.e. the higher the value of STATES), the value of reinsurance increases.

LINES represent the percentage of business written in five major lines: automobile (AUTO), multiple peril (PERIL), workers’ compensation (WC), malpractice (MAL), and other liability (OTHER). We do not make any predictions on the sign of these coefficients. These variables are included to account for risk differences across lines of business.

INOWN, is the percentage of common shares of the insurer beneficially and directly owned by top executives and directors (excluding options). This variable is included to control for the effect of management’s stock ownership on the

$^2$For the majority of the insurers, we used losses gross of reinsurance to measure SDLOSS. However, 7 insurers, or 11 insurer-years, did not report gross losses. We used net losses to measure SDLOSS for this group.
reinsurance decision. Smith and Stulz (1985) argue that as managers' wealth becomes increasingly dependent on the success of a single firm, they become more risk-averse. Consistent with this expectation, Amihud and Lev (1981) find that managers engage in conglomerate mergers to decrease their own risk at the expense of shareholder value. The results in Tufano (1996), May (1995) and Schrand and Unal (1998) are also consistent with this prediction. This suggests that stock ownership by management should be positively related to the utilization of reinsurance.

Alternatively, as managers own more stock, their interests are more closely aligned with those of outside shareholders; as a result they should reduce the costly utilization of reinsurance (Jensen and Meckling 1976). The results in Saunders, Strock, and Travlos (1990) and Core (1997) are consistent with this prediction. Ultimately the relation between managerial stock ownership and reinsurance depends on the unobservable managerial risk preferences and the degree of agency conflicts and therefore we do not make a prediction of the sign of the coefficient on INOWN.

We control for the impact that the ownership of stock options may have on the reinsurance decision by including the natural log of the number of stock options held (in thousands) by the five highest paid executives, \( \ln(\text{OPTIONS}) \). Stock options are commonly believed to be an effective mechanism to induce risk-averse managers to increase firm risk. Unfortunately, the theoretical prediction of the impact of stock options on managerial risk-taking is unclear (Carpenter 2000; Lambert, Larcker, and Verrecchia 1991; Meulbroek 2000). Out-of-the-money options induce risk-averse managers to incur more risks. However, once the options are deep in-the-money, the option holders may actually seek less risk. As a result, risk averse-managers that hold stock options may purchase more reinsurance in order to protect the value of options from downside risks. Because there are conflicting theories on the relationship between reinsurance and stock options, we do not make a prediction on the sign of the coefficient on \( \ln(\text{OPTIONS}) \).

Y97, is a dummy variable that denotes that the insurer-year is from 1997. This variable is included in the model to capture any differences in the use of reinsurance for the average insurer during 1996 and 1997.

We report Pearson product-moment correlations between the variables in our model, except for the lines of business, in Table 2. Consistent with our prediction, REINS and INST are negatively correlated (significant at the 0.06 level, two-sided). Also, as expected, REINS is negatively related to insurer size (SIZE), the financial strength of the insurer (SPRATIO), and the level of business concentration (HERF). The volatility of the

<table>
<thead>
<tr>
<th>TABLE 2</th>
<th>Pearson Product-Moment Correlations (Two-Sided p-levels in Parentheses), n=118</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>INST</td>
</tr>
<tr>
<td>REINS</td>
<td>0.23</td>
</tr>
<tr>
<td>(0.01)</td>
<td>(0.00)</td>
</tr>
<tr>
<td>INST</td>
<td>-0.23</td>
</tr>
<tr>
<td>(0.01)</td>
<td>(0.02)</td>
</tr>
<tr>
<td>SPRATIO</td>
<td>0.21</td>
</tr>
<tr>
<td>(0.02)</td>
<td>(0.13)</td>
</tr>
<tr>
<td>SDLOSS</td>
<td>0.16</td>
</tr>
<tr>
<td>(0.14)</td>
<td>(0.26)</td>
</tr>
<tr>
<td>HERF</td>
<td>-0.11</td>
</tr>
<tr>
<td>(0.26)</td>
<td>(0.00)</td>
</tr>
<tr>
<td>STATES</td>
<td>-0.07</td>
</tr>
<tr>
<td>(0.43)</td>
<td>(0.00)</td>
</tr>
<tr>
<td>INOWN</td>
<td>0.23</td>
</tr>
<tr>
<td>(0.01)</td>
<td>(0.01)</td>
</tr>
<tr>
<td>OPTIONS</td>
<td></td>
</tr>
</tbody>
</table>
insurers’ business (SDLOSS) is positively correlated with REINS.

The correlation between INST and SIZE is significantly positive while the correlation between INST and insider ownership (INOWN) is significantly negative. Both of these results are consistent with empirical findings in Duggal and Millar (1999). They argue that institutional investors are more likely to invest in larger firms because larger firms offer greater trading liquidity. Further, higher levels of insider ownership reduce agency costs and therefore the need for institutional investor monitoring. We also find a positive relation between INST and both ln(OPTIONS) and STATES and a negative relation between INST and both SPRATIO and HERF. Finally, the correlation between INOWN and ln(OPTIONS) is insignificant. Thus, managers who own a lot of stock do not necessarily hold a lot of stock options.

**REGRESSION RESULTS**

In Table 3, Column 3, we report the results of the pooled cross-sectional OLS regression performed to determine the impact of institutional ownership on the reinsurance decision. In the second column we include our prediction of the sign of the coefficient on the independent variables. The error terms in the OLS model fail White’s (1980) specification test and are likely serially correlated. As a result, we report p-values that account for heteroskedasticity and serial correlation (see Rogers 1993). Using 81 insurer-years, the regression is explanatory with an adjusted $R^2$ of 57%.$^3$ Consistent with the univariate results, the coefficient on INST is negative and significant at the 0.015 level. This suggests that insurers with high institutional ownership prefer to buy less reinsurance.

As predicted, the coefficients on SIZE, SPRATIO and HERF are all negative and significant at conventional levels. This suggests that the utilization of reinsurance decreases as firms become larger, as the financial health of the insurer improves, and as the business concentration of the insurer increases. The coefficient on SDLOSS is significantly positive. This is consistent with the argument that firms with greater loss variances purchase more reinsurance. The coefficient on STATES is marginally positive as predicted. Finally, a few of the lines of business variables have explanatory power.

The coefficient on INOWN is negative and marginally significant (p=0.05). This suggests that as managerial stock ownership increases, managers utilize less reinsurance (i.e., act more risk-seeking). This result is consistent with the findings in Saunders, Strock, and Travlos (1990) and Core (1997). Specifically, Saunders, Strock and Travlos (1990) found that banks with more managerial ownership are associated with higher measures of several capital market risk factors. In addition, Core (1997) demonstrated that the demand for directors’ and officers’ insurance decreases as the level of managerial stock ownership increases. Apparently, in these settings the agency argument dominates the managerial risk aversion argument.

The coefficient on ln(OPTIONS) is significantly positive. This suggests that as managers own more stock options they purchase more reinsurance. For 75 out of the 81 firm-years in our sample, the accumulated return over a two-year period is positive. If these options were deep in-the-money, this would support the risk reduction behavior by managers with large amounts of in the money stock options. These arguments have been made in Lambert, Larcker, and Verrecchia (1991) and Carpenter (2000). This result suggests that corporate compensation committees may need to weigh the costs and benefits of stock options more carefully, especially during bull markets.

To provide complementary evidence on the effect of institutional ownership on reinsurance, we also examine how the amount of reinsurance changes in response to changes in institutional ownership. We look at the change in institutional ownership over a two-year period (i.e., the change from 1994 to 1996 and from 1995 to 1997) to allow some time for the change in institutional ownership to

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$^3$ No observations appear to have undue influence on our results based on Cook’s distance criteria (Cook 1977).
### TABLE 3
Pooled Cross-Sectional Ordinary Least Square (OLS) Regression of the Utilization of Reinsurance

<table>
<thead>
<tr>
<th>Prediction</th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>INST</td>
<td>-0.003 (-5.11)**</td>
<td>-0.003 (-5.47)**</td>
</tr>
<tr>
<td>SPRATIO</td>
<td>-0.109 (-6.46)**</td>
<td>-0.109 (-7.26)**</td>
</tr>
<tr>
<td>SDLOSS</td>
<td>0.385 (7.35)**</td>
<td>0.420 (8.64)**</td>
</tr>
<tr>
<td>HERF</td>
<td>-0.188 (-2.95)**</td>
<td>-0.221 (-3.89)**</td>
</tr>
<tr>
<td>STATES</td>
<td>0.001 (1.70)*</td>
<td>0.002 (2.57)**</td>
</tr>
<tr>
<td>AUTO</td>
<td>0.062 (0.48)</td>
<td></td>
</tr>
<tr>
<td>PERIL</td>
<td>0.112 (0.76)</td>
<td></td>
</tr>
<tr>
<td>OTHER</td>
<td>0.226 (1.42)</td>
<td></td>
</tr>
<tr>
<td>WC</td>
<td>0.097 (0.71)</td>
<td></td>
</tr>
<tr>
<td>MAL</td>
<td>-0.523 (-1.01)</td>
<td></td>
</tr>
<tr>
<td>INOWN</td>
<td>-0.003 (-4.20)**</td>
<td>-0.003 (-4.53)**</td>
</tr>
<tr>
<td>OPTIONS (thousands)</td>
<td>0.025 (2.88)**</td>
<td>0.028 (3.35)**</td>
</tr>
<tr>
<td>ASSETS (billions)</td>
<td>-0.002 (-2.43)**</td>
<td>-0.002 (-3.03)**</td>
</tr>
<tr>
<td>α</td>
<td>0.271 (2.02)*</td>
<td>0.356 (10.26)**</td>
</tr>
<tr>
<td>YR97</td>
<td>0.004 (0.15)</td>
<td>0.005 (0.23)</td>
</tr>
<tr>
<td>YR96</td>
<td>0.006 (0.25)</td>
<td>0.009 (0.41)</td>
</tr>
<tr>
<td>Adj R²</td>
<td>61%</td>
<td>61%</td>
</tr>
</tbody>
</table>

* (** ) significant at 5% (1%) level

Influence management. The use of a two-year period also increases that likelihood that there is variation in INST between the time periods.

We report descriptive statistics on the two-year change in INST and REINS for the 77 insurer-years with the necessary data in Table 4 Panel A. Note that the change in INST is measured at the beginning of the year while the change in REINS is measured at the end of the year. Thus the causal relation goes from INST to REINS and not vice versa. The level of institutional ownership for the average and median insurer increased by approximately 3 percentage points over a two-year period. The changes in the level of reinsurance for the average and median insurer are essentially zero.

Panel B includes the results of a pooled cross-sectional OLS regression on the relationship between the change in institutional ownership (ΔINST) and reinsurance. We include the two-year change in ASSETS (ΔASSETS) to control for changes in insurer size and the two-year change.
in SPRATIO ($\Delta$SPRATIO) to control for changes in the financial condition of the insurer. Since we expect reinsurance to be decreasing in insurer size and financial condition, we expect the coefficient on both of these variables to be negative.

In the third column we report the results of the regression using all 77 insurer-years. The

TABLE 4
Analysis of the Two-Year Change in Reinsurance (REINS) as a Function of the Lagged Two-Year Change in Institutional Ownership (INST) for 43 Property-Liability Insurers from 1994-1997

<table>
<thead>
<tr>
<th>Panel A</th>
<th>Descriptives for change in institutional ownership and the utilization of reinsurance (in percentage terms) for 77 insurer-years.</th>
</tr>
</thead>
<tbody>
<tr>
<td>INST$<em>t$ INST$</em>{t-2}$</td>
<td>REINS$<em>t$-REINS$</em>{t-2}$</td>
</tr>
<tr>
<td>Mean</td>
<td>3.89</td>
</tr>
<tr>
<td>Standard deviation</td>
<td>10.31</td>
</tr>
<tr>
<td>100%</td>
<td>62.93</td>
</tr>
<tr>
<td>75%</td>
<td>8.09</td>
</tr>
<tr>
<td>50%</td>
<td>2.90</td>
</tr>
<tr>
<td>25%</td>
<td>-11.64</td>
</tr>
<tr>
<td>0%</td>
<td>-21.16</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Panel B</th>
<th>Pooled cross-sectional OLS regression of the change in the utilization of reinsurance, REINS$<em>t$-REINS$</em>{t-2}$. Robust p-values account for heteroskedasticity and serial correlations.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prediction</td>
<td>Coefficient estimate (robust p-value, one-sided if sign is as predicted)</td>
</tr>
<tr>
<td>All insurer-years</td>
<td>Insurer years with less than 50% institutional ownership at t-2</td>
</tr>
<tr>
<td>$\Delta$INST.</td>
<td>-0.001 (0.10) -0.004 (0.02)$^*$</td>
</tr>
<tr>
<td>$\Delta$ASSETS</td>
<td>0.093 (0.06) -0.108 (0.10)</td>
</tr>
<tr>
<td>$\Delta$SPRATIO</td>
<td>-0.074 (0.10) -0.212 (0.01)$^{**}$</td>
</tr>
<tr>
<td>$\alpha$</td>
<td>0.006 (0.80) 0.097 (0.06)</td>
</tr>
<tr>
<td>YR97</td>
<td>-0.004 (0.83) 0.031 (0.18)</td>
</tr>
<tr>
<td>Adjusted $R^2$</td>
<td>0.08 0.17</td>
</tr>
<tr>
<td>Insurer-years</td>
<td>77 48</td>
</tr>
</tbody>
</table>

*($^*$) significant at 5% (1%) level

The coefficient $\Delta$INST is negative but only marginally significant (p-value=0.10). This provides weak support for our conclusions drawn from the OLS levels regression. However, it is not clear to us that once an insurer is controlled by institutional owners that further increases in institutional ownership should have much impact on the reinsurance decision. As a result we perform an additional analysis that only considers those insurer-years with institutional ownership of less than 50% at the beginning of the two-year period. In the last column of Panel B we report the results on this subsample of 48 insurer-years.

---

4 We used two alternative cutoffs (40% and 60%) for the institutional ownership and obtained similar results.
For the reduced sample, we find that the coefficient $\Delta INST$ is four times as large as on the full sample and it is significantly different from zero (p-value=0.02). The coefficients on the control variables are both negative and the model’s adjusted $R^2$ is 17%. These results, in conjunction with the results of the full sample, suggest that increases in institutional ownership are associated with less utilization of reinsurance.

**CONCLUSION**

This paper investigates the role of ownership structure in the reinsurance decision. We argue that because institutional investors hold well-diversified investment portfolios, insurers with high institutional ownership prefer to minimize the utilization of reinsurance. The results are consistent with this hypothesis. Specifically, using a sample of 43 publicly-traded property-liability insurers during 1996-97, we find that the level of reinsurance utilized decreases as the level of institutional ownership increases. Our regression includes controls for the standard economic determinants of reinsurance as well as managerial stock and option holdings. This research adds an important component that may provide assistance to insurers in determining an optimal level of reinsurance.

This study contributes to our understanding of the corporate demand for insurance. In particular, the results are consistent with the theory that the demand for insurance in publicly-traded companies varies with the diversification of the owners’ portfolios. In addition, it contributes to our understanding of the investment preferences of institutional investors. Importantly, however, this study only demonstrates a negative relation between reinsurance and the percentage of institutional ownership. Admittedly, it is possible that the results may not be driven by differences in the diversification of the owners’ portfolios but by some other characteristic of insurers that is associated with institutional ownership. We encourage more research on the relationship between institutional ownership and risk management decisions.

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THE MEANING OF ADDITIONAL MINIMUM PENSION LIABILITY

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ABSTRACT

This study examines two views of the additional minimum pension liability (AMPL). The Financial Accounting Standards Board created this accounting concept in SFAS No. 87. AMPL was designed to protect investors, creditors, and other decision-makers from underestimating the liabilities of a company with an underfunded pension plan. However, AMPL rarely appears on financial statements as a separate account category, and no support for its significance in firm valuation has been identified.

We examine AMPL disclosure in order to identify factors that determine AMPL. This preliminary study is important because the usual computation of AMPL uses summary variables that include components open to varied interpretations. The traditional view emphasizes AMPL's computational precedents: accumulated pension obligation, prepaid (accrued) pension cost, and pension plan assets. However, underlying components may play a more important role from the perspective of decision-makers reading the financial statement. This study presents a component view that emphasizes the underlying unrecognized prior service cost, unrecognized net losses (gains), estimated rate of pension increase, and accumulated pension obligation. Although AMPL has had no value-relevant support in accounting research, the component view suggests that there may be value-relevant information through association with a predominant underlying component.

This initial study finds support for the component view of AMPL. The results show that high levels of unrecognized prior service cost, high (low) levels of unrecognized net losses (gains), and low levels of estimated rate of compensation increase are significantly related to AMPL disclosure while levels of plan assets at fair value and prepaid (accrued) pension cost are not. Thus, the traditional formulation of AMPL does not adequately identify the factors that are most important to its disclosure. This paper takes the first step in understanding the role of AMPL in financial disclosure by identifying factors underlying it, paving the way for further evaluation.
EUROPEAN UNION TAX ENFORCEMENT
ON DIGITAL PRODUCT SALES:
NEW REQUIREMENTS FOR INTERNATIONAL BUSINESSES

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ABSTRACT

The European Union has enacted new legislation concerning the application of value-added tax (VAT) to sales of digital goods. This legislation became effective in mid-2003. Although the legislation is European Union, it has attracted the attention of companies based outside of the European Union that sell digital goods to consumers based in one or more European Union countries. Non-European Union companies that sell into the European Union must now register with European Union tax authorities and levy, collect and remit VAT if their sales include digital goods delivered into the European Union. This paper outlines the European Union rules, compares them to current sales tax rules on interstate transactions within the United States, and examines the implications for future international legislation. The European Union legislation has important implications for all companies making online sales across national borders, not only for those companies who fall under the aegis of the new law, but those companies that might face similar legislation enacted in the future by other countries and organized international markets.

TRANSACTION TAX ENFORCEMENT

The enforcement and collection of transaction taxes, such as the sales tax levied by most U.S. states or the VATs levied by many other countries throughout the world, has always been relatively easy and straightforward. Because the taxes occur at the point of transaction, tracking the occurrences of the economic events that trigger these taxes can be much easier than calculating and collecting income-based taxes (Yang and Poon, 2002).

A taxable transaction that involves a physical good typically results in a fairly clear and visible event. Some form of product is moved from one location to another. In the case of services, an observable activity occurs. International transactions involving physical goods have always been particularly easy to track because a product crosses an international border and most international borders are controlled to one degree or another. Services provided across borders can also be easy to track; in most cases, a person or persons must travel across an international border to perform the service.

Online Sales Create Additional Complexities

With the availability of the Internet as a medium for placing orders, confirming orders, and delivering digital goods and services, the visibility of cross-border transactions diminished significantly. Relevant laws and court decisions, which relied largely on the existing language of physical (as opposed to virtual) commerce, were unclear (Jones and Basu, 2002). Laws and court decisions were highly complex and often had conflicting holdings on a number of legal and fact elements. Various courts interpreted facts quite differently in seemingly similar situations. These varying interpretations have created high levels of uncertainty for companies selling goods online (McClure, 2002; Schneider, 2003).

Most transaction taxes were enacted many years ago, when it was reasonable to assume that most
transactions would involve a buyer and a seller in the same jurisdiction. As mail order, telephone order, and more recently, online order businesses evolved, this assumption became less and less likely to be true. The inability of one jurisdiction to enforce collection of transaction taxes (at the point of sale) on items sold into its jurisdiction from outside its jurisdiction was, in most cases, nonexistent (Bagby and McCarty, 2003). Difficulty with enforcing collection at the purchaser’s side of the transaction was costing jurisdictions (both U.S. states and other countries) large amounts of revenue (Bruce and Fox, 2001).

Solutions in the United States
In the early days of online sales, there was a general consensus that imposing transaction tax collections on the nascent entities engaging in such sales would tend to stifle the development of online business activities (Barlas, 2003). However, in recent years, there has been a growing sentiment that online businesses can stand on their own without additional government subsidies in the form of non-enforcement of existing laws (Thibodeau, 2002; Wingfield, 2003). A number of major retailers have announced that they will begin to collect U.S. sales taxes voluntarily on sales made online, even when they are not required to do so because they have a physical presence in the customer’s jurisdiction (Krebs and Krim, 2003; Tax Notes Today, 2003).

In the United States, federal legislators have been reluctant to take action on creating a national enforcement mechanism (McClure, 2002) and have instead encouraged the individual states to join together in a confederation for the purpose of coordinating sales tax enforcement. Many of the states have done so under the auspices of the National Governors Association in the Streamlined Sales Tax Project (National Governors Association, 2003). This project provides a way for states to participate voluntarily in sales tax enforcement and collection activities. The combination of voluntary state enforcement cooperation and voluntary source collection by large retailers may combine to solve a large part of the problem in the United States. In other parts of the world, however, few initiatives have been undertaken by either government or private enterprise to address the collection of transaction taxes on international transactions. One exception to this lack of action is the recent set of rulings by the European Union that will be imposed on companies selling to European Union-based purchasers.

EUROPEAN UNION LEGISLATION
The VAT is the most significant contributor to the public coffers in most European Union countries. It is a transaction tax that is levied at each stage of production on the value added by that stage of production. Companies track and report the tax on domestic sales to their own national tax authority. The tax varies considerably from country to country within the European Union. Countries such as Luxembourg (15%) and Madeira (12%) levy the lowest rates, while Denmark and Sweden levy the highest rate (25%). In 2002, the European Union Council issued Directive 2002/38/EC (De Rato Y Figaredo, 2002) and accompanying Regulation 792/2002 that. The Directive and Regulation amended existing European Union law to add specific provisions regarding the sale of broadcasting services and electronically supplied services; that is, digital products (Hamblen, 2003; Hwang and Klosek, 2003; Tedeschi, 2003). The effective date of these new rules was July 1, 2003.

Nature of the New Rules
Under the new rules, companies that sell into European Union countries must register with European Union tax authorities and levy, collect, and remit VAT on digital products. The legislation includes not only digital products, but also “electronically supplied services,” which encompasses a wide array of services, including the electronic supply of cultural, artistic, sporting, scientific, distance education, entertainment and similar services (De Rato Y Figaredo, 2002).

The digital products specifically included under the new rules are software, software upgrades or updates, computer games, digital music files, rights to access information databases, Internet access provision, Web site hosting, and both subscription and pay-per-download audio and video entertainment services. The list of products and services included in the law is expressly stated to be “illustrative,” so the intent of the law is to include virtually all manner of goods and services that are delivered electronically. The only specific exclusion in the list is that the use of electronic mail for communication will not, by itself, create the existence of a digital product or service (De Rato Y Figaredo, 2002). Thus, the list is comprehensive and it is reasonable to assume
that it will be interpreted broadly in European Union courts if challenged.

The legislation provides that sales of digital products and services by companies operating outside the European Union to users in the European Union will now incur VAT. Under the new rules, the location used to determine occurrence of sale will no longer be the jurisdiction in which the seller is established, but will instead be the jurisdiction in which the buyer is located. In an interesting and asymmetric tack, however, the new rules provide that European Union sellers are no longer required to levy VAT when selling digital products and services to customers outside the European Union.

Non-European Union sellers must register with an European Union country authority, but must pay the VAT rate of the country into which the digital product is shipped. European Union sellers pay the VAT rate in effect in the country from which the digital products are shipped. Since most digital products and all digital services can be provided from almost any physical location, the strategy opportunities are almost immediately obvious. These strategies are outlined in a later section of this paper.

Motivation for the New Rules
Hwang and Klosek (2003) argue that these asymmetric changes in the application of VAT to digital sales were motivated by strong European Union desires to put European Union and non-European Union sellers on a more equal footing when they compete with each other. They state that there is a long history of concerns that European Union enterprises have been at a disadvantage compared to non-European Union businesses in the markets for digital goods and services because the European Union enterprises had to levy the VAT and their non-European Union competitors did not.

The intent of the new rules is to prevent non-European Union sellers from avoiding VAT liability on European Union sales while at the same time relieving European Union sellers of the VAT burden on sales they make outside the European Union. European Unions in favor of the new laws argue that these two changes could help European Union suppliers of digital products and services compete against foreign companies more effectively for both European Union and non-European Union business.

Compliance with the New Rules
European Union sellers must register with the tax authority in their home country. Since they will remit VAT to their own tax authority, this allows them to create a fairly simple system for tracking sales and calculating the tax. If an European Union seller is already conducting any sales at all, the company will have in place already a system adequate to track, report, and remit the VAT.

Non-European Union sellers must register with an European Union country tax authority. This authority can be in any European Union country, so non-European Union sellers do have some choice in the matter. However, this apparent help to non-European Union sellers is nullified by provisions in the law that require non-European Union sellers, no matter where registered, to assess the VAT at the rate in effect in the destination country. This de facto imposes a greater burden on non-European Union companies because they must track, report, and remit VATs computed using a variety of rates, one for each country into which they ship. Unfortunately, the underlying legal concept of equal protection under the law is not as well defined in the European Union as it is in the United States. The law does provide for online registration by non-European Union companies, so at least the registration requirement itself is not particularly onerous.

A number of companies have boosted their investment in accounting systems designed to handle the calculation and reporting tasks required by the new rules, in some cases by more than a million dollars (Hamblen, 2003). Companies such as Digital River (2003) and Taxware (2003) have created Web sites designed to help companies meet the requirements of the new rules and offer VAT tracking and reporting software to help with the burden.

Planning Strategies Under the New Rules
Companies outside the European Union have two basic VAT strategies under the new rules. The first strategy requires that the company determine the customer’s jurisdiction and calculate the VAT for that country. A second strategy requires that the company create a physical operation in a European Union country and charge all European
Union customers the tax associated with that country.

The first strategy can become an administrative nightmare for companies that sell into many different European Union countries. Once the physical location of the customer is determined, the company must then calculate the tax and remit it to the right authorities in the right countries. Tedeschi (2003) reports that eBay is planning to follow this approach. With its large number of transactions (eBay collects a fee from the seller each time an auction is completed successfully), eBay will face a monumental record-keeping and disbursement task.

Following the second strategy allows companies to create branch operations in a country with low VAT rates and pass along the savings in the form of reduced prices to their customers. Both Amazon.com and Time Warner’s AOL International operation have set up operations in Luxembourg, ostensibly to pursue this strategy (Tedeschi, 2003). It is notable that AOL International has stated that it set up its Luxembourg operation to simplify its VAT reporting requirements, not to avoid or reduce the amount of the tax (Hamblen, 2003).

Although this is certainly not a recommended strategy, one additional approach is a possible choice of many smaller companies. That strategy is intentional non-compliance. Digital goods and services have proven to be very hard for tax authorities to track and the VAT is largely a self-assessed tax. Most countries that have a VAT rely on voluntary compliance. This compliance level is high for larger companies.

Smaller companies have a low rate of VAT compliance in many countries. The difficulty of tracking transactions and enforcing honest reporting may be the biggest weakness in the taxing plan. Some smaller companies based in the United States have argued the reporting and payment burden is overly punishing for them (Hamblen, 2003). This type of sentiment can lead to avoidance behavior by smaller businesses, especially given the difficulty of pursuing cases in extra-national jurisdictions (Liptak, 2003; Podlas, 2000).

One deterrent to avoidance are the penalties, which vary by country but can be hefty. In addition to back taxes, VAT collectors add interest, filing penalties, and a fine that ranges between 100% and 200% of the amount due. A highly punitive throwback and recapture rule adds fines based on the amount of tax the company would have paid in the seven years preceding the new VAT’s effective date.

CONCLUSIONS

The timing of the enactment of these tax enforcement measures is open to suspicion. Tedeschi (2003) reports survey results and other data from eMarketer (2003) that show the European Union as just now having a number of Internet users that exceeds that of the United States (221 million vs. 196 million). Some industry analysts have noted that the Europeans seem to be untowardly opportunistic in their actions here.

International companies based outside the European Union do have two viable strategies for dealing with the new regulations, although neither is easy or simple. Smaller companies might decide that non-compliance is a reasonable risk, although penalties can be substantial. Companies that comply with the new rules can face costs of more than a million dollars to bring their digital sales operations into compliance with the law.

The rules are unfair by design. They discriminate against non-European Union companies that want to do business in the European market. One possibility that might arise in the future is that countries outside the European Union might consider retaliating with similarly punitive tax laws or other regulations on sellers operating out of the European Union.

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ABSTRACT

Businesses that experience problems with physical products they have purchased find that the legal system provides adequate redress for their grievances. Large verdicts or out of court settlements are not unusual for product liability in business-to-business transactions. Software vendors, including vendors of accounting software, routinely immunize themselves from such product liability by including exculpatory language in the agreements to which users must agree as they install the software. This paper examines the rights of companies to collect damages from accounting software vendors when their products introduce errors or fail to perform accounting tasks correctly. The paper also outlines future trends in this area.

ERRORS IN ACCOUNTING SOFTWARE

Software vendors regularly ship software that has defects that are known to the vendor and that the vendor does not disclose to the purchaser (Kaner and Pels, 1998). Some of these defects are quite serious. For example, in the case of Mortenson v. Timberline (2000), Mortenson used Timberline’s Precision Bid Analysis Software to prepare a bid for construction of a medical center.

The software contained errors that caused Mortenson to bid the job approximately $2 million lower than it should have bid. Bills (2002) reports a software glitch at the Bank of America that processed automated clearing house payments incorrectly, resulting in unauthorized charges to thousands of customer accounts.

Extent of Software Errors

Although individual examples of software errors are interesting to read, the true danger of the current situation is made clear by studies of the extent to which accounting software is plagued by errors and by estimates of the dollar impact of these errors. Financial Executive’s News (2002) presented a feature report on a series of common errors in mid-level accounting software packages. Goodwin (2002) reports the results of a study of 45 financial software applications. The study found that more than half of the applications contained errors that could have been fixed easily if they had been detected during the design of the software. Estimates of the annual cost to U.S. businesses of software errors is approximately $60 billion (Jusko, 2002; Trembly, 2002).

The way that software errors enter the software production process and the final software product is also enlightening. If software errors were the inevitable outcome of a complex process, which some researchers have argued in the past (Foster, 2003; Nakashima and Oyama, 1999; Roush, 2003), then there might not be much that legal reform could do about the problem.

Although it is true that some software error situations are probably beyond the control of the software vendors (for example, the rapid development cycles of annual revisions of tax preparation software might make them the exception to the rule (Johnston, 2001)), most...
accounting software developers do not work on tight deadlines and rapidly changing tax rules.

Kaner and Pels (1998) report that some software publishers track the number of errors that are discovered in their software after it has been released, calling these bugs their “surprises.” They only include errors in this category that had not been detected in the software development process by programmers, quality assurance technicians, or by their own customer support staff.

A common experience among these companies is to have fewer than five “surprise” bugs surface after the software is released. Many of them report only one or two such “surprise” errors.

This means that the large number of bugs identified in the industry press is not a true reflection of some innate condition in software development. In fact, it suggests that most software vendors know about the vast majority of the bugs that exist in the software they release. They just are not telling their customers about the errors.

**Limits of Tolerance**

An increasing number of writers are reporting that business managers and IT staff members are coming to believe that tolerating software errors is no longer necessary (Foster, 2003; Hunter and Boscher, 2003). They argue that improving software design tools and software design methods offer hope for higher quality software. As companies realize the cost of error-laden software, they are demanding that internal software developers use these design tools and methods to improve the quality of the software developed in-house (Hayes, 2003).

The number of companies that have reached the limits of their tolerance is growing. Since there is ample evidence that the tools now exist to produce software that is less error-laden than that being currently produced, the logical place to turn is to the legal system.

**LEGAL RECOUSE FOR SOFTWARE ERRORS**

Assuming that legal recourse exists for those who are burned by error-laden software, what type of damages are available? Our legal system provides for several types of damages, dependant upon the type of harm suffered. Compensatory damages are the most common. These type of damages are also referred to as “direct damages.” In other words, direct damages are those that flow directly from the contract. For example, if defective software caused actual damage to the purchaser’s computer, the cost to repair the damage to the computer would be compensatory, or direct, damages.

A second type of damages is consequential damages, also known as “special damages.” Consequential damages are those that result from the unique circumstances of a particular injured party. This type of damages is rarely awarded. The remedy comes from the seminal case of *Hadley v. Baxendale*, a British case that dates from 1854. The Hadleys sued for lost profits, but the court held that such damages were not foreseeable, therefore no such damages could be awarded.

Unfortunately for purchasers of error-laden software, courts have held that producers of such software who include disclaimers for defects or nonconformance are liable for neither compensatory nor consequential damages.

**Shrink Wrap, Click Wrap, and Web Wrap Licenses**

Click wrap terms are those embedded in the software itself. Shrink wrap terms are on the packaging of the software. Finally, web wrap terms are available on a Web page after the product is purchased online. The issue with all three of these licenses is that you cannot review the terms until you purchase the software and unwrap it, or until you place the order and pay for the software.

In *ProCD Incorporated v. Zeidenberg*, Zeidenberg purchased software made by ProCD. The software contained a shrink wrap license. Zeidenberg claimed that in order to be binding, the terms of the license must be on the outside of the box. The court disagreed, citing other examples of getting terms after a purchase (e.g. airline tickets, movie tickets, etc.) If the purchaser of software disagrees with the terms, he may simply return the product.

Courts across the country have disagreed on exactly how to interpret click wrap, shrink wrap, and web wrap licenses. There have generally been three theories advanced on how to decide such cases. Some courts hold that the offer is
made with the purchase offer is communicated and the offer is accepted when the shipment is sent. This approach exemplifies the UCC’s informal approach to contracts. Other courts hold that the license terms are proposals for additions to the contract terms. Under the UCC, such terms do not become part of the contract because they significantly alter the rights of the parties (i.e. by limiting the liability of the seller). Finally, some courts hold that there is a new theory of “contract layering” – it permits contract terms to accumulated in stages until the contract is completely formed. Because the UCC governs contracts for software that is contained in “goods,” such as diskettes for CD’s, some believe that the UCC’s liberal rules may support the layered contract theory.

The “layered contract” theory is exemplified in the case of *M.A. Mortenson Company v. Timberline Software Corporation*. Mortenson was a construction contractor who purchased software to prepare bids on projects. He prepared a bid, the software malfunctioned, and he underbid a project by $1.95 million. Mortenson sued Timberline Software for damages. Timberline argued that consequential damages were excluded according to the software license terms. The issue, then, was whether a limit on consequential damages, enclosed in the shrink wrap license accompanying the software, was enforceable against the purchaser of the licensed software.

The court in *Mortenson* held that the terms of the shrink wrap license were part of the contract and that Mortenson’s use of the software constituted assent to the agreement, including the license terms (i.e. the “layered contract” theory). The patent unfairness of the “layered contract” theory is obvious in *Mortenson*. A party purchases software and uses it for its intended purpose. The software malfunctions and costs the party $1.95 million. Because of a shrink wrap license inside the box of the software, the party has no recovery!

**Attempt at Reform**

As a way of dealing with this and other controversial issues, it was proposed that there be a new article added to the UCC, the Uniform Commercial Information Transaction Act (UCITA). Because of the controversial nature of UCITA, it was ultimately drafted as a separate law. UCITA’s purpose was to propose new laws to cover contracts to create, transfer, modify, or license computer information.

Not covered under UCITA were transactions in goods, software embedded in goods (with a few exceptions), movies, and sound recordings.

To date, only two states have adopted UCITA (Maryland and Virginia). Controversy over the proposed new law came from many sources. The American Bar Association felt the statute was too complex for even a lawyer to understand. Libraries argued that UCITA, by allowing states to follow different rules regarding software, would whittle away at federal copyright law.

The main problems with UCITA are as follows: (1) it allows software publishers to change the terms of the contract after a purchase; (2) it allows restrictions that prohibit users from criticizing or publicly commenting on software they purchased; (3) it allows software to contain “backdoor” entrances, potentially making software vulnerable to infiltration by unauthorized hackers; and (4) it allows software publishers to sell their software “as is” and to disclaim liability for product shortcomings.

Supporters of UCITA (including Microsoft, LexisNexis, and the Business Software Alliance) argued that UCITA was needed because the UCC did not anticipate contracts for software, which are generally license agreements. Moreover, they feel that the UCC does not adequately address e-commerce issues.

**Proposals for Further Reform**

The question that remains involves the issue of what can be done to allow purchasers of software a remedy for defective or nonconforming software, while prohibiting unlimited liability against software manufacturers. This is not an easy question to answer.

Giving incentives to manufacturers to reveal known defects could be a reasonable first step. Limiting the time for consumers to bring a complaint for defective software (i.e. a short statute of limitations) is another possibility. Moreover, potential liability could be assessed based upon the nature of the error.

For example, if the software program when used properly does not perform the major function for
which it is intended, the damages permitted would be much higher than for minor defects or malfunctions.

CONCLUSION

The limited liability of vendors for direct and consequential damages is a problem that is causing growing concern among business users of software. For accounting software in particular, the problem of consequential damages is becoming a significant element of companies’ exposure to unforeseen liabilities. Specific legislation that addresses direct and consequential damages for software products is a possible solution.

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To overcome the limitations of the standard costing system, this paper presents an activity-based costing model to assign costs to their five business units based on how each consumes available resources. Activity-based costing measures process and activity performance, determines the cost of outputs, and identifies opportunities to improve process efficiency and effectiveness. This paper focuses on determining the cost of imaged documents using the imaging process and activity performance. The following steps were taken to develop an activity-based costing model for National Imaging:
I. Background of Waterfield Group

A. Largest publicly-held mortgage servicing operation in the U.S.

B. Services over $12 billion in residential mortgages

C. Companies include mortgage, insurance, and banking

II. Technology at Waterfield

A. This technology resulted in Waterfield receiving recognition by the Smithsonian Institute for technological innovation in real estate and finance.

B. This was accomplished with the integration of imaging technology into the mortgage process to achieve a “paperless” processing environment

C. Files and documents are scanned into the system and made available to end users as images on the computer

D. Waterfield has leveraged this technology over all of their business units including mortgages
III. Current Costing Procedures

A. Currently, Waterfield uses a standard costing/predetermined OH rates to allocate National Imaging's costs to the five business units.

B. The standard costing model allocates costs on the basis of closed loan units. This model uses a standard rate that assumes that the same costs are involved with imaging a file for each of the five business units, which is not an accurate assumption.

C. A major problem not captured by the standard costing system is that the five business units all have different "fallout rates." The fallout rate measures loans originated and processed that never actually close. By allocating costs only on the basis of closed loan units, cross-subsidization occurs. Business units with higher fallout rates are able to pass on part of the cost to other business units.

D. To overcome the limitations of the standard costing system, an activity-based costing model was developed to assign costs to the five business units based on how each consumes Waterfield’s available resources.
IV. Activity-Based Costing at Waterfield

A Activity-based costing measures process and activity performance, determines the cost of outputs, and identifies opportunities to improve process efficiency and effectiveness.

B This paper focuses on determining the cost of imaged documents using the imaging process and activity performance. The following steps were taken to develop an activity-based costing model for Waterford:

1. Define the Scope of the Model
2. Analyze the Activities
3. First stage allocation
4. Develop the Model
5. Compare the Activity-Based Model to the Standard Costing Model

V. Define the Scope of the Model

The scope selected for the model was to determine the cost of imaging for Waterfield’s five business units. Data availability limited the scope of the model. Certain data items are not currently captured or tracked accurately and, therefore, were not available for use when developing the model. These items are addressed under "Future Considerations."
VI. Analyze the Activities

The imaging division has four main processes: imaging, document custody, appraisals and faxes. The activities involved with each process are well defined.

1. Imaging: ID (Identification)—Batch and Prepare—Scan—Index
2. Document custody: Pull documents—Review status—Send documents for processing
3. Appraisals: Review appraisals—Batch and Prepare—Scan—Index
4. Faxes: Assemble fax—Index fax

VII. First stage allocation: resources to activities

The predominant resource at National Imaging is labor. Therefore, the major focus of the resource cost assignment to the activities is labor hours consumed. Studies were conducted to define the labor requirements for individual activities. At Waterfield, several resource drivers could have been used: closed loan units, batches, documents, and pages, among others.
VIII. Second stage cost allocation

Once the amount of direct labor consumed was defined for each activity, a cost for each activity was then determined. Waterford’s financial statements combined with human resource records provided the necessary data.

IX. Comparison of the Activity-Based Model to the Standard Costing Model

As expected, the business units that do not use all the activities nor consume as many of Waterford’s resources saw a reduction in the costs allocated to them. On the other hand, business units that use the largest majority of resources saw a significant increase in the costs allocated to them.

X Conclusion

The activity-based costing model provides the Waterfield Group with a useful tool to more accurately assign costs to its five business units. Beyond just cost allocation, this model can and should be used when making decisions regarding capital improvement projects in Imaging. With the data collected and formulated in the activity-based costing model, the actual cost impact may be determined based on the
expected improvement to how an activity is performed.
RISK STRATEGY OF VENTURE CAPITAL

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Lakehead University, Thunder Bay,
Ontario, Canada

ABSTRACT

Venture capitalists have been called *vulture capitalists*—e.g. hard individuals, known for “…taking what they did not put in, and reaping what they did not sow.” And yet, their involvement is greatly valued. Among other things, creditors, investors, and follow-up venture capitalists often link their decision to invest in a venture on what is signalled by the venture capitalist’s decision to mentor.

Risk is the main focus of venture capitalists—they select from hundreds of risky high-potential ventures, a mere handful that they can help. This paper argues that, despite their reputation to the contrary, venture capitalists do not make ventures successful or even more successful—they add value by reducing the risk of failure, in the ventures they mentor, to a level that creditors and investors consider acceptable. Thus, an ability to promote a winner and make it more of a winner is of some value, but it is *neither necessary nor sufficient* for the venture-capital process.

The effect of the venture-risk profile on the venture capital process is examined. Desirable attributes in venture-capitalist and their appropriate asset structure are posited—along with strategies, return possibilities, and risk-to-return allocations. This paper concludes by noting “…venture-capitalists create value by reducing the risk of failure—not by creating winners.”

Key Words: Venture Capital, Risk, Return, Risk Management, Value Added, Leverage, Skewed Distribution

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1.0 INTRODUCTION
There are a number of excellent descriptive articles on what venture capitalists do (Caravalho, 1996; Frear and Wetzal, 1990; Gorman and Sahlman, 1989; Brophy and Verga, 1988) and there is some discussion on how venture capitalists do what they do (Amit, et al, 1998), but little effort appears to have been directed at explaining and linking the why, how, and what of venture capital. This paper postulates a theory of venture capital that links the observed behaviour of venture capitalists to a means of earning substantial returns from selecting a portfolio of venture, managing the risk of those ventures, and leveraging their earnings by involving other investors and creditors.

Venture capital has been described as “brave and patient money” (Bygrave and Timmons, 1992). This paper argues that venture capitalists are neither: “fools rushing in where angels fear to tread” nor are they particularly brave or patient. Venture capitalists are proficient business people using reliable risk-management techniques to select and convert a high-enough percentage of perceived “dross-investments” into gold to cover their costs and provide a rich return.

Fisher (p.223, 1906) asserts “...the value of any capital-good, either of wealth or property rights, assuming that all future income is foreknown, is the discounted value of that income.” In the real world, there is almost always a distribution of expected NPVs (net present values) and the fair risk-neutral price of a venture is the arithmetic mean average of the distribution of its expected NPVs.

This paper examines the effect on a venture’s market value (i.e. assumed to be the mean expected NPV) if the application of risk management techniques trims the lower third from its distribution of expected NPVs. Also, the paper considers the effect on the potential venture capital gains of three basic distribution shapes (i.e. normal, skewed left, and skewed right). The initial analysis reviews the pure venture-capitalist effect by assuming that s/he buys the venture and becomes the entrepreneur—common ways venture capitalists leverage their time and returns are covered later.

1.1 Venture Capitalists Earn Superior Returns
The venture-capital process is more than mere speculation (any investor seeks to buy low and sell high) and while venture promotion may have pride of place, it is neither necessary nor sufficient for the venture-capital process. In efficient markets, the fair risk-neutral-market-price of a venture equals its expected NPV (usually the mean of the distribution of expected NPVs) and an investor paying that price expects to earn only a normal return on their investment.

This paper asserts that venture capitalists differ from most investors in that they add value to their investment portfolio via the use of risk management techniques (MacMillan, et al., 1985; Ruhunka and Young, 1991; Driscoll, 1974) to favourably alter the distribution of risk—so as to increase the mean expected NPV of the investment.

The value a venture capitalist helps create is measured by the difference between the venture’s exit-point value (i.e. when s/he ceased to mentor it) and the entry-point market value (i.e. when s/he started to mentor it). However, because the exit price often occurs six or more years after the entry price, the two sums are not comparable until the exit price is adjusted to reflect the time-value-of-money (e.g. $1.00 today is more valued than $1.00 six years from today) and any inflation effects (assumed to be nil, for this paper). Thus, the gross gain in the venture during the mentoring should be attributed into the notional gains of:

✓ A pure capital gain on the increased value of the venture—the exit price (adjusted for the time value of money to the entry time) less the entry price.
A normal return (time value of money) on the entry price.

A normal return on the pure capital gain—the exact nature of this gain (normal return or capital gain) is contentious and needs to be considered in detail in future research.

Venture capitalists are more than speculators—they profit by adding value, in the form of reduced risk and increased survival of the firms they nurture. Understanding the behaviour of venture capitalists is best done by examining first the distribution of venture expected NPVs, then by examining how venture capitalists enhance that distribution, and finally considering how venture capitalists leverage their returns.

1.2 Venture Risk and the Cost of Its Reduction

Definitions of risk usually focus on the total distribution (i.e. the standard deviation) of the expected range of IRR (internal rates of return), or net present values (NPV), or some other measure of return or value (Brealey, et al., pp.280-284 and p.305, 2003; Francis and Ibbotson, p.26, 2002). As shown in the next two sections, venture capitalists have good reason to want to mentor ventures that exhibit strong-right-skewed, expected-NPV distributions. Asymmetry makes it inappropriate to use standard deviation as a risk proxy. This paper refines the definition of risk to be the distribution of the expected NPVs to the downside (i.e. left) of the mean expected NPV—the upside distribution reflects opportunity rather than risk.

As with any economic activity, risk reduction (i.e. reducing the downside potential) likely works first on the most cost-effective activities and moves progressively through less cost-effective actions until the marginal cost of risk reduction equals its marginal benefit. Rather than develop a complex side-model for risk reduction, this paper develops a logical simplifying assumption. Risk reduction can range from nil to total—given how risk is defined above, the risk reduction range translates to eliminating a range of the expected NPVs of the venture from nil to all of the lower 50 percent of that distribution.

Given that the marginal cost of risk reduction likely rises exponentially as risk is reduced, ridding a venture of all risk (i.e. eliminating the entire downside) is likely infinitely costly. Thus, reduction of the entire nil to half of all risk (i.e. nil to the lower 25 percent of the distribution of expected NPVs) is highly likely and that further elimination of risk becomes progressively less likely as elimination of all risk is approached. A cut-off point must be selected, that point likely varies with the venture, and venture capitalists likely select ventures where risk reduction is easy and cost-effective.

This paper assumes for simplicity that two thirds of the total risk (i.e. the lower one third of the total distribution of NPVs) is eliminated by risk reduction and that one third of the total risk remains. The average level of risk reduction that venture capitalists actually perform on the ventures they mentor is a matter for future empirical research and likely varies from venture to venture.

2.0 DISTRIBUTION OF EXPECTED NPVs

The effect of NPV distribution on venture capital profits was examined using Standard Beta distributions with probability density functions (PDF) of P(x) to mimic normal and skewed distributions of expected NPVs. Beta distributions are used because, per Figure 1, they provide the appropriate shapes and symmetry and their domain is limited (i.e. 0 < x < 1) in such a way as to provide good control for the analysis.
The following formulas are adapted from von Seggern (pp. 248 and 206, 1993) and NIST (2003). Standard Beta distribution with the PDF defined as follows (subject to: 0 = x = 1; a,b > -0-):

\[
\text{Beta, } P(x) = x^{a-1}(1-x)^{b-1}/B(a,b) \tag{1}
\]

\(x = \text{value index; } 0 = x = 1.00\)

\(B(a,b) = \text{Beta function}\)

\(a,b = \text{distribution shape-setting parameters}\)

\[
B(a,b) = \int_{0}^{1} n^{a-1}(1-n)^{b-1} \, dn \tag{2}
\]

\(n = \text{an array of index values where } 0 = n = 1.00\)

\[
I(a,b) = \int_{0}^{x} q^{a-1}(1-q)^{b-1} \, dq \tag{3}
\]

\(I(a,b) = \text{incomplete Beta function}\)

\(q = \text{an array of index values where } 0 = q = x\)

The cumulative Standard Beta distribution (also called the \textit{Incomplete Beta function ratio}—NIST, 2003) is defined by replacing the numerator in eqn (1) with the right hand side (RHS) of eqn (3):

\[
I_x(a,b) = \int_{0}^{x} P(n)dn = \left[ \int_{0}^{x} n^{a-1}(1-n)^{b-1} \, dn \right]/B(a,b) \tag{4}
\]

\(x\)-values at the cumulative distributions (i.e. \(S P(x)\)) of the boundary of the lower third, the mean, and the adjusted mean are estimated (to the nearest 0.0001) by substituting the RHS of eqn (3) into eqn (4) for an array of \(x\)-values.

Figure 1: Basic Probability Densities of Venture NPVs

The Figure 1 distributions, discussed in subsequent subsections, are created by setting appropriate values for parameters “a” and “b” and substituting the RHS of eqn (2) into (1).
2.1 Normal-Shaped Beta Distribution of P(X)

A venture that is normal in every sense of the word produces a normal distribution of expected NPVs. A normal-shaped Beta-curve is generated by setting parameters “a” and “b” to (respectively) 3.00 and 3.00 so that eqns (1), (2), (3), and (4) simplify to:

\[ B(3,3) = 1^3/3 - 1^4/2 + 1^5/5 = 1/30 \]  
\[ I(3,3) = x^3/3 - x^4/2 + x^5/5 \]  
\[ P(x) = 30x^2(1-x)^2 \]  
\[ \int_0^x P(n)dn = 30(x^3/3 - x^4/2 + x^5/5) \]

Equation (1a) is used to draw the normal-shaped Beta curve in Figures 1 and 2. Equation (4a), using increments of 0.0001x, is used to identify the arithmetic mean of the unadjusted density curve, the boundary of the lower third of the density curve, and the new mean after the lower third had been eliminated. The discrete approximations from eqn (4a) are not exact. However, their precision is consistent with the quality of real-world data and they are sufficient to provide sensible estimates of the values for the analysis in this paper.

**Figure 2: Effect on a Venture’s Market Value of Eliminating the Lower One Third of the Normal Distribution of Its Expected NPVs**

The values in Figure 2 provide a means to estimate the gross benefit accruing to a venture capitalist from eliminating the lower third of the distribution of expected NPVs in that venture. Specifically, a venture capitalist could buy the unadjusted venture for 0.5000 and sell the risk adjusted venture for 0.5909. Assuming the venture is held for six years, and a normal annual return is eight percent, the venture capitalist earns:

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross Exit Price of ((0.5909 \times 1.08^6))</td>
<td>0.9377</td>
</tr>
<tr>
<td>Less: The entrance Price of</td>
<td>0.5000</td>
</tr>
<tr>
<td>Gross Gain of</td>
<td>0.4377 for an 11.05% IRR on 0.5000</td>
</tr>
</tbody>
</table>

This gross gain can be notionally separated into:

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>A pure capital gain ((0.5909 - 0.5000))</td>
<td>0.0909</td>
</tr>
<tr>
<td>A normal return on the:</td>
<td></td>
</tr>
</tbody>
</table>

\[ \text{IRR on 0.5000} \]
• Initial investment \((0.5000[1.08^6 – 1.00])\) \(= 0.2934\)
• Capital gain of \([(0.5909-0.5000)(1.08^6 – 1.00)]\) \(= 0.0534\)

Gross Gain of \(= 0.4377\)

The gross gain represents an annual internal rate of return (IRR) of 11.05 % \(((.9377/0.5000)^{1/6} – 1)\) or 3.05 percentage points above an 8.00 % normal return. However, the costs of implementing a risk-management program significantly reduce the IRR—i.e. they are deducted from the numerator (i.e. net income). Venture capitalists have, historically, charged 2.0 to 3.0 percent to manage venture capital funds (Joseph, et al., 2001) and it is reasonable to assume that the cost of their management efforts is closely related. Thus, venture capitalists are unlikely to be excited by the net premium from ventures exhibiting a normal distribution of expected NPVs.

2.2 Left-Skew-Shaped Beta Distribution

A venture that has a small risk of large reductions in NPV exhibits a distribution of expected NPVs that is skewed to the left. A left-skew-shaped Beta-curve is generated by setting parameters “a” and “b” to (respectively) 3.00 and 2.00 so that eqns (1), (2), (3), and (4) simplify to:

\[
B(3,2) = \frac{3^3/3 - 4^4/4}{3} = 1/12
\]

\[
I(3,2) = x^3/3 - .25x^4
\]

\[
P(x) = x^212(1-x)
\]

\[
\int_{0}^{x} P(n) dn = 12(x^3/3 - .25x^4)
\]

The values in Figure 3 provide a means to estimate the gross gain accruing to a venture capitalist from eliminating the lower third of the expected NPVs in that venture. Specifically, a venture capitalist could buy the unadjusted venture for 0.6143 and sell the risk adjusted venture for 0.7085.

**Figure 3: Effect on a Venture’s Market Value of Eliminating the Lower Third of the Left-Skewed Distribution of Its Expected NPVs**

Assuming the venture is held for six years, and a normal annual return is eight percent, the venture capitalist earns:
A Gross Exit Price of \((0.7085 \times 1.08^6)\) = 1.1243
Less: The entrance Price of = 0.6143
Gross Gain of = 0.5100 for an 10.60 % IRR on 0.6143
This gross gain can be notionally separated into:
A pure capital gain \((0.7085 - 0.6143)\) = 0.0942
A normal return on the:
• Initial investment \((0.6143[1.08^6 - 1.00])\) = 0.3605
• Capital gain of \([(0.7085 - 0.6143)(1.08^6 - 1.00)]\) = 0.0553
Gross Gain of = 0.5100
The gross gain represents a 10.60 % \(((1.1243/0.6143)^{1/6} - 1)\) gross IRR, or 2.60 percentage points above the 8.00 % normal return. This return is significantly lower than that of the venture with a normal distribution of expected NPVs—as in the previous case, the costs of the risk-management program significantly reduces this return because those costs are deducted from the numerator. Thus, venture capitalists are even less likely to show interest in a venture with a left-skewed distribution of expected NPVs than they will in one with a normal distribution

### 2.3 Right-Skew-Shaped Beta Distribution

A venture that has a high risk of large reductions in NPV and a small chance of large increases in NPV exhibits a distribution of expected NPVs that is skewed to the right. A right-skew-shaped Beta-curve is generated by setting parameters “a” and “b” to (respectively) 2.00 and 3.00 so that eqns (1), (2), (3), and (4) simplify to:

\[
\begin{align*}
B(2,3) &= 1/2 - 2/3 + 1/4 = 1/12 \quad (2c) \\
I(2,3) &= .50x^2 - 2x^3/3 + .25x^4 \quad (3c) \\
P(x) &= 12x(1-x)^2 \quad (1c) \\
\int_0^x P(n)dn &= 12(.50x^2 - 2x^3/3 + .25x^4) \quad (4c)
\end{align*}
\]
The values in Figure 4 provide a means to estimate the gross benefit accruing to a venture capitalist from eliminating the lower third of the distribution of expected NPVs in that venture. Specifically, a venture capitalist could buy the unadjusted venture for 0.3857 and sell the risk adjusted venture for 0.4863. Assuming the venture is held for six years, and a normal annual return is eight percent, the venture capitalist earns:

\[
\text{A Gross Exit Price of } (0.4863 \times 1.08^6) = 0.7717 \\
\text{Less: The entrance Price of } = 0.3857 \\
\text{Gross Gain of } = 0.3860 \text{ for an 12.25 \% IRR on 0.4863}
\]

This gross gain can be notionally separated into:

\[
\text{A pure capital gain (0.4863 – 0.3857) } = 0.1006 \\
\text{A normal return on the:} \\
\text{• Initial investment (0.3857[1.08^6 – 1.00]) } = 0.2264 \\
\text{• Capital gain of [(0.7717 - 0.4863)(1.08^6 – 1.00)] = 0.0590 \\
\text{Gross Gain of } = 0.3860
\]

The gross gain represents an IRR of 12.25 \% ((0.7717/0.3857)^1/6 – 1) or 4.25 percentage points above the normal return of 8.00\%. The costs of implementing the risk-management program reduce this return (the costs are deducted from the numerator) but the return on the venture supports a 3.00 \% venture capital charge and still returns 1.25 \%, above the normal return of 8.00 \%. Thus, venture capitalists are likely to show more interest in ventures with a right-skewed distribution of expected NPVs than in ventures with normal or left-skewed distributions of expected NPVs.

2.4 A Big Return for Managing a Big Risk
The use of Beta distributions for illustrative purposes kept the venture risk moderate. The use of a lognormal distribution allows for almost infinite risk bounded only by the sensible requirement that the venture capitalist can only lose up the amount invested (i.e. \( x > 0 \)).

The standard lognormal distribution is adapted from von Seggern (p.252, 1983), NIST (2003), and Holton (2003):

\[
P(x) = \left(2\pi \right)^{-\frac{1}{2}} \exp \left\{ -\frac{1}{2} \left( \frac{\ln(x) - \mu}{\sigma} \right)^2 \right\} / \sigma / x
\]

\[\mu = \text{mean of the normal distribution} = 0.00\]
\[s = \text{standard deviation}\]

Figure 5: Three Lognormal-Probability Densities of Venture NPVs

Risk in a lognormal distribution varies inversely with the degree of kurtosis (i.e. the peakedness of the distribution—a flat distribution has a lot of variance/risk). The three expected NPV distributions illustrated in Figure 5 were generated using eqn (5) with “\( \mu \)” set at nil and “\( s \)” set at (respectively from highest to least Kurtosis) 0.20, 0.40, and 1.20.

Visually, Figure 5 indicates that in terms of potential gains from risk management, the opportunity varies with the risk and the highest opportunity is in the highest risk (i.e. flattest) distribution. Thus, high-risk ventures offer venture capitalists lucrative opportunities to profit from managing that risk. However, given their risk-management role and the rule of large numbers (e.g. the insurance effect), mentoring high risk ventures does not necessarily pass that risk on to the venture capitalist or the venture capital fund being managed. Thus, mentoring risky ventures does not have to itself be risky.

Table 1: Returns Earned on the Three Distributions of Venture NPVs illustrated in Figure 5 if the Purchase Price is the Arithmetic Means of the Pre-adjustment Distributions

<table>
<thead>
<tr>
<th>DESCRIPTION OF RETURNS</th>
<th>LOW RISK</th>
<th>MEDIUM RISK</th>
<th>HIGH RISK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exit price at the time of Sale</td>
<td>1.7216</td>
<td>1.8773</td>
<td>2.6529</td>
</tr>
<tr>
<td>Return of original investment</td>
<td>0.9950</td>
<td>0.9950</td>
<td>0.9950</td>
</tr>
</tbody>
</table>
A one-time, risk-averse investor would tend see the mode of the Figure 5 distributions (respectively, from highest to lowest Kurtosis, .96, .85, and .24) as being the best measure of central tendency and would set a price at that level. A risk-neutral institutional investor with a large portfolio of investments may be willing to bid the price up, closer to the arithmetic mean. Thus, the price of the investments will tend to settle between those values, depending on the makeup of the market.

Table 2: Returns Earned on the Three Distributions of Venture NPVs illustrated in Figure 5 if the Purchase Price is the Modes of the Pre-adjustment Distributions

<table>
<thead>
<tr>
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<tr>
<td>Exit price at the time of Sale</td>
<td>1.7216</td>
<td>1.8773</td>
<td>2.6529</td>
</tr>
<tr>
<td>Return of original investment</td>
<td>0.9600</td>
<td>0.8500</td>
<td>0.2400</td>
</tr>
<tr>
<td>Gross gain (unadjusted for time value of money)</td>
<td>0.7616</td>
<td>1.0273</td>
<td>2.4129</td>
</tr>
<tr>
<td>Annual IRR over the 6 years of investment</td>
<td>9.83 %</td>
<td>14.12 %</td>
<td>49.25 %</td>
</tr>
<tr>
<td>IRR less normal return and venture-capital charge</td>
<td>(0.67) %</td>
<td>3.12 %</td>
<td>38.25 %</td>
</tr>
<tr>
<td>Pure capital gain (PV adjusted exit price – entry price)</td>
<td>0.1249</td>
<td>0.3330</td>
<td>1.6718</td>
</tr>
<tr>
<td>Normal return (8.00 %) on original investment</td>
<td>0.5634</td>
<td>0.4988</td>
<td>0.1408</td>
</tr>
<tr>
<td>Normal return (8.00 %) on pure capital gain</td>
<td>0.1248</td>
<td>0.1955</td>
<td>0.0840</td>
</tr>
<tr>
<td>Gross gain (unadjusted for time value of money)</td>
<td>0.7266</td>
<td>1.0273</td>
<td>2.4129</td>
</tr>
</tbody>
</table>

Figure 6 and Tables 1 and 2 show that to make a reasonable return, venture capitalists have to work with high-risk ventures—low- and medium-risk ventures just lack the capacity to provide a venture capitalist with a fair net return on his/her costs and effort. The next section looks at what skills and attributes a venture capitalist brings to the marketplace.
3.0 VENTURE CAPITALIST SKILL SET
The previous sections discussed the attributes that make a venture worth a venture capitalist’s time, this section lists and discusses what skills and resources venture capitalists need to work their magic on a venture—Four attributes help a venture capitalist function well:

✓ Entrepreneur – specializing in risk management,
✓ Actuary/Monitor – knowing the effect of numbers on risk and uncertainty and when to exit from a losing venture,
✓ Handicapper – knowing what makes for a winner, in a given race.
✓ Reputation as a great, infallible leader – investors, creditors, and follow-up venture capitalists are pack animals that form into syndicates to follow proven leaders (Lerner, 1994).

While the first attribute differentiates venture capitalists from all other investors, it is the last that makes them successful. Thus, in the following review, the last attribute is made first, and so forth.

3.1 Reputation
In the same way that (as marketers often note) “restaurants sell the sizzle not the steak”, a reputable venture capitalist can capitalize on his/her reputation of producing “a silk purse from a sows ear” to draw resources to their portfolio of firms at a lower cost than would otherwise be available (Rosenstein, et al. 1993).
Bankers, even commercial bankers, (Fried and Hisrich, 1994; Magginson and Weiss, 1991) are very conservative in their lending practises and tend to lend somewhat less than what they think is a safe and secure amount. In terms of the venture shown in Figure 6, bankers would lend, at most, 80 percent of the modal expected NPV (i.e. 0.1920 = (0.240)(0.80)). After a reputable venture capitalist agrees to mentor the venture the perceived risk shifts such so that the bank will consider loaning up to 80 percent of the new lower limit of expected NPVs (i.e. 0.4728 = (.591)(0.80)). In the case of the venture in Figure 6, the involvement of a reputable venture capitalist increases the access to credit from banks and other creditors by nearly 250 percent (e.g. 2.4625 = 0.4728/0.1920). Given that inadequate financing is a major cause of new firm failure, the mere involvement of a reputable venture capitalist can significantly reduce a firm’s risk of failure—even before the venture capitalist commits funds and other resources.

There is a similar, but stronger, effect with investors. A completely risk-neutral investor would be willing to invest in a venture up to its mean average expected NPV. In the venture in Figure 6, this investment would be up to 0.995. However, many investors tend to be risk averse because they are so small they cannot afford to diversify their portfolios sufficiently to use the rule of large numbers to benefit from central tendency. Involvement in a large investment pool may not offset this problem because of increased administration costs and moral-hazard issues. The reputation of the venture capitalist allows them to access this large pool of risk-averse investors at a relatively low cost. In terms of the venture in Figure 6, the access to investor capital is increased from the modal expected NPV to the adjusted arithmetic mean—roughly 697 percent (e.g. 6.9658 = 1.6718/.2400). Reputable venture capitalists could access those investor funds for only a few points (fractions of a percent) over the normal rate. However, by offering the outside investors up to 80 percent of the venture capital gains, a venture capitalist can persuade them to provide up 99 percent of the venture capital fund (Clark, 1987)—typically, such funds invest in a handful of ventures and are wrapped up (i.e. the assets sold and the creditors and the investors paid out) after five to seven years.

A reputation for picking winners is a prized asset among venture capitalists and contributes greatly to their ability to gain from amassing funds and other resources to commit to the firms in their portfolio of ventures. However, it is not the essence of the venture capital process.

### 3.2 Handicapper

A handicapper assesses the strengths and weakness of each participant in a field of contestants and, in so doing, provides a means to assess their expected performance. Good handicapping is an essential part of how venture capitalists develop the reputation (Nash, 1988; Maier and Walker, 1987) that (as discussed in the previous subsection) allows them to access funds and other inputs from creditors and investors. After a rigorous screening process of hundreds of possible projects, only few are selected (Hall and Hofer, 1993, Marriefield, 1987).

Those who are good at handicapping recognize that many of their rules of thumb work only as long as they are not widely known and applied. As a result, handicapping is not only an arcane art but those who are good at it have reason to be secretive. Thus, much of what is known of handicapping is more myth than science and/or is sadly dated. The Economist (p.5, 6 September, 2003) drew from Franklin (2003) to list some rules as examples of how winners are picked among the innovations in technology:

> “Successful innovations had all or some of the following features: they were moderately new to the market, based on tried and tested technology, saved money, met customer needs and supported existing practises. [In contrast, failed products] were
based on cutting-edge or untested technology, followed a *me-too* approach, or were created with no clearly defined solution in mind.”

Table 3: Innovation Idea-Factors (per Franklin, 2003)

<table>
<thead>
<tr>
<th>IDEA FACTOR</th>
<th>DESCRIPTION</th>
<th>SUCCESS/FAILURE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Need Spotting</td>
<td>Actively looking for an answer to a known problem.</td>
<td>2:1</td>
</tr>
<tr>
<td>Solution Spotting</td>
<td>Looking for a new way to apply existing technology.</td>
<td>7:1</td>
</tr>
<tr>
<td>Mental Inventions</td>
<td>Dreamed up with little or no reference to outside world.</td>
<td>1:3</td>
</tr>
<tr>
<td>Random Events</td>
<td>Spotting the value in a serendipitous event.</td>
<td>13:1</td>
</tr>
<tr>
<td>Market Research</td>
<td>Questionnaires – asking the market what it wants.</td>
<td>4:1</td>
</tr>
<tr>
<td>Trend Following</td>
<td>Forecasting where market is going and getting there first.</td>
<td>1:3</td>
</tr>
</tbody>
</table>

The actual processes used in handicapping are closely guarded secrets – e.g. the innovation-idea factors in Table 3 likely lost much of their handicapping utility when they became widely known. Thus, while handicapping is well-known process, its secrets will tend to remain obscure.

Good handicapping is an important part of being profitable as a venture capitalist, but again it is important to note that it is not the essence of the venture capital process.

**3.3 Actuary/Monitor – many are called, but few are chosen**

“While you can’t win them all” (Chandler’s Law—Rawson, pp.47-48, 1997), venture capitalists know that to maintain their access to funds they must win often enough and well enough to retain, or if possible enhance, their reputation of picking and mentoring winners.

The venture capitalists’ need to maintain their reputation means that they must understand what makes a loser well enough to have few if any losers in their portfolio of firms—such firms must be weeded out early (the first loss, is the best loss) and in such a way that blame and loss falls mostly on strangers (especially newly-created strangers) and that those who continue entrusting wealth with the venture capitalist suffer little or no loss. Thus, monitoring, set ground rules, and understood consequences are an important part of the venture capital process.

Actuarial skills feed into handicapping and help the venture capitalist carefully pick a few ventures, from hundreds reviewed, to add lustre to his/her reputation, however, again it is not the essence of the venture capital process.

**3.4 Entrepreneur**

The essence of the venture-capital process is the skill to enter into a highly risky venture and to so manage its risk that more desirable outcomes become so much more likely than less desirable outcomes that the venture value increases in the eyes of actual and potential creditors and investors.

The two most common causes of venture failure involve shortfalls in financing and in the quality of management skills available to the venture. Thus, the venture-capital process involves managing a venture’s financing and its management—direct ownership, in whole or in part, is not necessary. However, taking an ownership stake in the ventures it mentors is a signal to creditors and outside investors of commitment and sincerity.

Venture capital firms maintain the following inventories:

- A portfolio of ventures that need access to the following pools to succeed.
- Access to a pool of funds from creditors and investors,
- Access to a pool of management skills—to pinch-hit in ventures,
- A pool of contacts—political, business, and consultant, and

Ideally a venture capitalist minimizes the actual use of these inputs by a given venture—the idea is to reduce risk by having key resources available to ventures in the event of a crisis. While there will be an
expected number of such crises, actual use of resources is costly, reduces the net return from mentoring the venture, and their excessive use is an indication of problems either with the selection of ventures in the venture portfolio or with the venture mentoring. Specifically, the venture-capital process is one of reducing the venture risk through cost-effective involvement.

In this model, venture capitalists triage the firms in their venture portfolio into:

😊 The Dead and Dying – good handicapping and mentoring minimizes the number of these firms to few or none and the few that do occur are disposed of quickly and quietly in a way that minimizes losses to those who continue to associate with the venture capitalist.

😊 The Living Dead and Successes – are a large portion of the portfolio (≥ 75 percent) and provide decent but unspectacular returns. A lot of effort is put into mentoring these firms, especially to prevent them from joining the ranks of the dead and dying.

😊 The Super Stars – most venture capitalists take credit for such successes. However, the appearance of a super star is more a matter of luck and good handicapping than skill in mentoring (i.e. good mentoring focuses more on preventing failure than fostering success).

4.0 THE VENTURE-CAPITAL STRATEGY

The venture-capital process produces a venture portfolio that will tend to contain a few big winners, some successes, no losers, and a lot of living dead. This occurs because the venture-capital process can reduce the risk of failure but usually can do little to make a winner more of a winner. Further, the venture-capital process produces the highest returns if the venture capitalist chooses a selection of ventures from those with high-risk-lognormal distributions of expected NPV—like that shown in Figure 6.
Another way of looking at this is to say that the venture capital process, by careful selection and mentoring, converts ventures that were seen as having an unacceptable risk of failure into ventures that are seen as having some chance of being a spectacular success, a high risk of mediocre returns (i.e. living dead), a good chance of being successful, and little or no risk of failure. These ideas are illustrated in Figure 7, where the Zombie Zone (i.e. mediocre returns of a living-dead firm) is where ventures return less than mean expected NPV of the risk adjusted firm, the Success Zone is where ventures return more than the mean expected NPV but less than twice that amount, and the Zone of Great Success is where ventures return more than twice the mean expected NPV. In Figure 6, these zones represent 50.0, 26.4, and 23.6 percent for (respectively) the Zombie Zone, the Success Zone, and the Zone of Great Success. While the actual distributions will vary with how the zones are defined, the model predicts that the largest measure of a venture capitalist’s portfolio of ventures will be living-dead firms and the smallest measure will be the great successes—the more stringent that definition, the smaller will be the number of great successes (e.g. when great success is defined as more than 5.0 times the expected NPV then, in Figure 7, only 5.8 percent of the venture portfolio will be great successes and 44.2 percent will be successes).

As an interesting side note, excessive fiddling with ventures by a venture capitalist is unlikely to produce more great successes and is probably a sure sign of future trouble as resources are diverted from reducing the risk of firms in the Zombie Zone. Thus, while venture capitalists should be proud of their great successes, they make their money by
assuring the investors and creditors that, for the ventures they mentor, the Zombie Zone is as bad as it gets.

5.0 MANY HAPPY RETURNS

Venture capitalists proudly display their history of great successes when seeking to sway a venture entrepreneur to become a client, and/or a consultant to join the pool of management resources, and/or creditors, outside investors and follow-up venture capitalists to provide funds. However, venture capitalists earn their living on the average performance of their venture portfolio.

The following example, assumes that the venture illustrated in Figures 6 and 7 is representative of the average venture. The following values and simplifying conditions were adapted and combined from Clark (1987), Joeseph, et al. (2001), and work developed previously in this paper.

1) The present value of the investment required to start up the average venture is the pre-adjusted mean NPV and the venture period is six years.

2) The pre-tax cost of credit is 10.0% resulting in a 6.0% after-tax cost of credit. However, 1/4 of the credit is in the form of interest-free payables (salaries payable, accounts payable, taxes payable, etc.) and this effect reduces the after-tax cost of credit from 6.0% to 4.5%.

3) Creditors will only loan 80.0% of the lowest perceived possible expected NPV (i.e. the lower 1/3 boundary of the pre-adjustment cumulative distribution of NPVs).

4) The venture capital fund provides 80.0% of the net funding of the portfolio venture (i.e. the amount in item (1) less the item (3) creditor amount) and receives 75.0% of the net gain in the portfolio venture (e.g. venture exit value less its entry value).

5) The venture entrepreneur provides the remaining 20.0% of the net funding of the portfolio venture plus management and receives 25.0% of the net gain in the portfolio venture.

6) The outside investors provide 99.0% of the venture capital fund and receive 80.0% of its net gain.

7) The lead venture capitalist (there are no follow-up venture capitalists) provides 1.0% of the venture capital fund and receives 20.0% of its net gain.

8) The ratio of venture capital fund invested in ventures varies depending on the fund’s age, but 50.0% is a reasonable average (Asian Venture Capital Journal, 2003). The remaining 50.0% of the funds are held in short-term, low-risk investments at 8.0%.

9) The cost of risk management is 3.0% of the capital fund—that amount is capitalized at 8.0% per annum until the venture is sold.

10) The credit costs and risk-management costs are paid before the portfolio venture gain is calculated and distributed.

In terms of the venture in Figures 6 and 7, the venture capitalist will use credit (cheapest source of funds) to its maximum of 0.4728. At the end of six years, a \(0.4728(1.06^6)^{3/4} = 0.5030\) payment is made to Creditors.

The venture-capital fund invests \(0.80(0.9950-.4728) = 0.4178\), made up of \(0.99(0.4178) = 0.4136\) from outside investors and 0.0042 from the venture capitalist. The risk-management costs at exit need a \(\text{FV}_a(0.030(0.4178)2,0.08,6)=0.1838\) payment to cover the risk-management costs of the venture capitalist. The venture entrepreneur invests \(0.20(0.9950-.4728) = 0.1044\).
Table 3: Calculation of the Venture Net Return after Disposal in Year Six

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross Gain of Venture (per Table 1)</td>
<td>$2.4543</td>
</tr>
<tr>
<td>Less: Creditor Share</td>
<td>$0.5030</td>
</tr>
<tr>
<td>Outside Investor Investment</td>
<td>0.4136</td>
</tr>
<tr>
<td>Venture Capitalist Investment</td>
<td>0.0042</td>
</tr>
<tr>
<td>Venture Entrepreneur Investment</td>
<td>0.1044</td>
</tr>
<tr>
<td>Net Gain Distributed</td>
<td>$1.0252</td>
</tr>
<tr>
<td>Less: Venture Entrepreneur Share (25 %)</td>
<td>$0.3573</td>
</tr>
<tr>
<td>Net Gain to Venture Fund</td>
<td>$1.0718</td>
</tr>
<tr>
<td>Plus: Other Income (8.0 % x (.4136+.0042))</td>
<td>0.0334</td>
</tr>
<tr>
<td>Less: Risk Management Costs</td>
<td>0.1838</td>
</tr>
<tr>
<td>Total Gain to Venture Fund</td>
<td>$0.9214</td>
</tr>
<tr>
<td>Outside Investor Share (80 %)</td>
<td>$0.7371</td>
</tr>
<tr>
<td>Venture Capitalist Share (20 %)</td>
<td>0.1843</td>
</tr>
</tbody>
</table>

Table 4: Pe-tax IRRs for the Venture and Venture Participants

<table>
<thead>
<tr>
<th>PARTICIPANT</th>
<th>CALCULATION</th>
<th>IRR</th>
<th>RELATIVE RISK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Venture</td>
<td>([2.4543/.9950]^{1/6} - 1) = 16.24 % = 16.24 %</td>
<td>n.a.</td>
<td></td>
</tr>
<tr>
<td>Normal Return</td>
<td>Given</td>
<td>8.00 %</td>
<td>Very Low</td>
</tr>
<tr>
<td>Creditors</td>
<td>Given</td>
<td>10.00 %</td>
<td>Very Low</td>
</tr>
<tr>
<td>Venture Entrepreneur</td>
<td>([(.3573+.1044)/.1044]^{1/6} - 1) = 28.12 % = 28.12 %</td>
<td>Very High</td>
<td></td>
</tr>
<tr>
<td>Outside Investors</td>
<td>([(.7371+.4136x2)/.4136/2]^{1/6} - 1) = 11.20 % = 11.20 %</td>
<td>Moderate</td>
<td></td>
</tr>
<tr>
<td>Venture Capitalist</td>
<td>([(.1843+.0042x2)/.0042/2]^{1/6} - 1) = 68.56 % = 68.56 %</td>
<td>Low</td>
<td></td>
</tr>
</tbody>
</table>

5.1 Risk and Return

Creditors are by nature risk averse, will not loan money into even moderately risky ventures, and often demand that loans be secured with real assets or personal guarantees. Credit is the lowest-cost source of funds because interest is deductible for tax purposes and some payables have no interest charge. As a result, the effective after-tax cost of credit is very low (0.10(1.00-.40)3/4 = 4.50 %).

As the number of ventures in a portfolio rises, the effect of the central limit theory rapidly reduces the average risk of the portfolio. However, the venture entrepreneur, unlike the venture capitalist and outside investors, is involved with only one venture and, therefore, experiences the highest risk.

The level of risk experienced by outside investors depends on the nature of their investment. In the preceding example, outside investors participated in a fund used to finance several ventures and the expected risk of such funds could easily be tailored by the venture capitalist to the risk/return needs of groups of outside investors. Only rarely would outside investors be exposed to the full risk of single venture investing—the venture capitalist has little to gain from encouraging such behaviour.
The high return and low risk of venture capitalists occurs because: 1) they create and manage the opportunities for venture participants; 2) they are involved in multiple funds and receive even more benefit from the central-limit theorem; 3) however, they may suffer horrific and non-recoverable consequences from a run of bad luck.

6.0 CONCLUSIONS

Venture capitalists are new-venture midwifes. In its purest form, venture capitalists reduce the risk of the new venture by creating access to key resources (financing, management skills, contacts, experience, etc.), monitoring progress toward pre-set goals (that have clearly understood sub-lethal consequences for failure) and providing timely feedback.

Venture capitalists leverage their time by focusing solely on the risk management and monitoring aspects of the ventures they mentor and leaving the day-to-day management of the venture to the venture entrepreneur. Time leverage allows venture capitalists to reduce their risk by expanding their involvement to many dozens of ventures, instead of just a few. However, the involvement of venture entrepreneurs creates monitoring issues and future research is needed to establish the monitoring needs, processes, and procedures of venture capitalists.

Venture capitalists leverage their money by creating/managing a venture-capital fund where outside investors provide most of the investment funds, in return for a right to participate in the increase in value that is created by the venture capitalists mentoring of the venture. Thus, reputation (e.g. track record and trustworthiness) is a venture capitalist’s most important asset in that it allows leveraging by creating access to viable ventures and low-cost access to credit, equity funding, and other inputs. This financial leveraging process can create an erroneous impression that venture capitalists are similar to commercial bankers. However, unlike bankers, venture capitalists create value by getting involved in managing the ventures they mentor.

The venture-capital risk reduction process creates more net value with ventures exhibiting expected NPVs with a high risk and a pronounced lognormal skew to the right. However, this tendency toward risky ventures is offset with the need of venture capitalists to maintain their reputation as winners who pick and mentor winning ventures. While it appears that returns to venture capitalists vary with the initial risk of the ventures they mentor, little of the downside risk carries forward to them—future research should look to establishing/proving a more rigorous risk-return relationship for venture capitalists.

The timing of the value created by a venture capitalist mentoring a venture was a contentious issue between the authors—future research should seek to establish and prove how much of this value is created at the time of entry, at the time of exit, and as a continuous process during mentoring. Theory (signalling, moral hazard, agency, etc.) and mathematics (Bernoulli process, set theory, time value of money, etc.) indicate that this is a much more complex issue than it might at first appear.

A venture capitalist specializes in creating value by reducing venture risk—once a venture becomes a success, there tends to be little that they can do to make it more of a success. Venture capitalists that expend time, effort, and funds trying to increase their proportion of great successes are likely starving ventures that need those resources and, as a consequence, the average performance of their portfolio will suffer, along with their reputation. The venture capitalists’ stock and trade is creating value by reducing the risk of failure—not creating winners.
7.0 REFERENCES


ACCOUNTING FOR STOCK OPTIONS – RENEWED INTEREST

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ABSTRACT

Accounting for options remains a controversial topic. In March, 2003, the FASB voted to once again add accounting for stock options to its agenda. This follows the December, 2002 issuance of St. No. 148, Stock Based Compensation – Transition and Disclosure – An Amendment of St. No. 123.

In 1995, the FASB issued Statement No. 123, Accounting for Stock Based Compensation, requiring companies to “expense” stock options on the income statement. The standard advocated the “fair value” method of measuring stock based compensation costs, which applied for both employees and non-employees if equity instruments were the medium of consideration. This measurement was a departure from the intrinsic value method, which had been used since the 1972 issuance of APB Opinion No. 25.

While St. No. 123 encouraged measurement under the fair value method, the FASB bowed to intense political pressure and allowed companies to continue using the intrinsic value method, with the new measurement reflected in pro forma disclosures. Most companies elected to continue using the intrinsic value method. The wave of corporate scandals, intense criticism of reporting practices and public scrutiny of executive compensation packages have brought the issue of stock options back to life. It is expected that the provisions of St. Nos.123 and 148 will provide the technical background for measuring the compensation expense of stock options. It is, however, uncertain whether the accounting profession and the investing public understand the provisions of these standards.
This first part of the paper discusses the reporting requirements of FASB St. No. 123 and No. 148, contrasting these requirements with those of Opinion No. 25. We will highlight the major provisions of the new standards, including a review of the various option pricing models.

As of January, 2003, approximately two hundred companies have announced that they will comply with St. No. 123 in expensing stock options, while others continue to follow the guidelines of Opinion No. 25. We will select a sample of publicly traded companies and review their reporting of stock options.

In summary, this is a paper on the current status of accounting for stock based compensation. We will summarize the reporting requirements, the major concerns of implementing the new standards, and the economic implications of these accounting requirements.

INTRODUCTION

Options have been accounted for under the guidelines of APB Opinion No. 25, which used the “intrinsic value” method to measure compensation expense. Whether any intrinsic value existed depended on the two types of stock option plans used – incentive option plans and non-qualified option plans. Under an incentive plan, employees were granted options to acquire shares of stock at a predetermined fixed price. The definition of intrinsic value was the difference between the market price and the option price at the measurement date, with the measurement date specified as the date at which both the number of shares and the option price was determined. From the company’s perspective, no compensation expense is recognized under the incentive option plan. Since the tax rules require the option price be equal to or greater than the market price when the option is granted, there is no defined intrinsic value, therefore no compensation expense. Since there is no compensation expense, no entry is booked to record the granting of the option. When the options are exercised, this is treated as a issuance or sale of stock.

From the employee’s perspective, there is no taxable income for the executive at the time of receiving or exercising the option. Income, therefore taxes, is deferred until the shares are subsequently sold. Should the shares be held for the required time interval, any gain is treated as a capital gain, thereby taxed at a lower tax rate. The disadvantage for the employee is they must come up with the cash to exercise the option to purchase the shares. There may also be alternative minimum tax implications for the employee.

In a non-qualified plan, the option price may be less than the market price. The employee reports taxable income when the option is exercised, on the difference between the option and market price. This income is taxed at ordinary income tax rates. If the option price is less than the market price, the company measures compensation expense as the difference, at the measurement date. The expense is allocated to the periods benefited. Since this expense is deductible for tax purposes, the company benefits from the tax savings.

Since non-qualified plans provide tax benefits, why offer incentive plans? Companies offering incentive options did so to reward high level executives or attract competitive personnel. For the high tech companies, this provided a non-cash source of compensation and since they reported little, or no, taxable income, the tax benefit was relatively unimportant.
Statement No. 123

FASB St. No. 123, issued in 1995, changed the reporting requirements for employee compensation plans, including stock options. The statement proposed the “fair value based method” for valuing stock options and stock compensation plans. “For stock options, fair value is determined using an option-pricing model that takes into account the stock price at the grant date, the exercise price, the expected life of the option, the volatility of the underlying stock and the expected dividends on it, and the risk-free interest rate over the expected life of the option.” [St. No. 123, Summary Section]

There was intense political lobbying against this reporting requirement, leading the FASB to defer the effective date for meeting these requirements. St. No. 123, permitted companies to continue using the intrinsic value method of Opinion No. 25. If companies so elected, pro forma disclosure of the effect on net income and EPS must be provided, as if the fair value method had been used to measure compensation costs. In making this compromise decision, the FASB indicated they believed the required pro forma disclosures would “provide relevant new information that will be of value to the capital markets and thus achieve some but not all of the original objectives of the project.” [St No. 123, pg 25] They further indicated the disclosure compromise decision was intended to end the divisive debate, not because it was the best alternative.

Most companies elected to continue using the intrinsic value method. This may well have continued, but for various intervening circumstances. The decline in stock market values had an effect, with many options expiring. The burst of the high tech, dot com, bubble added publicity to the value (now lack of) attributed to stock based compensation. The most pervasive influence, however, was the reporting abuses of many companies, with the accompanying publicity of excessive executive compensation and preferential treatment. Enron and WorldCom became household names, personifying corporate greed. These scandals, with high profile executives and lucrative compensation plans, provided the catalyst for change. Public pressure was intense on the accounting profession and standard setting bodies to protect investors and end corporate excesses.

Accordingly, many companies opted to comply with the reporting requirements of St. No. 123. Companies, primarily the larger, more established firms, have started using the fair value method to value options, while others have indicated they will do so. As companies transition to this method, several problem areas have been identified. Allowing pro forma disclosure has helped provide time for the profession to address these issues. Among the problems are which method(s) should be used to measure the cost and how the allocation of this cost should be made. In addition, the FASB needed to clarify the means of booking and reporting the transition, or accounting change.

Measuring the Fair Value

St. No. 123 specified that the fair value of stock options should be estimated using an option-pricing model. The Black-Scholes model was suggested, along with binomial models. Companies must disclose the basic assumptions used in these models, including the exercise price, expected life of the option, the current price of the underlying stock, expected price volatility of the underlying stock, expected dividends (with exceptions) and the risk-free interest rate for the expected term of the option. The statement provided guidance on selecting the values for these assumptions. Once the fair value of the option is estimated at the grant date, this value is not adjusted for changes in the underlying assumptions.

While St. No. 123 indicates an option-pricing model should be used for measurement purposes, there are problems in implementing this calculation. See Appendix A of this paper for a theoretical discussion of the problems. Another excellent source is “Valuing Employee Stock Options: A Comparison of Alternative Models,” authored by John D. Finnerty, and published by Financial Executives Research Foundation, Inc. [FMA Online, Summer, 2003]

Our review of corporate disclosures indicated that companies provided data on the assumptions required, as specified. The data varied dramatically, not only among
companies, but also within the company from period to period. We also believe the average reader (or even accounting practitioner) lacks knowledge of the significance of such assumptions. The typical accounting curriculum, unless students are double majoring in Finance or going on for an MBA, does not include option pricing models. They may have heard of the Black-Scholes model, but lack the fundamental knowledge to understand the formulas or calculations. The average reader probably doesn't have a clue. We do not, however, believe this is a fatal flaw in requiring the fair value method. There is precedent for incorporating various assumptions in accounting, as neither group probably fully comprehends actuarial assumptions, yet pension accounting assumptions and methods are equally prominently disclosed.

Allocating the Cost

In addition to measurement, St. No. 123 provided guidance on attributing compensation expense to reporting periods. In general, compensation expense should be allocated to the periods required for the awarded options to vest. Vesting is usually determined as the point at which an employee's right to receive and retain the award is not contingent on the performance of additional work.

While this sounds very straightforward, significant issues have been raised regarding this allocation. With regard to this issue, Balsam, Mozes & Newman (2003) investigated whether the footnote disclosures required under No. 123 were managed. Using data from 137 firms' financial statements, they reported. “Although we find little evidence that firms manage the estimated value of their option grants, we find that firm-specific incentives affect how that value is allocated. Specifically, firms that provide high levels of either CEO compensation or stock option compensation relative to performance allocate a smaller proportion of the options' value to the 1996 pro forma expense, apparently to reduce criticism of that compensation. Small firms and firms that recently went public also allocate a smaller proportion of option value to the 1996 pro forma expense, apparently to increase perception of their profitability.” [Balsam, pg. 31]. This study used 1996 data, which was the first year supplemental disclosure was required. The authors indicate the effect on 1996 allocations may be more significant than the effect on later years.

Based on their findings, the authors noted, “We conjecture that firms were less likely to manage the value of the options granted than the allocation of that value in 1996 because the parameter estimates underlying the reported option value must be disclosed in the footnote, whereas the inputs to the allocation computation are not disclosed.” [Balsam, pg. 31]

Transition to Fair Value Method

As companies voluntarily switched to the fair value method, adopters expressed concerns over the “ramp up” effect of using the prospective application transition method, which is required in No. 123. Concerns were also raised regarding the perceived lack of consistency and comparability in reported results.

Responding to these concerns, the FASB, in August, 2002, added a limited scope project to its agenda. Electing not to reconsider recognition and measurement issues until a later time, the Board addressed the concerns of preparers and users regarding transitional issues. Issuing St No. 148 in December, 2002, the Board allowed alternative methods of transition for companies voluntarily changing to the fair value method. If a company elects in a fiscal year beginning before Dec.16, 2003, the change in accounting principle shall be reported using the prospective method, the modified prospective method, or the retroactive restatement method. If a company elects to change in years beginning after Dec.15, 2003, a choice of prescribed methods of transition is provided. Adjustments may be required to reverse existing balances, recognize newly calculated balances using the fair value method, with the difference between the two reported as an adjustment to Additional PIC or the beginning of the period Retained Earnings. No Cumulative Effect of a Change in Accounting Principle should be included. Should the restatement method of transition be elected, any adjustment from the period of
earliest adoption to the initial period presented should be included as an adjustment to that period’s beginning balance of Additional PIC or Retained Earnings.

Disclosure requirements were amended to provide more prominent disclosure in the Summary of Significant Accounting Policies section of the financial statements, which usually appears just before, or as the first, footnote. A tabular form of presentation has been specified. Disclosures are now required for interim as well as annual reports.

Review of Corporate Disclosures

We examined the most recently issued financial statements and footnote disclosures on Stock-Based Compensation for ten companies. We found that all companies included extensive footnote disclosures on stock option plans and other stock based compensation plans. All included the number of shares under option at the various points during the year, the range of option prices, the average life of the option plans, and other required disclosures. All but one indicated they use the intrinsic value method to value options, with one using the fair value method. Four of those using No. 25 indicated they are switching the fair value method advocated in No. 123, with three of these indicating they will use the prospective transitional method. Six companies disclosed that they used the Black-Scholes model to value options. The assumptions used in this valuation varied dramatically. With respect to volatility of Stock Price, volatility ranged from 14.68% to 59.07%. The risk-free rate of interest ranged from 4.05% - 6.2%.

The effect on EPS ranged from negative 1 to 15%, with the effect on diluted EPS ranging from negative 1.5 to 13%. The impact was much larger, percentage-wise, for one company, but that company showed a small per share loss, which almost tripled due to pro forma disclosure of stock based compensation.

Many companies had both incentive stock options plans and non-qualified plans. Two companies indicated they are ending existing incentive stock option plans.

Current Status

The intrinsic value method may still be used to measure options, supplemented by pro forma disclosure of net income and EPS, as if the fair value method of St. No. 123 had been applied. Disclosure requirements are more prominent under St. No.148, which requires a tabular format to disclose the difference in the two methods. The method used must be disclosed in the Summary of Significant Accounting Policies, and must be disclosed in interim as well as annual reports. Many companies still use the intrinsic value method, but meet disclosure requirements as specified in St. No.123, since St. No. 148 was only recently issued.

Many large, well established companies have elected to use the fair value method, with many more indicating they will begin expensing options in 2003 reports. Most of these companies have announced the effect of this change on projected earnings.

The FASB, in November, 2002, issued an “Invitation to Comment on Accounting for Stock-Based Compensation.” This invitation is available on the FASB website, along with the 292 comments received [as of December 5, 2003]. The purpose of the invitation was “...to solicit comments on certain issues that the Board will discuss when, in accordance with its objectives of improving U.S. financial accounting and reporting standards and promoting international convergence of high-quality accounting standards, it considers whether it should propose any changes to the U.S. accounting standards on stock-based compensation.” [FASB Invitation . . ., pg. 1]

In the Introductory section, it is noted, “Statement 123 and the Proposed IFRS are similar in many respects. They are based on the same fundamental conclusions: (a) they both conclude that equity instruments, including stock options, are valuable, (b) they both require that equity instruments granted to employees should be measured at grant-date fair value, and (c) they both require that compensation for equity instruments granted to employees be recognized in the income statement over the period in which the employees provide services to earn the related benefit.” [FASB, pg. 17]
Assuming the ISAC and the FASB projects proceed as expected, the FASB has indicated a desire to issue a new standard early in 2004. It is anticipated the fair value method will be required for measuring stock based compensation, with the vesting period as the attribution period.

Since companies have been disclosing this information for seven years, they have the data to meet this requirement. Many companies are, however, considering alternative compensation plans. GE recently announced a new performance based plan for its chief executive. Stock options are a valuable source of compensation, without immediate cash flow implications. It is highly likely that new innovative plans will be, or are being, developed to meet this need.

**APPENDIX**

Understanding the Valuation of Employee Stock Options: Current Implementation of FAS 123

With the impending adoption of FASB Standard No. 123 by about 150 U. S. corporations, a clear understanding of the impact upon firm earnings is important. Paragraph 19 of Standard No. 123 calls for the use of an option-pricing model to establish the "fair value of a stock option". Recommended valuation models are the Black-Scholes and binomial models.

To gain a full understanding of the valuation models, some intuitive discussion to lay the groundwork will be beneficial. An excellent MBA-level discussion of the binomial and the Black-Scholes models is available in Chapter 8 of Copeland and Weston (1988).

First, the factors that affect the value of an option must be clarified. The options used for compensation purposes are usually American-style call options, with additional complexities beyond those of an exchange traded option. These call options represent the right to buy the underlying stock at an established price (the exercise or "strike" price) on or before an expiration date. The ending value of this claim is contingent upon the stock price exceeding the exercise price (i.e. it is a "contingent claim").

Holders of an option will only choose to exercise the option if the stock price is above the strike price. In such a case, the option is said to be "in-the-money," indicating that it would be valuable to exercise. Otherwise, the holder could merely purchase the stock at the prevailing price in the stock market. The value of the option contains both an intrinsic-value component and a time-value component:

\[
\text{Value of option} = \text{Intrinsic Value} + \text{Time Value}
\]

"In-the-money" refers to the intrinsic value of the option being positive, i.e. it would be valuable to exercise the option at that particular moment. The intrinsic value would increase (if not yet exercised) if the price of the underlying stock were to rise, because the stock can be purchased for less than the amount it could be sold for in the open market. Thus, intrinsic value of a call option can be represented as:

\[
\text{Intrinsic Value of Call Option} = \text{Maximum (Stock Price – Exercise Price, 0)}
\]

This representation identifies that the minimum possible value of an option is zero "0", since nothing forces the holder to exercise if the value is less than zero. If the intrinsic value is not zero, then the intrinsic value is the current price of the underlying stock less the exercise price. Time value is always positive (or falls to zero as "time" expires) and is generally an increasing function of time to maturity and the volatility of the underlying stock. Intuitively, the more time until maturity, the greater the potential for the option to end or move in-the-money. For an employee stock option (ESO), the time value component is negatively impacted by the non-transferability of the ESOs. Essentially, the market value of the time value is zero when the option is out of the money because the holder is not able to sell the option (before exercise) in order to capture the time value.

Additionally, greater volatility of the stock will produce more opportunities for the option to move in-the-money or even farther in-the-
money. A final factor that influences the value of an option is the risk-free rate of return.

The payoff that establishes the intrinsic value of an option can be derived in a discrete-time binomial model:

\[ \text{MAX}[u^n d^{n} S - X, 0] \]

where \( u \) is one plus the percentage increase in the stock price (given an upward movement greater than \( r_f \)) and \( d \) is one minus the percentage decrease in the stock price (given a movement less than \( r_f \) or negative), \( T \) is the total number of time periods until maturity, and \( n \) is the number of upward movements in the stock price. This is essentially a statement of the intrinsic value over repeated future iterations, with the probability of the outcomes being considered (as a “discounting” process). The binomial pricing model thus produces a discounted present value of the future expected payoffs.

Black-Scholes Option Pricing Model with Dividends

Since the binomial pricing model is a discrete model, it can become quite complicated as various potential outcomes and non-standard features are addressed. Furthermore, the real world functions in continuous time. Fortunately, the prescribed Black-Scholes option pricing model is a continuous time model which can be derived by extending the discrete binomial model to continuous time. Although the original model is established for non-dividend paying stocks, it proves to be quite accurate for stocks that pay dividends, where the stock price ex dividend stock price is used in place of the stock price cum dividend. (Black, Whaley) The logic is that the current price reflects the additional present value of the upcoming dividend and the price of the stock should fall by approximately the amount of the dividend. Thus, the ex dividend price can be estimated by taking the expected dividend and dividing by \( 1 + r_f \), where \( r_f \) is treated as a periodic risk-free rate. (Black)

[Note: More precisely, substitute \( S - D e^{-r_f t} \), which accounts for the continuous compounding assumption of the model, in place of \( S \).]

Let’s examine the Black-Scholes option pricing model to see the factors affecting the value of a call option.

\[
c = S N(d_1) - X e^{-r_f T} N(d_2), \quad \text{where} \quad [1]
\]

\[
d_1 = \frac{\ln(S/X) + r_f T}{\sigma \sqrt{T}} + \frac{1}{2} \sigma \sqrt{T}, \quad [2]
\]

\[
d_2 = d_1 - \sigma \sqrt{T}. \quad [3]
\]

\( N(d_1) \) and \( N(d_2) \) are the cumulative probabilities for a unit normal variable and \( s \) is the standard deviation of the underlying stock. A difference in the (probability weighted) current stock price and the (probability weighted) exercise price (discounted back to the present) is at the core of the calculation. In addition, the standard deviation of the stock and the time to maturity play a significant part in establishing the probability terms. FAS 123 recommends the use of an annualized historical standard deviation. The partial derivatives of \( c \), the call price, with respect to the various factors are:

\[
\frac{\partial c}{\partial S} > 0, \quad \frac{\partial c}{\partial X} < 0, \quad \frac{\partial c}{\partial \sigma} > 0, \quad \frac{\partial c}{\partial T} > 0, \quad \frac{\partial c}{\partial r_f} > 0 \quad [4]
\]

showing the positive impact on the option price for a higher stock price, greater volatility, greater time to maturity, and a higher risk-free rate, and a negative relation to the exercise price, when each factor is examined in isolation. [Note: Also note that \( \frac{\partial c}{\partial D} < 0 \), i.e. the value of the call is lower for an otherwise equivalent stock that pays a dividend. By Black’s approximation, it is clear that the only change is from \( S \) to \( S - D e^{-D} \), giving a lower value to \( c \).]

Recent work by John D. Finnerty of the Financial Executives Research Foundation indicates that the different available valuation models can result in greatly different estimates. The complex issues of early exercise, forfeiture, non-transferability, and other non-standard features can be explicitly modeled in an enhanced binomial model. Unfortunately, the complex nature (and difficult intuition) of the enhanced binomial model makes it less attractive for use in many applications.
Black-Scholes OPM with FAS 123 Modifications:

A Black-Scholes model with adjustments for early exercise allowed by FAS 123 is the most commonly used option pricing model for ESOs. Significant modifications for ESO features as authorized by FAS 123 are as follows:

1. Vesting – Graded vesting of ESOs is generally handled by treating the option grant as a set of separate grants.

2. Forfeiture – An adjustment can be made based on past experience for expected forfeitures before vesting, with required adjustments for later changes in forfeiture expectations. Data on actual ESOs can be used to calculate the fraction that never vest, which can be used to adjust the number of ESOs. If a particular company has no ESO history, a basket of similar companies can be used to estimate the forfeiture numbers.

3. Early Exercise – Use of expected life in place of contractual life of the option is allowed. Thus, \( T \) is adjusted based on the average time to exercise for the firm’s ESOs. If no history is available, then the average time to exercise for a set of similar companies can be used.

Each of these three allowable adjustments would diminish the value of the option. Unfortunately, there are additional issues for which FAS 123 does not currently allow adjustments. Since it does not account for lack of transferability and possibility of forfeiture after vesting, it still would overestimate the value of employee stock options. In addition, a Black-Scholes model cannot address non-standard features like indexed options and performance-based vesting for options, which can, however, be addressed in a binomial model. Based on the examples provided by Finnerty, the BSOPM with FAS 123 Modifications still overestimates option values by approximately 30 percent (as compared to the Analysis Group, Inc. enhanced model). This 30 percent discount can be interpreted as approximately the expected discount on value of the options due to possible forfeiture after vesting and non-transferability.

REFERENCES


ROOT OUT FRAUD FOLLOWING BENFORD'S LAW  
Or Looking Out for Number One

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Abstract

Is it possible to tell if a number is fraudulent just by looking at it? Within certain criteria, the answer is yes. That is if you are aware of Benford’s Law, a mathematical law rarely covered in auditing texts but possessing huge ramifications to auditors.

Benford's Law states that in a wide variety of circumstances numbers as diverse as the drainage areas of rivers, physical properties of chemicals, populations of small towns, figures in a newspaper or magazine, and the half-lives of radioactive atoms begin disproportionately with the digit "1."

Specifically, they begin with "1" about 30 percent of the time, with "2" about 18 percent of the time, with "3" about 12.5 percent of the time, and with larger digits progressively less often. Less than 5 percent of the numbers in these circumstances begin with the digit "9."

SAS no. 82, Consideration of Fraud in a Financial Statement Audit, requires the auditors to assess the risk of material misstatement in financial statements due to fraud. CPAs in smaller organizations use inexpensive means to fight fraud. For small amounts of data, techniques like data mines, digital analysis and discovery sampling are effective; they require only easy-to-use, generic software to search for possible signs of fraud. These methods help prevent organizations from exceeding their budgets or resources. Larger companies can use custom software to estimate what types of fraud take place in specific situations. Investigative teams perform the inductive analysis by deriving general principles from specific circumstances. This procedure is expensive and complex, but it is usually effective in detecting the types of fraud that are the most threatening to the organization.

Companies, both large and small, are encouraged to make the necessary investment to hire employees or consultants with advanced fraud-detection-and-prevention skills. The reasoning is that preventing fraud is cheaper than curing fraud. However, Benford’s law can be applied to many aspects of these companies without cost being an issue.

The following are some possible practical applications for Benford’s law (sometimes referred to as digital analysis when intertwined with technology):

- Accounts payable data
- Estimations in the general ledger
- The relative size of inventory unit prices among locations
• Duplicate payments
• Computer system conversion
• Processing inefficiencies due to high quantity/low dollar transactions
• New combinations of selling prices
• Customer refunds

So, in one very simple discovery, we now have the ability to determine if data is likely fraudulent. We can even test data of future predictions. As wonderful as this law may seem, it does not come without fault. Various anomalies cause some tests to result in too many false positives when fraud is not the issue. After all, Benford’s law is not used to prove fraud, only to raise the level of suspicion.

Benford’s law has definitely caused a stir in the world of science and math. With all the interest and fascination rising in this relatively new phenomenon, so will the many uses for it. It is not human nature to assume the non-randomness of numbers; however, with increasing knowledge of the basic rule of these new tests, people who are committing the fraud now have a new basis of covering it up. Such a simple principle as that of Benford’s law will have its drawbacks. The growing awareness of its simplicity will eventually counteract the benefits of its subtlety. The uses of digital analysis, along with its cost efficiency, could prove to be advantageous to companies around the world. However, in order for its benefits to continue, the publicity of this newfound tool needs to remain dwindled.
AN EMPIRICAL INVESTIGATION OF THE
CORPORATE OWNERSHIP IN THE LIFE INSURANCE
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ABSTRACT

The primary purpose of this paper is to determine financial policy differences between stock and mutual life insurers. The ownership factor is expected to have implications for different capital structure, underwriting, and investment policies. The diversity of the organizational form in the life insurance industry provides researchers and theorists with a laboratory setting for testing the fundamental results of capital structure theory and corporate ownership form. Other influential factors are likely to shape financial policies. Accordingly, a set of testable hypotheses is developed to test for financial policies differences between the two insurers. Controlling for differences of other influential factors, the corporate ownership form is found to be significant in two policy areas: capital structure and investment. The empirical results yield support to the following conclusions. First, mutual life insurers maintain significantly higher financial leverage than stock insurers. Second, the proportion of investment in the asset categories of bonds, mortgage loans, and policy loans are higher for mutuals. No systematic differences are found in the underwriting policy.
THE EFFECT OF MATERIALITY THRESHOLDS ON THE ISSUANCE OF GOING-CONCERN OPINIONS

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In this study, we investigated the auditor’s materiality judgments concerning the issuance of a going-concern opinion by testing whether the materiality threshold levels differ between Big Six (Five) and non-Big Six (Five) auditors. More specifically, we addressed the issue of Type II or beta error, situations where firms that ultimately survive as independent entities are mistakenly identified as failing. Using 1,332 financially-troubled but non-bankrupt sample firms, we found that non-Big Six (Five) auditors are more likely to issue a going-concern opinion than Big Six (Five) auditors because non-Big Six (Five) auditors have lower materiality thresholds than their Big Six (Five) counterparts.

I. INTRODUCTION

Auditor decision making in the presence of going-concern uncertainties can be characterized as a two-stage process in which the auditor recognizes that a client has some problems, and then uses subsequent information cues to determine whether a going-concern opinion is appropriate (Mutchler 1985). According to Statement on Auditing Standard (SAS) No. 59 (AICPA, 1988), The Auditor’s Consideration of an Entity’s Ability to Continue in Existence, the auditor must consider whether there is substantial doubt about the client’s ability to continue operations for a reasonable period of time not to exceed one year from the date of the financial statements. Various types of evidence should be first evaluated to determine the nature and significance of any of the client’s financial problems. For all significant problems, the auditor must seek evidence, as the subsequent information cues, about any mitigating factors such as management plan to overcome the problems. If, after considering the mitigating factors, the auditor still has substantial doubt about the entity’s ability to continue as a going concern, the auditor must include an explanatory paragraph in the standard audit report, i.e., going-concern opinion.

It is a matter of materiality that determines the problem/nonproblem status. The concept of materiality is important in auditing because it influences decisions regarding the scope of the audit and the extent of audit tests. In spite of substantial research efforts devoted to studying the concept of materiality, the FASB’s current position is that “no general standards of materiality could be formulated to take into account all the considerations that enter into an experienced human judgment.” (FASB, 1980). So, it is the FASB’s current position that the materiality decisions should be left up to the individual making the judgment, and more research on the materiality thresholds must be undertaken to establish any definitive materiality guidelines (Holstrum and Messier 1982).

As mentioned later, several researchers conducted experiments/surveys to examine the materiality judgments of auditors (Woolsey 1973, Messier 1983, Chewning et al. 1989, among others). The results indicated significant differences in the materiality thresholds between Big Eight and non-Big Eight auditors. These studies tested the auditors’ materiality judgments on some financial ratios such as the ratio of an error to current net income (Woolsey 1973), inventory writedowns (Messier 1983), and changes in accounting principles (Chewning et al. 1989). In this study, we expanded on these previous studies to investigate the auditor’s materiality judgments concerning the issuance of a going-concern qualified opinion to financially-troubled companies.

Audit services are demanded as monitoring devices because of the potential conflicts of interest between owners and managers as well as those among different classes of security holders (DeAngelo, 1981). The going-concern qualification can have numerous consequences for both the audited companies and the auditors, and can also greatly increase the auditors’ conflict with the clients. For example, since the auditor is responsible for assessing the effects of going-concern uncertainties for a period of approximately one year, the auditor may not avoid lawsuits if the clients go bankrupt with allegedly little or no warning from audit reports issued within a year of bankruptcy (Type I or alpha error). In contrast, the auditor’s relationship with the client may deteriorate, and the likelihood that the auditor will lose the client may
increase if a going-concern opinion is issued and the client remains healthy (Type II or beta error). In the event that a conflict develops between the interests of the financial statement users and those of the audited companies, the auditor's responsibility should lie on the side of the users. In the light of the incentive structure (audit fees), however, the auditor obviously wants to avoid a reputation as hardliners who routinely load audit reports with qualified opinions, and may attempt to cooperate with the audited companies in presenting financial results as favorably as possible, to the potential detriment of the outside users (Steven et al., 1979). This is an important accounting issue because information certified by the auditor is valuable to the accounting users only so long as it is accurate as well as relevant and reliable.

This study is designed to examine the auditor's propensity to issue a going-concern qualified opinion to financially-troubled, but non-bankrupt companies. i.e., Type II or beta error. We investigated whether there is any significant difference in the audit accuracy among audit firms, especially between Big Six (Five) and non-Big Six (Five) audit firms. Using 1,332 sample firms, we found that Big Six (Five) firms have higher materiality thresholds, and are less likely to issue a going-concern opinion to their clients with some financial problems than non-Big Six (Five) firms. Our results are consistent with the previous research in that the materiality threshold levels are statistically different between the two groups of auditors. The results of this study would provide a basis for a proper evaluation of audit performance between Big Six (Five) and non-Big Six (Five) firms.

II. PREVIOUS RESEARCH

Regulators have argued that audit firm size does not affect audit quality because there is little or no product differentiation in the audit profession. For example, the Cohen Report (AICPA, 1978) stated that:

"Public accounting firms go to considerable lengths to develop superior services for their clients, but there is little effective product differentiation in the audit profession from the viewpoint of the present buyer of the service, that is, the management of the corporation" (p. 111). Also, the Derieux Committee Report (AICPA, 1980) criticized that smaller audit firms may be replaced simply because they are less well known, even though the smaller firms may well be providing as high quality services as larger firms. The key point of these reports is that the audit firm size should be irrelevant in the selection of an auditor because the size does not affect the quality of audit services.

Contrary to this view, DeAngelo (1981) presented arguments that, *ceteris paribus*, larger audit firms have less incentive to behave opportunistically, and are perceived by investors as providing higher-quality audits than small audit firms. She suggested that audit quality is not independent of audit firm size, even when auditors initially possess identical technological capabilities. The arguments made by Dopuch and Simunic (1980) are consistent with DeAngelo in that product differentiation is reflected in the credibility associated with the auditor's name.

Shockley and Holt (1983) evaluated the Cohen Commission's assertion by demonstrating that chief financial officers of banks can at least discriminate between Big Eight firms and can do so in a systematic fashion. They pointed out that if differentiation among audit firms is assumed to be equivalent to differentiation of the firms' services, there exists product differentiation in the auditing profession, at least within the Big Eight. Messier (1983) investigated the effects of auditors' experience and audit firm type on the materiality/disclosure judgments. He found that less-experienced auditors have lower materiality and disclosure thresholds than more-experienced auditors, and, more importantly for our research, that non-Big Eight partners have lower materiality thresholds than Big Eight partners, so they are more willing to modify their opinions than their Big Eight counterparts. The results of Chewning et al. (1989) are consistent with Messier's findings. Chewning et al. examined audit reports of companies that had changed accounting principles to provide evidence on how auditors interpret the materiality concept. They found limited evidence indicating that Big Eight firms are less likely to issue a consistency modification than non-Big Eight firms. Mutchler et al. (1997) tested the influence of contrary information and
mitigating factor variables on audit opinion decisions for soon-to-be bankrupt companies. In their multiple regression model, they included auditor types (Big Six vs. non-Big Six) as a control variable. This variable was not statistically significant, suggesting that there is no difference between Big Six and non-Big Six firms in issuing going-concern opinions to companies that go bankrupt within one year after the issuance of financial statements; i.e., no difference in Type I or alpha error. Carcello and Neal (2000) examined the relation between the composition of firms’ audit committees and the likelihood of receiving going-concern opinions using sample firms that are non-bankrupt but financially stressed, a test of Type II or beta error. As a sensitivity analysis, they added audit-firm type (1 = Big Six auditors, 0 = otherwise) to their logistic regression model, but could not find a significant result; no difference in Type II or beta error between Big Six and non-Big Six audit firms in issuing a going-concern opinion to financially-troubled but non-bankrupt companies.

III. RESEARCH DESIGN

Main Hypothesis

Consistent with the previous research regarding the audit product differentiation and auditors’ materiality/disclosure judgements (DeAngelo 1981, Dopuch and Simunic 1980, Holstrum and Messier 1982, Shockley and Holt 1983, Messier 1983, and Chewning et al. 1989, Nogler 1995), our main hypothesis is: Ceteris Paribus, Big Six(Five) audit firms have higher materiality thresholds than non-Big Six (Five) audit firms, and so are less likely to issue a going-concern modified opinion to financially-troubled, but non-bankrupt firms than non-Big Six (Five) audit firms are.

Companies receive a going-concern opinion due to uncertainties from two sources: financial distress and litigation. As in above-mentioned previous studies, we only considered those companies receiving a going-concern opinion due to financial distress.

Control Variables

To examine the main hypothesis, it is necessary to control for variables already known to be related to auditors’ opinion decisions. We selected 10 control variables from several previous studies as follows:

- PROP = 1 if a firm received a going-concern opinion in prior year, and 0 otherwise,
- CACL = One year change in current ratio,
- RLSS = Recurring loss from operations (1 if net income is negative both in current year and prior year, and 0 otherwise),
- CURR = Current ratio,
- CFTL = Cash flows from operations / Total liabilities,
- LDTA = Long-term debt / Total assets,
- NITA = Net income / Total assets,
- SIZE = Log (Total sales),
- ALAG = Number of days from financial statement date to audit report date,
- DFLT = 1 if a firm was in default or in the process of restructuring debt, and 0 otherwise

Mutchler (1985) and Carcello and Neal (2000) found that a going-concern report in the previous year significantly increases the auditor’s tendency to issue another going-concern opinion in the current year. Such financial variables as CACL, RLSS, CURR, CFTL, LDTA, NITA, and SIZE were used in many previous studies (Carcello and Neal 2000, Mutchler et al. 1997, Carcello et al. 1995, Raghunandan and Rama 1995, Chen and Church 1992, Dopuch et al. 1989, Mutchler 1985, among others). DFLT was initially developed by Chen and Church (1992), and was included in the opinion decision models as a control variable by Carcello and Neal (2000), Mutchler et al. (1997), and Carcello et al. (1997, 1995). As a measure of audit effort, ALAG was a highly significant variable in Mutchler et al. (1997) and Carcello et al. (1997, 1995), and McKeown et al. (1991), suggesting that greater audit effort results in a higher probability of detecting going-concern problems. Auditors are also expected to spend more time auditing problem companies because they may need to meet with management several times when a going-concern opinion is probable.

Model Specification

The specific form of the logit model is as follows:

\[ Y_i = \beta_0 + \beta_1 \text{AUDT}_i + \beta_2 \text{PROP}_i + \beta_3 \text{CACL}_i + \beta_4 \text{RLSS}_i + \beta_5 \text{CURR}_i + \beta_6 \text{CFTL}_i + \beta_7 \text{LDTA}_i \]
\[ Y_i = 1 \text{ if a firm received a going-concern opinion and 0 otherwise,} \]
\[ \text{AUDT}_i = 1 \text{ if Big Six (Five) auditors, and 0 otherwise.} \]

**Sample Selection**

One thousand three hundred thirty two non-bankrupt, but financially stressed firms were chosen from the 1997 (498 firms) and 1999 (834 firms) PC Compustat active firm files. Consistent with the extant literature, we focused on distressed companies since auditors virtually never issue going-concern opinions to healthy companies (McKeown et al. 1991). Thus, our sample includes only companies whose level of financial distress is high enough to prompt auditors to question the company’s going-concern status.

The level of financial distress is determined by Z-score. The Z-score was developed by Altman (1968) based on a discriminant analysis of 5 financial ratios as follows:

\[
ZSCO = 1.2*(\text{WCAP}/\text{AT}) + 1.4*(\text{RE}/\text{AT}) + 3.3*(\text{EBIT}/\text{AT}) + .6*(\text{MKTEQUITY}/\text{TL}) + .999*(\text{SALE}/\text{AT}),
\]

where

- WCAP = Working Capital
- AT = Total Assets
- RE = Retained Earnings
- EBIT = Earnings Before Interest and Taxes
- MKTEQUITY = Market Value of Equity
- TL = Total Liabilities
- SALE = Total Sales

Although the model is not based on any rigorously-derived theoretical foundations, it has performed very well in predicting bankruptcies. As the equation shows, the model does not consider the size of the firm as a determining factor in bankruptcies, but it has the advantage of including a stock market variable (market value of equity) to derive the scores. The higher ZSCORE indicates greater financial strength and lower ZSCORE indicates financial distress with 2.675 being the cutoff point best discriminating between bankrupt and non-bankrupt firms. Only firms whose ZSCORE is lower than 2.675 are included in our sample. Also, as in previous bankruptcy-related research (for example, Chen and Church 1992), only industrial firms were retained in the sample; utilities, banks, and other financial service firms are excluded. Several bankruptcy prediction or financial distress prediction models were developed based on some financial ratios (Zmijewski 1984, Hopwood et al. 1989, Mutchler et al. 1997), but the Z-score model is used in our paper because the ZSCORE is now readily available on the PC Compustat (mnemonic = ZSCORE).

We started the sample selection with more than 1,500 firms from the 1999 PC Compustat file, but deletion of firms due to the unavailability of audit opinions in the 10-K or annual report resulted in 834 sample firms. Additionally, 498 firms were selected from the 1997 PC Compustat file. Out of 1,332 distressed firms, 957 firms (71.8%) were audited by Big Six (Five) auditors and 375 firms (28.1%) were audited by non-Big Six (Five) auditors.

**IV. RESULTS**

Distribution of audit opinions by auditors is given in Table I. Non-Big Six (Five) auditors issued a going-concern opinion to 248 firms (66.1%) out of 375 firms, while Big Six (Five) auditors issued a going-concern opinion only to 254 firms (26.5%) out of 957 firms. The difference is statistically significant at the .01 level. Consistent with the main hypothesis, non-Big Six (Five) firms issued more going-concern opinions to non-bankrupt clients than Big Six (Five) firms. Except for Coopers & Lybrand that was merged with Price Waterhouse in 1998 and Arthur Anderson, there seem to be no significant differences among the Big Six (Five) auditors’ ratios of issuing a going concern opinion, ranging from 19.7% (Deloitte & Touche) to 26.1% (Peat, Marwick & Main).

**Insert TABLE 1 here.**

Descriptive statistics and univariate tests for the variables of interest, including ZSCORE, are presented in Table 2. The mean difference is statistically significant in most variables except for one year change in current ratio (CACL), cash flows from operations / total liabilities (CFTL) and net income / total assets (NITA). The main variable of interest, AUDT [auditor type, Big
Six (Five) vs. non-Big Six (Five)], is highly significant (at the .01 level) as predicted by our hypothesis. Also, the Z-score variable (ZSCO) is highly significant, providing a significant explanatory power in auditors' opinion decisions.

Insert TABLE 2 here.

The correlation analysis is provided in Table 3. Significant correlations, as measured by Pearson Correlation Coefficients, exist between several pairs of explanatory variables. These correlations suggest that a multivariate analysis is necessary to examine the simultaneous effects of the variables. The degree of multicollinearity, however, does not seem to cause any serious problems in the multivariate analysis. According to Judge, et al. (1980, pp. 459), a rule of thumb for a serious multicollinearity problem is when the correlation coefficient is higher than 0.8, which is not the case in our analysis.

There is a strong correlation between ZSCO and financial ratio variables (except for CACL, one year change in current ratio), suggesting that ZSCO can measure much of what other financial ratios measure. Due to this correlation we conducted three multiple regression analyses with and without ZSCO.

Insert TABLE 3 here.

Estimation results for three dichotomous logit models (1999 and 1997 combined) are reported in Table 4. In Model 1, all financial ratios are included as control variables, but not ZSCO. In Model 2, instead of financial ratio variables, ZSCO is included. Model 3 contains both ZSCO and financial ratios.

Insert TABLE 4 here.

The chi-square statistics indicate all three models are significant at the .0001 level. The percentage of firms correctly classified is around 90% in all three models. Also, the pseudo $R^2$ level of 39.0% to 44.4% is fairly high when compared to previous studies.

Consistent with the main hypothesis, in all three models, AUDT has a negative sign, and is statistically significant (at the 1% level). There is a clear difference in the audit judgment between Big Six (Five) and non-Big Six (Five) firms in terms of issuing going-concern opinions to financially distressed, but non-bankrupt firms; *ceteris paribus*, non-Big Six (Five) auditors are more likely to issue going-concern opinions than Big Six (Five) auditors. Our results provide evidence consistent with the findings of Messier (1983) and Chewning et al. (1989) that non-Big Six (Five) auditors have lower materiality thresholds than their Big Six (Five) counterparts.

Among control variables, PROP (prior year's opinion), RLSS (recurring losses), CURR (current ratio) and CFTL (cash flows from operations/total liabilities), SIZE (firm size), ALAG (audit lag) and DFLT (default status) are consistently significant and have expected signs. Although LDTA (long-term debt / total assets) was a significant variable explaining auditors' opinion decisions in some previous studies, but are insignificant in our study.

ZSCO is also highly significant in both Model 2 and Model 3. This indicates that this variable has some incremental explanatory power over other financial ratio variables. Or, at least, ZSCO could be used as a substitute for many financial ratios because Model 2 is not much different from Model 1 in terms of the overall model significance, pseudo R-square, percentage correctly classified, and more importantly the significance of other variables, including AUDT. So, auditors can use this readily available variable as a decision aid to identify clients that are likely to receive a going-concern opinion or to screen potential clients.

Table 5 provides the estimation results for the two separate years, 1997 and 1999. Since ZSCO is highly correlated to financial ratio variables, we tested the model significance using the two models: (1) with financial ratios and without ZSCO (Model 1) (2) without financial ratios and with ZSCO (Model 2). The results are similar to those reported on Table 4, but the p-value of AUDT slightly went down (significant at the 5% level).

Insert TABLE 5 here.

V. SUMMARY AND CONCLUSIONS

As an intermediary between preparers and users of financial statements, the auditor's most fundamental judgment is
to evaluate clients’ ability to continue to operate as a going concern. It has long been questioned by those financial statement users whether the auditors have taken enough responsibility for evaluating going concern. There has been an expectation gap - a difference between what the users believe auditors are responsible for and what the auditors believe their responsibilities are. SAS No.59 was issued to bridge this gap, but this auditing standard also expanded the auditor’s traditional role in reporting on the ability of the entity to continue in existence beyond the effect on assets and liabilities (Ellingsen et al., 1989).

Audit services are demanded as monitoring devices because of the potential conflicts of interest between owners and managers as well as those among different classes of security holders (DeAngelo, 1981). Thus, the information certified by the auditor has to be valuable to the financial community, and is valuable only so long as it is complete, accurate, and reliable.

In this study, we investigated the auditor’s materiality judgments concerning the issuance of a going-concern opinion by testing whether the materiality threshold levels differ between Big Six (Five) and non-Big Six (Five) auditors. More specifically, we addressed the issue of Type II or beta error, situations where firms that ultimately survive as independent entities are mistakenly identified as failing. Using 1,332 financially-troubled but non-bankrupt sample firms, we found that non-Big Six (Five) auditors are more likely to issue a going-concern opinion than Big Six (Five) auditors because non-Big Six (Five) auditors have lower materiality thresholds than their Big Six (Five) counterparts. The results of this study would provide a basis for a proper evaluation of audit performance between Big Six (Five) and non-Big Six (Five)

REFERENCES


________________________
Small and Medium Sized Firms. New York, NY.


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## TABLE 1
Distribution of Audit Opinions

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<tr>
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<th>1999</th>
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<td>GC***</td>
<td>Total</td>
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</tr>
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<td>21 (33.3%)</td>
<td>63 (100%)</td>
</tr>
<tr>
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</tr>
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</tr>
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<td>35 (24.3%)</td>
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<tr>
<td>Total</td>
<td>265 (53.2%)</td>
<td>233 (46.8%)</td>
<td>498 (100%)</td>
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</table>

*Auditors:
Arth: Arthur Anderson
Cprs: Coopers & Lybrand (Merged with Price Waterhouse in 1998)
Erst: Ernst & Young
Delt: Deloitte & Touche
Peat: Peat, Marwick, & Main
Prce: Price Waterhouse
** UNQ: Unqualified Opinion
*** GC: Going-Concern Opinion
### TABLE 2
Descriptive Statistics and Univariate Tests

<table>
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<th>Mean (Going-Concern)</th>
<th>t-statistic</th>
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Y<sub>i</sub> = 1 if a firm received a going-concern opinion and 0 otherwise, AUDT<sub>i</sub> = 1 if Big Six auditors, and 0 otherwise, PROP = 1 if a firm received a going-concern opinion in prior year, and 0 otherwise, CACL = One year change in current ratio, RLSS = Recurring loss from operations (1 if net income is negative both in current year and prior year, and 0 otherwise), CURR = Current ratio, CFTL = Cash flows from operations / Total liabilities, LDTA = Long-term debt / Total assets, NITA = Net income / Total assets, SIZE = Log (Total sales), ALAG = Number of days from financial statement date to audit report date, DFLT = 1 if a firm was in default or in the process of restructuring debt, and 0 otherwise, ZSCO = Altman's Z-score.

***significant at the .01 level, ** significant at the .05 level, *significant at the .10 level
**TABLE 3**

**Pearson Correlation Coefficient**

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AUDT$_1$ = 1 if Big Six auditors, and 0 otherwise,
PROG = 1 if a firm received a going-concern opinion in prior year, and 0 otherwise,
CACL = One year change in current ratio,
RLSS = Recurring loss from operations (1 if net income is negative both in current year and prior year, and 0 otherwise),
CURR = Current ratio,
CFTL = Cash flows from operations / Total liabilities,
LDTA = Long-term debt / Total assets,
NITA = Net income / Total assets,
SIZE = Log(Total sales),
ALAG = Number of days from financial statement date to audit report date,
DFLT = 1 if a firm was in default or in the process of restructuring debt, and 0 otherwise,
ZSCO = Altman’s Z-score.

***significant at the .01 level, ** significant at the .05 level, *significant at the .10
TABLE 4
Estimation Results of Logistic Regressions, 1997 and 1999 (Aggregated) (n = 1,332)

Model 1:
\[ Y_i = \beta_0 + \beta_1 AUDT_i + \beta_2 PROP_i + \beta_3 CACL_i + \beta_4 RLSS_i + \beta_5 CURR_i + \beta_6 CFTL_i + \beta_7 LDTA_i + \beta_8 NITA_i + \beta_9 SIZE_i + \beta_10 ALAG_i + \beta_11 DFLT_i + \varepsilon_i, \]

Model 2:
\[ Y_i = \beta_0 + \beta_1 AUDT_i + \beta_2 PROP_i + \beta_3 SIZE_i + \beta_4 ALAG_i + \beta_5 DFLT_i + \beta_6 ZSCO_i + \varepsilon_i, \]

Model 3:
\[ Y_i = \beta_0 + \beta_1 AUDT_i + \beta_2 PROP_i + \beta_3 CACL_i + \beta_4 RLSS_i + \beta_5 CURR_i + \beta_6 CFTL_i + \beta_7 LDTA_i + \beta_8 NITA_i + \beta_9 SIZE_i + \beta_10 ALAG_i + \beta_11 DFLT_i + \beta_12 ZSCO_i + \varepsilon_i, \]

<table>
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<tr>
<th>Variable</th>
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<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
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</thead>
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<td>.24***</td>
<td>.20***</td>
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<td>89.1%</td>
<td>90.8%</td>
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\[a\] Variable Definitions:
\[ Y_i = \] 1 if a firm received a going-concern opinion and 0 otherwise,
\[ AUDT_i = \] 1 if Big Six (Five) auditors, and 0 otherwise,
\[ PROP = \] 1 if a firm received a going-concern opinion in prior year, and 0 otherwise,
\[ CACL = \] One year change in current ratio,
\[ RLSS = \] Recurring loss from operations (1 if net income is negative both in current year and prior year, and 0 otherwise),
\[ CURR = \] Current ratio,
\[ CFTL = \] Cash flows from operations / Total liabilities,
\[ LDTA = \] Long-term debt / Total assets,
\[ NITA = \] Net income / Total assets,
Variable Definitions (continued):
SIZE = Log (Total sales),
ALAG = Number of days from financial statement date to audit report date,
DFLT = 1 if a firm was in default or in the process of restructuring debt, and 0 otherwise,
ZSCO = Altman’s Z-score.

***significant at the .01 level, ** significant at the .05 level, *significant at the .10 level
TABLE 5
Estimation Results of Logistic Regression, 1997 and 1999 (Separated)

**Model 1:**
\[
Y_i = \beta_0 + \beta_1 \text{AUDT}_i + \beta_2 \text{PROP}_i + \beta_3 \text{CACL}_i + \beta_4 \text{RLSS}_i + \beta_5 \text{CURR}_i + \beta_6 \text{CFTL}_i + \beta_7 \text{LDTA}_i \\
+ \beta_8 \text{NITA}_i + \beta_9 \text{SIZE}_i + \beta_{10} \text{ALAG}_i + \beta_{11} \text{DFLT}_i + \varepsilon_i,
\]

**Model 2:**
\[
Y_i = \beta_0 + \beta_1 \text{AUDT}_i + \beta_2 \text{PROP}_i + \beta_3 \text{SIZE}_i + \beta_4 \text{ALAG}_i + \beta_5 \text{DFLT}_i + \beta_6 \text{ZSCO}_i + \varepsilon_i.
\]

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<td>CURR</td>
<td>-</td>
<td>-0.67***</td>
<td>-0.35**</td>
</tr>
<tr>
<td>CFTL</td>
<td>-</td>
<td>-0.36*</td>
<td></td>
</tr>
<tr>
<td>LDTA</td>
<td>+</td>
<td>-0.16</td>
<td></td>
</tr>
<tr>
<td>NITA</td>
<td>-</td>
<td>-0.41**</td>
<td>-0.34**</td>
</tr>
<tr>
<td>SIZE</td>
<td>-</td>
<td>-0.54***</td>
<td>-0.58***</td>
</tr>
<tr>
<td>ALAG</td>
<td>+</td>
<td>0.02***</td>
<td>0.02***</td>
</tr>
<tr>
<td>DFLT</td>
<td>+</td>
<td>1.04***</td>
<td>1.20***</td>
</tr>
<tr>
<td>ZSCO</td>
<td>-</td>
<td>-0.11***</td>
<td>-0.14***</td>
</tr>
<tr>
<td>Pseudo R-square</td>
<td>47.4%</td>
<td>39.0%</td>
<td>60.5%</td>
</tr>
<tr>
<td>Chi-square</td>
<td>130.0***</td>
<td>123.7***</td>
<td>224.3***</td>
</tr>
<tr>
<td>Concordant Pairs</td>
<td>91.9%</td>
<td>90.1%</td>
<td>95.5%</td>
</tr>
</tbody>
</table>

* Variable Definitions:
  - \( Y_i = 1 \) if a firm received a going-concern opinion and 0 otherwise,
  - \( \text{AUDT}_i = 1 \) if Big Six (Five) auditors, and 0 otherwise,
  - \( \text{PROP} = 1 \) if a firm received a going-concern opinion in prior year, and 0 otherwise,
  - \( \text{CACL} = \) One year change in current ratio,
  - \( \text{RLSS} = \) Recurring loss from operations (1 if net income is negative both in current year and prior year, and 0 otherwise),
  - \( \text{CURR} = \) Current ratio,
  - \( \text{CFTL} = \) Cash flows from operations / Total liabilities,
  - \( \text{LDTA} = \) Long-term debt / Total assets,
  - \( \text{NITA} = \) Net income / Total assets,
  - \( \text{SIZE} = \) Log (Total sales),
  - \( \text{ALAG} = \) Number of days from financial statement date to audit report date,
  - \( \text{DFLT} = 1 \) if a firm was in default or in the process of restructuring debt, and 0 otherwise,
  - \( \text{ZSCO} = \) Altman’s Z-score.

***significant at the .01 level, ** significant at the .05 level, *significant at the .10 level
Abstract

“Social Security Retirement Planning Considerations for Married Couples in Family Owned Businesses”

By

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Abstract

“Social Security Retirement Planning Considerations for Married Couples in Family Owned Businesses”

Social Security is a major source of retirement income for an overwhelming majority of Americans. According to the Social Security Administration 91% of persons in the United States age 65 or older receive Social Security benefits. As a source of retirement income, Social Security benefits provide the only source of income for 20% of retirees in America, at least 90% of retirement income for 30% of retirees, and at least 50% of the total retirement income for 65% of retirees.

Individual decisions affecting Social Security benefits are very important and, once made, decisions affecting Social Security benefits are usually irrevocable. Proper planning is essential in making the right decisions concerning Social Security retirement benefits. A critical area for many individuals is the decision pertaining to Social Security spousal benefits. Working spouses have the option of receiving Social Security retirement benefits based upon their own work history of paying into the Social Security System or receiving benefits based upon a specified percentage, ranging from 37.5% to 50%, of their covered spouse’s Social Security benefits, depending upon their age and spouse’s age at time of retirement.

For employees, all annual earned income up to the maximum amount subject to Social Security taxes, currently $87,000 in 2003, is taxed at the rate of 7.65%. This amount is matched by the employer. For self employed individuals, the tax rate is 15.3% of all earned income up to the maximum amount. The maximum amount is adjusted annually for inflation.

Married couples working together in a family business generally have the opportunity to allocate income between the spouses which will be subject to Social Security taxes and thus determine the retirement benefits available from Social Security for each. This provides some planning opportunities which can be used to increase the family’s overall benefits.

This article explores Social Security retirement considerations for family owned business owners and presents income distribution strategies on how to maximize Social Security retirement benefits for married couples working in family owned businesses.
This is a paper on intraday security price forecasting and trading technologies. Using professor Stigler's original securities trading model as a basis, the author advances an econometric model to forecast intraday stock prices by generating the intraday bid and asked prices via Monte Carlo simulation. The author then argues that trading activities would occur within the boundary of the bid and asked, and that a typical problem facing the buyer and the seller can be looked at as a simple two-person, zero-sum game from the trader's standpoint. Various trading rules are suggested with regards to limit and market order strategies.

A. INTRODUCTION

In his seminal paper on the effect of public policies on the stock market volatility, Professor George Stigler introduced an interesting way to examine price volatility in the securities market. The market volatility in his view was not necessarily the volatility of prices which would normally equate the demand for securities to the total number of shares outstanding, but that which arises from uncertainty that traders experience in reaching equilibrium in the market for securities. Facing uncertainties about the notional equilibrium price, traders act on their belief about what the price should be by submitting their buy and sell orders. When buy and sell orders cross, deals get struck. Each time deals are made, prices are recorded. We observe that these prices are subject to a great deal of variation. The core of the Professor Stigler's analysis lies in the fact that the trader's market for securities to buy (or sell) will have to be distinguished from the market for securities to own (or hold). Economists often identify that the demand for securities to buy is a flow demand, while the demand for securities to own or hold given a finite number of securities in supply is a stock demand. The argument is then that even when the stock demand for securities are stationary, that is, the demand for securities to hold does not shift; it is possible to witness changes in security prices in the flow market and in fact, in multiple times. Professor Stigler, however, has not elaborated how the flow equilibrium may converge to the stock equilibrium. Nonetheless, his model suggests that these transaction prices in the flow market can be seen as observations of a sample drawn from a certain stock market equilibrium price distribution. Naturally, the multiple numbers of transaction prices coexist for any equilibrium price in the market for securities to hold.
Professor Stigler argues that the marketplace for trading on securities would exist as long as people are willing and able to express themselves with orders to buy or sell at various prices, i.e. price limit orders. Although quite counter-intuitive, Professor Stigler assumes that every trader is able to buy or sell however many shares they wish at any given price, i.e. the assumption of perfect competition. In reality, however, not every share placed for an order to buy or sell gets executed all at one price in many circumstances, because every order arrives at the market with different sizes. However, Professor Stigler advances an important theorem in securities trading. That is, when a trading occurs, the \textit{willing} bid must be at least as great as the \textit{willing} ask or conversely, the \textit{willing} ask should be no greater than the \textit{willing} bid. It then follows that the \textit{willing} bid must equal the \textit{willing} ask, only \textit{ex post}. In summary, the multiple numbers of trading prices in the \textit{flow} market tend to revert to mean, which will equal the equilibrium price in the \textit{stock} market.

In this paper, we will review the Professor Stigler’s securities trading model, describe the manner in which intraday security prices can be forecasted within Stigler’s original trading rules, introduce theory of games to the securities trading environment, and explore a few securities trading technology.

B. SIMPLE TECHNIQUES OF SIMULATING SECURITIES TRADING: STIGLER MODEL

Professor Stigler simulates securities transactions in a special way. Assume that it is 9:30 a.m., and the market has just opened. We are about to forecast the stock price for the next 30 minutes starting 9:31 a.m. and ending at 10:00 a.m. Consider Table 1. First, generate three-digit random numbers between 000 and 900, where the first even numbers represent buy orders and the first odd numbers are possible sell orders. See Column (2). Assuming that stock prices would fluctuate between $20 and $30 for the next half an hour; generate two-digit random numbers within that price range in Column (3). Column (4) combines random numbers in Columns (2) and (3). Those random numbers shown in Column (4) are interpreted in Columns (5) and (6). For example, the number 925 in Column (4) means a price limit order to \textit{sell} at $25.

Following Stigler, transactions will take place under either one of the following conditions. Either, the \textit{willing} bid price at time $t$ is higher than the asked at time $t-1$, in which case no bid price will have ever been registered in the market and yet, a deal gets struck at the asking price. Or, the \textit{willing} asked price at time $t$ is lower than the bid price at time $t-1$, in which case no ask price will have ever been declared and yet, a trade occurs at the bid price. Columns (7) and (8) are the final outcome of this rather simplistic exercise. In the Stigler’s model, the equilibrium price of the security is then $23.42$, the arithmetic mean of all transaction prices shown in Column (8). Hence, existence of multiple transaction prices may still be consistent with a given equilibrium price. The implication is quite intriguing, except that the Stigler’s model will hold true only when the equilibrium price does not change for a limited time period. What if the equilibrium structure changes frequently? How would the bid and asked prices change as a consequence? Most importantly, the Stigler’s model also assumes that the stochastic process in which the bid and ask orders would arrive in the market is of uniform distribution, which seems quite reasonable. However, it would be somewhat uncomfortable to assume that the bid and asked price would also have a uniform distribution. More recent studies about stock price behaviors indicate that the stock price does not necessarily follow uniform but lognormal distribution. A little more realistic securities pricing models would require investigating characteristics of random components of security prices. Consequently, we will examine random components of the bid and asked price as well, because one can never argue that they would have identical means and volatilities. In other words, those who will submit their orders to buy may not have the same expectation and hence, behave the same way as those who would be willing to sell.

A few financial economists have attempted to improve on the original Stigler’s model by recognizing the effect of order sizes and the role of market makers. Although some of these studies were successful in showing how they can either raise or lower the price.
volatilities, the work was somewhat *ad hoc* and produced no meaningful results for traders. Tinic and West particularly looked at these problems and repeated the Stigler’s model to see how the volatility may change. With respect to the issue of order size, however, what could have been more interesting in their earlier studies was to suggest a way in which to compute perhaps the maximum number of tradable shares without affecting the market price. Discussions on order sizes are normally left out in the traditional economic literature, because the market is presumed to be perfectly competitive and consequently, traders are assumed to be able to buy and sell however many shares they wish to trade at a given price. For larger institutions and market makers, however, their order sizes and offering prices may have profound impacts in their ability to be able to buy and sell. Therefore, it seems quite reasonable to conjecture that certain trading strategies are implicit in any securities forecasting model.

Table 1: A Simple Technique to Forecast Intraday Stock Prices

<table>
<thead>
<tr>
<th>Time</th>
<th>Buy/Sell</th>
<th>Price Limit</th>
<th>Code</th>
<th>Order</th>
<th>Transaction Code</th>
<th>Transaction Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>9:31 AM</td>
<td>300</td>
<td>021</td>
<td>321</td>
<td>Ask</td>
<td>@ $21</td>
<td></td>
</tr>
<tr>
<td>9:32 AM</td>
<td>300</td>
<td>025</td>
<td>325</td>
<td>Ask</td>
<td>@ $25</td>
<td></td>
</tr>
<tr>
<td>9:33 AM</td>
<td>800</td>
<td>021</td>
<td>821</td>
<td>Bid</td>
<td>@ $21</td>
<td></td>
</tr>
<tr>
<td>9:34 AM</td>
<td>300</td>
<td>028</td>
<td>328</td>
<td>Ask</td>
<td>@ $28</td>
<td></td>
</tr>
<tr>
<td>9:35 AM</td>
<td>900</td>
<td>025</td>
<td>925</td>
<td>Ask</td>
<td>@ $25</td>
<td></td>
</tr>
<tr>
<td>9:36 AM</td>
<td>000</td>
<td>020</td>
<td>020</td>
<td>Bid</td>
<td>@ $20</td>
<td></td>
</tr>
<tr>
<td>9:37 AM</td>
<td>200</td>
<td>027</td>
<td>227</td>
<td>Bid</td>
<td>@ $27</td>
<td>Bought @ $25</td>
</tr>
<tr>
<td>9:38 AM</td>
<td>000</td>
<td>021</td>
<td>021</td>
<td>Bid</td>
<td>@ $21</td>
<td></td>
</tr>
<tr>
<td>9:39 AM</td>
<td>900</td>
<td>021</td>
<td>921</td>
<td>Ask</td>
<td>@ $21</td>
<td>Sold @ $21</td>
</tr>
<tr>
<td>9:40 AM</td>
<td>900</td>
<td>025</td>
<td>925</td>
<td>Ask</td>
<td>@ $25</td>
<td></td>
</tr>
<tr>
<td>9:41 AM</td>
<td>800</td>
<td>021</td>
<td>821</td>
<td>Bid</td>
<td>@ $21</td>
<td></td>
</tr>
<tr>
<td>9:42 AM</td>
<td>300</td>
<td>024</td>
<td>324</td>
<td>Ask</td>
<td>@ $24</td>
<td></td>
</tr>
<tr>
<td>9:43 AM</td>
<td>200</td>
<td>025</td>
<td>225</td>
<td>Bid</td>
<td>@ $25</td>
<td>Bought @ $24</td>
</tr>
<tr>
<td>9:44 AM</td>
<td>500</td>
<td>021</td>
<td>521</td>
<td>Ask</td>
<td>@ $21</td>
<td>Sold @ $21</td>
</tr>
<tr>
<td>9:45 AM</td>
<td>000</td>
<td>024</td>
<td>024</td>
<td>Bid</td>
<td>@ $24</td>
<td>Bought @ $24</td>
</tr>
<tr>
<td>9:46 AM</td>
<td>000</td>
<td>024</td>
<td>024</td>
<td>Bid</td>
<td>@ $24</td>
<td>Bought @ $24</td>
</tr>
<tr>
<td>9:47 AM</td>
<td>800</td>
<td>029</td>
<td>829</td>
<td>Bid</td>
<td>@ $29</td>
<td>Bought @ $24</td>
</tr>
<tr>
<td>9:48 AM</td>
<td>200</td>
<td>020</td>
<td>220</td>
<td>Bid</td>
<td>@ $20</td>
<td></td>
</tr>
<tr>
<td>9:49 AM</td>
<td>300</td>
<td>026</td>
<td>326</td>
<td>Ask</td>
<td>@ $26</td>
<td></td>
</tr>
<tr>
<td>9:50 AM</td>
<td>300</td>
<td>027</td>
<td>327</td>
<td>Ask</td>
<td>@ $27</td>
<td></td>
</tr>
<tr>
<td>9:51 AM</td>
<td>800</td>
<td>029</td>
<td>829</td>
<td>Bid</td>
<td>@ $29</td>
<td>Bought @ $27</td>
</tr>
<tr>
<td>9:52 AM</td>
<td>700</td>
<td>029</td>
<td>729</td>
<td>Ask</td>
<td>@ $29</td>
<td></td>
</tr>
<tr>
<td>9:53 AM</td>
<td>300</td>
<td>023</td>
<td>323</td>
<td>Ask</td>
<td>@ $23</td>
<td></td>
</tr>
<tr>
<td>9:54 AM</td>
<td>800</td>
<td>027</td>
<td>827</td>
<td>Bid</td>
<td>@ $27</td>
<td>Bought @ $23</td>
</tr>
<tr>
<td>9:55 AM</td>
<td>000</td>
<td>025</td>
<td>025</td>
<td>Bid</td>
<td>@ $25</td>
<td>Bought @ $23</td>
</tr>
<tr>
<td>9:56 AM</td>
<td>200</td>
<td>022</td>
<td>222</td>
<td>Bid</td>
<td>@ $22</td>
<td></td>
</tr>
<tr>
<td>9:57 AM</td>
<td>100</td>
<td>021</td>
<td>121</td>
<td>Ask</td>
<td>@ $21</td>
<td>Sold @ $22</td>
</tr>
<tr>
<td>9:58 AM</td>
<td>800</td>
<td>021</td>
<td>821</td>
<td>Bid</td>
<td>@ $21</td>
<td></td>
</tr>
<tr>
<td>9:59 AM</td>
<td>800</td>
<td>027</td>
<td>827</td>
<td>Bid</td>
<td>@ $27</td>
<td>Bought @ $23</td>
</tr>
<tr>
<td>10:00 AM</td>
<td>700</td>
<td>023</td>
<td>723</td>
<td>Ask</td>
<td>@ $23</td>
<td></td>
</tr>
</tbody>
</table>

Table 2: NASDAQ Level I and Trading Activities (Equilibrium Price: $23.42)

<table>
<thead>
<tr>
<th>Time</th>
<th>Bid</th>
<th>Ask</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>9:31 A.M.</td>
<td>21</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
C. ALTERNATIVE SECURITIES TRADING MODEL

(1) Return Generating Functions and Monte Carlo Simulation

Time series forecasting techniques for intraday notional equilibrium prices is typically lacking traders' behavioral contents. We believe that any meaningful forecasting technique for securities transaction prices should incorporate such traders' behaviors as the ones Professor Stigler has deployed in his model. In addition, when building such a model, one should accommodate two underlying elements of time-dependent transaction price behaviors. One is to predict changes in the slope or the general shape of the curve with respect to the passage of time, and second, to accommodate a possible up- or downward shifting of the curve itself.

As a first step, we will generate daily stock returns based on a real-time tick bid, asked, and last price series for $x$ number of days for each stock. We will do so, however, by taking minute-to-minute log price relatives. Define the log best bid ($b$), best ask ($a$) and last trade price relatives ($p$)

\[
\log \left( \frac{B_{t+1}}{B_t} \right) = b, \quad \log \left( \frac{A_{t+1}}{A_t} \right) = a \quad \text{and} \quad \log \left( \frac{P_{t+1}}{P_t} \right) = p.
\]

For example, if the price of a security at 11:00 a.m. were $21.25 and $21.15 a minute earlier, the log price relative is 0.4717%, which is the continuously compounded rate of return on the security.

Next, the instantaneous daily mean and volatility of these log price relatives ($b$, $a$, $p$) are computed separately using a sample of $x$ number of days' worth of data. Note that

\[
\text{Daily Mean} = \text{Minute Mean} \times 390
\]

\[
\text{Daily Volatility} = \text{Minute Volatility} \times \sqrt{390}
\]

We consider only the best bid and the best ask because we would want to examine the behavior of marginal buyers and sellers.

Assume that the stock returns are log normally distributed and follow a stochastic Wiener process with the Markov property. If the symbol, $S$, represents the stock price; and $m$, the instantaneous daily mean or drift; $\sigma$, the instantaneous daily volatility; and $\varepsilon$, the random variable with mean zero and unity variance, the usually accepted forecasting formula for stock returns over a time period, $\Delta t$, takes on a particular geometric Brownian motion of the form:

\[
\frac{\Delta S}{S} = m \Delta t + \sigma \varepsilon \sqrt{\Delta t} \quad (\text{Equation 1})
\]

Several comments are in order in implementing equation (1) with respect to variables $m$, $\sigma$ and $\Delta t$ as follows.

First, time varying volatilities may be allowed in the form of the exponentially weighted moving averages (EWMA), i.e.

\[
\sigma_{t+1} = \left( 1 - \lambda \right) \sigma_t^2 + \lambda \left( \frac{p_t - p_{t-\Delta t}}{p_{t-\Delta t}} \right)^2
\]

(Equation 2)

A slightly more general form of the time varying volatilities can also be obtained by what is known as GARCH (1, 1) with the equation:
\[ \sigma_{t+1}^2 = \gamma V + \delta \left( \frac{p_t - p_{t-1}}{p_{t-1}} \right)^2 + (1 - \lambda) \sigma_t^2 \]  
\[ \text{(Equation 3)} \]

If \( \gamma + \delta + (1 - \lambda) = 1 \) and \( V \) is a long-run variance rate, equation (3) gets reduced to equation (2). Estimate equation (3) by a regression for \( \omega \), \( \delta \) and \( \lambda \) where \( \omega = \gamma V \).

Since \( \gamma + \delta + (1 - \lambda) = 1 \), it is clear that \( \gamma \) can be calculated from the regression coefficients \( \delta \) and \( \lambda \). Suppose now that

\[ V = \frac{\lambda \left( \frac{p_t - p_{t-\tau}}{p_{t-\tau}} \right)^2 - \delta \left( \frac{p_t - p_{t-1}}{p_{t-1}} \right)^2}{\lambda - \delta} \]  
\[ \text{(Equation 4)} \]

Substituting equation (4) into equation (3) reproduces equation (2). So, we will find an optimal value of \( \tau \) at which equation (4) holds. The drift can also be predicted:

\[ m_{t+1} = m_t + \lambda m_t - \frac{p_t - p_{t-\tau}}{p_{t-\tau}} \]  
\[ \text{(Equation 5)} \]

Finally, we determine the optimal value of \( \Delta t \). We will set \( \Delta t \) equal to 1/390, if we wish to forecast stock prices for each minute forward. However, \textit{any} \( \Delta t \) would be acceptable in theory and as a matter of fact, \( \Delta t \to 0 \) may be perfect. Table 3 assumes that the instantaneous daily mean and standard deviation for the log last price relatives computed at 9:30 a.m. on a particular day for Bank of America Common Stock, are -0.6823% and 1.1165%, respectively; the corresponding statistics for the log bid price relatives are 0.6829% and 1.1169% each; and those for the log asked price relatives are 0.6819% and 1.1183%.

Columns (2), (3) and (4) are the log price relatives from Monte Carlo simulation using equation (1) above.

A forecasting series for the notional equilibrium prices is given by a formula

\[ P_t = P_{t-1} \cdot (1 + \text{Simulated Log Last Price Relatives}) \]  
\[ \text{(Equation 6)} \]

The results are shown in Column (2) in Table 4. The initial price at 9:30 a.m. has been assumed to be $68.33. Now define

\[ B_t = P_{t-1} \cdot (1 + \text{Simulated Log Bid Price Relatives}) \]  

That is, the simulated bid price, \( B_t \), in Column (3) in Table 4 is one plus simulated log bid price relatives, Column (2) in Table 2, multiplied by the forecasted price one period earlier, Column (2) in Table 4. Similar procedures are taken to generate a series for the simulated asked prices in Column (4) in Table 4. Column (5) shows possible transaction prices if any transaction were ever to occur. If no transaction were to take place, the transaction price is same as the one, which was determined one period earlier. The final forecast is then shown in Column (6).

Table 3: Monte Carlo Simulation Results for Log Price Relatives

<table>
<thead>
<tr>
<th>Time Forecasted</th>
<th>Column (2)</th>
<th>Column (3)</th>
<th>Column (4)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Simulated</td>
<td>Simulated</td>
<td>Simulated</td>
</tr>
<tr>
<td></td>
<td>Average Log</td>
<td>Average Log</td>
<td>Average Log</td>
</tr>
<tr>
<td></td>
<td>Bid Price</td>
<td>Ask Price</td>
<td>Last Price</td>
</tr>
<tr>
<td></td>
<td>Relatives</td>
<td>Relatives</td>
<td>Relatives</td>
</tr>
<tr>
<td>9:31 AM</td>
<td>0.01116%</td>
<td>0.01096%</td>
<td>0.01115%</td>
</tr>
<tr>
<td>9:32 AM</td>
<td>-0.00940%</td>
<td>0.00173%</td>
<td>-0.00940%</td>
</tr>
<tr>
<td>9:33 AM</td>
<td>-0.06938%</td>
<td>-0.01912%</td>
<td>-0.06935%</td>
</tr>
<tr>
<td>9:34 AM</td>
<td>-0.03931%</td>
<td>0.01527%</td>
<td>-0.03930%</td>
</tr>
<tr>
<td>9:35 AM</td>
<td>0.00248%</td>
<td>-0.00562%</td>
<td>0.00248%</td>
</tr>
<tr>
<td>....</td>
<td>....</td>
<td>....</td>
<td>....</td>
</tr>
<tr>
<td>9:58 AM</td>
<td>0.06686%</td>
<td>-0.00385%</td>
<td>0.06684%</td>
</tr>
<tr>
<td>9:59 AM</td>
<td>0.00420%</td>
<td>0.02493%</td>
<td>0.00420%</td>
</tr>
<tr>
<td>10:00 AM</td>
<td>0.00257%</td>
<td>-0.04858%</td>
<td>0.00257%</td>
</tr>
</tbody>
</table>
Table 4: Forecasting for Intraday Security Prices

<table>
<thead>
<tr>
<th>Time</th>
<th>Column (1)</th>
<th>Column (2)</th>
<th>Column (3)</th>
<th>Column (4)</th>
<th>Column (5)</th>
<th>Column (6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forecasted</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9:31 AM</td>
<td>68.34</td>
<td>68.34</td>
<td>68.32</td>
<td>68.34</td>
<td>68.34</td>
<td></td>
</tr>
<tr>
<td>9:32 AM</td>
<td>68.33</td>
<td>68.33</td>
<td>68.34</td>
<td>68.32</td>
<td>68.32</td>
<td></td>
</tr>
<tr>
<td>9:33 AM</td>
<td>68.28</td>
<td>68.28</td>
<td>68.32</td>
<td>No Trade</td>
<td>68.32</td>
<td></td>
</tr>
<tr>
<td>9:34 AM</td>
<td>68.26</td>
<td>68.26</td>
<td>68.29</td>
<td>No Trade</td>
<td>68.32</td>
<td></td>
</tr>
<tr>
<td>9:35 AM</td>
<td>68.26</td>
<td>68.26</td>
<td>68.25</td>
<td>68.26</td>
<td>68.26</td>
<td></td>
</tr>
<tr>
<td>...</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9:41 AM</td>
<td>68.26</td>
<td>68.26</td>
<td>68.27</td>
<td>No Trade</td>
<td>68.30</td>
<td></td>
</tr>
<tr>
<td>9:42 AM</td>
<td>68.25</td>
<td>68.26</td>
<td>68.25</td>
<td>68.26</td>
<td>68.26</td>
<td></td>
</tr>
<tr>
<td>9:43 AM</td>
<td>68.25</td>
<td>68.26</td>
<td>68.29</td>
<td>No Trade</td>
<td>68.26</td>
<td></td>
</tr>
<tr>
<td>9:44 AM</td>
<td>68.27</td>
<td>68.27</td>
<td>68.26</td>
<td>68.27</td>
<td>68.27</td>
<td></td>
</tr>
<tr>
<td>9:45 AM</td>
<td>68.27</td>
<td>68.27</td>
<td>68.25</td>
<td>68.26</td>
<td>68.26</td>
<td></td>
</tr>
<tr>
<td>...</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9:48 AM</td>
<td>68.29</td>
<td>68.29</td>
<td>68.31</td>
<td>68.23</td>
<td>68.23</td>
<td></td>
</tr>
<tr>
<td>9:49 AM</td>
<td>68.30</td>
<td>68.30</td>
<td>68.27</td>
<td>68.30</td>
<td>68.30</td>
<td></td>
</tr>
<tr>
<td>...</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10:00 AM</td>
<td>68.38</td>
<td>68.38</td>
<td>68.35</td>
<td>68.38</td>
<td>68.38</td>
<td></td>
</tr>
</tbody>
</table>

(2) Trading Rules – A Comparison to Stigler’s Trading Model

As previously mentioned, a transaction may occur under either one of the following conditions. If the willing asked price turns out to be lower than the willing bid price, which follows immediately, no bid price will have ever been declared in the market and yet, a security will be bought at the asked. On the other hand, if the willing bid price were higher than the asked price, which follows immediately, a security will be sold at the bid. No offer to sell will be registered on trading screen, and the deal will be struck. Please see the results in Column (5) in Table 4.

There is a slight difference between our trading rules and Stigler’s. We assume that bid and ask orders arrive in an alternative sequence. Although this may be the weakness of our algorithm, this will simplify the programming tremendously. We do not believe it to be unreasonable, however, as long as the arrival of orders is uniformly distributed. In order to highlight the difference between our and Stigler’s trading rules, we will reiterate our trading rules here. Recall that the random bid and ask draws for 9:31 a.m. is $68.34 and $68.32, respectively. In this case, since the randomly drawn ask price comes immediately after the bid, it is assumed that the trade will occur at $68.34. Now a new bid price is drawn, which is $68.33. But this is higher than $68.32, the immediately preceding random ask draw. So, the trade occurs at $68.32. The next ask draw is $68.26, which is followed by $68.28, and no trade takes place; the remainder is self explanatory. If we follow Stigler’s model, however, the trade window for the bid, ask, and transaction prices will be:

<table>
<thead>
<tr>
<th>Bid</th>
<th>Ask</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>68.34</td>
<td>68.34</td>
<td></td>
</tr>
<tr>
<td>68.33</td>
<td>68.32</td>
<td>68.33</td>
</tr>
<tr>
<td>68.28</td>
<td>68.29</td>
<td>68.26</td>
</tr>
<tr>
<td>68.26</td>
<td>68.29</td>
<td>68.25</td>
</tr>
<tr>
<td>68.29</td>
<td>68.31</td>
<td>68.31</td>
</tr>
<tr>
<td>68.31</td>
<td>68.31</td>
<td>68.31</td>
</tr>
</tbody>
</table>

One may criticize why not to use the results in Column (3) in forecasting the intraday stock prices? In reality, however, the last trade could have taken place a day earlier, or even a second earlier. We believe that one could use the results in Column (3) instead of the ones in Column (6), which we
have obtained painfully. The real answer lies in how often the security is traded. When the market does not offer enough depth, the best market statistics, which reflect the current market condition, is the bid and asked prices being posted in real time.

Some other criticisms might be that the true “current” price might be approximately halfway between the bid and the asked. Although the argument has its own merit ex post, it has no ex ante behavioral contents. Considering the interaction between the bid and asked behavior as described above, our alternative model seems to produce much richer results. Furthermore, prices as determined via crossing of the bids and the asked are those prices, at which demand to buy shares would equal supply to sell. Finally, the model appropriately incorporates the phenomena that the demand function for shares given supply shifts either upward or downward constantly, as we first forecast the notional equilibrium prices, which are then used to generate the bid and asked prices. So, we will propose the method herein constructed above.

D. CONFIDENCE LEVEL FOR FORECASTING ESTIMATES

Analysis on the confidence level of forecasts may differ depending on how one uses the forecasting results. We will group two types of users of our forecasting figures. One group of users may be actual traders interested in finding out whether or not their trades will go through, while the other type of users may only be interested in foreseeing the overall price trend between now and a particular future point in time, e.g. the day’s close.

(1) Traders’ Problem – One-Tail Test

Recall that the stock price at 9:30 a.m., when the forecasting was conducted, was $68.33 and that the forecasting for 9:48 a.m. was $68.23 in Table 4. If a trader wishes to place a buy limit order at $68.23, he may wish to be certain about the probability with which the price will fall by more than 10 cents or 0.15% in the next 18 minutes. Now, recall also that the log price relatives had a daily mean of -0.6823% with a daily standard deviation of 1.1165%. This means that the minute-to-minute mean and standard deviation is given by -0.0018% and 0.0565%. Let’s ignore conveniently the minute mean return is zero. What would be the probability that the stock price will fall by more than 0.15% over the next 18 minutes? If the standard error of the whole day’s worth of forecasts were 0.5%, the minute-to-minute stock returns forecasting would have an error $0.0253% \times \sqrt{18} = 0.1074%$. In order to standardize the anticipated decline in the stock price, i.e. 0.15% on a normal distribution scale, divide 0.15% by the standard error of 0.1074%, which gives 1.3966. The probability that the stock price will fall by more than 0.15% or 10 cents a share over the next 18 minutes is then 91.87%, that is, $\Pr[\varepsilon \leq 1.3966] \approx 91.87%$.

Equivalently, we would be 8.13% certain or confident that the stock price will not fall by more than 10 cents over the next 18 minutes. Obviously, if the stock price does not fall by more than 10 cents and in fact, fall by something less than 10 cents or even rise, those who may place a buy limit order should be concerned.

Now suppose that you are a seller who wants to maximize the sales proceeds by placing a limit sell order at $68.38, the forecasted price for 10:00 a.m. (See Table 4) This would be a 5 cent increase or 0.0732% over the last price at 9:30 a.m., which is $68.33. The 30-minute standard error is $0.0253% \times \sqrt{30} = 0.1386%$. Assuming that the seller would obviously be curious about whether the stock price will rise even more than 0.0732%, one can then compute the associated probability as $\Pr[\varepsilon \geq 0.0732% \over 0.1386% = 0.5282] \approx 70.13%$.

He would then be 29.87% confident that he will not be able to sell the stock at $68.38.

(2) Trend Analysts’ Problem – Two-Tail Test
The realization of the \textit{ex ante} forecasting is subject to forecasting errors. Presumably, a point forecasting estimate will lie within a certain forecasting band, or within a upper and lower bound. The range between the two bounds acceptable to analysts depends on the level of comfort that analysts could live with. That is, if an analyst is interested in knowing the price realization to lie within a certain forecasting price range and wishes to be 95\% certain about it, the probability that $P_{\hat{f}} \leq P \leq \hat{P}$ should be exactly 0.95, where the lower bound price forecasting is $\hat{P}$ and the upper bound is $\hat{P}$. Mathematically, if the symbol $r$ refers to percent changes, this would be equivalent to the statement that

$$Pr\left[ x \leq \frac{r - \hat{r}}{\sigma_e} \leq x \right] = \text{Confidence Level}$$

$\Leftrightarrow$$Pr[\hat{r} - x\sigma_e \leq r \leq \hat{r} + x\sigma_e] = \text{Confidence Level}$

The symbols $x$ represents the number of times by which the realization of our forecasts will deviate away from the point estimate, which is $\hat{r}$; and $\sigma_e$ is the standard error of forecasts. At the confidence level at 95\%, the mathematical statistics suggests that $x = 1.96$.

Consequently, if an analyst is interested in a 95\% confidence for the forecasting estimate and if the forecasting for 9:48 a.m. was $68.23 as in Table 3, would it be a good idea to wait approximately 18 minutes to buy the stock? In order to find out, first recall that when the stock is currently traded at $68.33, the stock is expected to fall by 10 cents or 0.15\%. This means $\hat{r} + x\sigma_e = -0.15\% + 1.96(0.0253\%) = -0.10\%$ and $\hat{r} - x\sigma_e = -0.15\% - 1.96(0.0253\%) = -0.20\%$. In terms of dollar price range, this is tantamount to saying that one would be certain 95\% the price will range somewhere between $68.19 on the down side and $68.26 on the upside. Consequently, it would be an acceptable strategy to buy the stock expecting that the price would fall.

### E. USE OF FORECASTS: AN APPLICATION OF GAME THEORY

Simulated intraday security prices could provide useful information to professional traders in obtaining the most “desirable” execution price. Generally, intraday forecasting figures can be used as a series of \textit{limit order} either to buy or to sell, as stated earlier. Alternatively, one could examine the forecasted trend and wait till the best time to trade at the market. Problem arises, however, if you are an institutional trader trading a large quantity of shares through your own brokers. It would then be virtually impossible to place any orders at the market without impacting share prices; you may not be able to buy all the shares you wish to buy at the price you wish to pay. Consequently, knowing intraday forecasting numbers can be a definite advantage to a trader.

To motivate the analysis, assume that the security market is comprised of sellers and buyers, each one of whom declares their willing ask and bid prices at any given moment in time. In order to make a direct application of our stock price forecasting model to the game theoretic trading strategies, note that trading will occur only after either the buyer and/or the seller declare their willing bid and asking prices. Thus, the asking price is at least as great as the bid. When bid and asking orders are submitted, also submitted are bid and asking sizes. Consequently, we will first estimate the number of traded shares ($v$) for any given bid ($b$) and asked prices ($a$) a minute prior by using a regression equation as follows:

$$v_i = \alpha + \beta_1 b_{i-1} + \beta_2 a_{i-1} + \varepsilon_i$$

$$\varepsilon_i = \rho \varepsilon_{i-1} + u_i ; |\rho| < 1 \quad \text{(Equation 7)}$$

That is, we assume a first-order serial correlation in the time series regression. To correct the auto correlated errors, transform equation (7) to give

$$v_i^* = \tilde{\alpha} + \tilde{\beta}_1 b_{i-1}^* + \tilde{\beta}_2 a_{i-1}^* + u_i \quad \text{(Equation 8)}$$

All regression coefficients are statistically significant at a 99 percent confidence level. First, the 95\% confidence band for the end-of-day forecasted stock prices are spaced out in an equal increment. Each cell in Table 5 shows the number of shares...
expected to be traded as computed under equation (7). We have ruled out cases where \( v_i < 0 \) and where bid prices to be declared is not greater than any given willing asked price. Since the dependent variable is a possible minute-to-minute trading volume, the estimated equation can be used to estimate the whole day’s trading volume. To do this, we have assigned a numerical value to each trading time of the day starting with the value 1 for 9:31 a.m. and ending with 390 for 4:00 p.m., when the market closes. Consequently, if it is 11:00 a.m. in the morning now, i.e. the value of 90, and if we want to estimate the remaining day’s trading volume, we will simply multiply our estimated equation by 300. To formalize the model in the context of a two-person, zero-sum game, assume \( m \) number of possible willing asks and \( n \) number of possible willing bids. Each cell in Table 6 is represented by \( \{a_{ij}\} \). The maximum expected numbers of shares that can be sold can be achieved by sellers’ placing mixed orders at different prices, but subject to satisfying the condition that \( \sum a_{ij}p_i \geq V \), where \( V \) is the value of the game and \( p \) is the probability with which an event \( \{a_{ij}\} \) may occur for any given \( j \).

If \( r_i = \frac{p_i}{V} \), then \( \sum r_i = \sum \frac{p_i}{V} = \frac{1}{V} \).

Maximizing the value of game is then equivalent to minimizing \( \frac{1}{V} = \sum r_i \) subject to the constraints \( V > 0, r_i \geq 0 \) for all \( i \) and \( \sum a_{ij}r_i \geq 1 \), since \( \sum a_{ij}p_i \geq V \iff \sum a_{ij}r_i \geq 1 \).

The seller’s problem is dual to the buyer’s problem. Table 6 shows the solutions for the best probabilistic trading strategies both for the seller and the buyer. The results also show that the seller who wishes to sell 5,000 shares will place an order to sell 771 shares at $10.20, 795 shares at $10.24 ... and 1,155 shares at $10.40. Similarly, the buyer who wishes to buy 5,000 shares will pay $10.20 for the first 1,125 shares, $10.24 for the next 627 shares, etc. until he finally buys 806 shares at $10.40. Total sales proceeds and the purchase costs are also shown.

### Table 5: Possible Transaction Volume Matrix When the Regression Estimation is:

\[
\begin{align*}
\hat{v}_i &= 87 + 497b_{-1} - 505a\hat{r}_{i,1} \\
(3.49) & (4.76) & (-4.84)
\end{align*}
\]

Notes: Figures in parenthesis are t-statistics. Samples based on 21 day minute tick prices. The estimating equation is:

\[
\hat{v}_i = 322 + 497b_{-1} - 505a\hat{r}_{i,1}; \ p = 0.27
\]

Assuming that it is 11:00 a.m., the trading volume estimates for the day’s remaining 300 minutes forward are shown in the following table.

<table>
<thead>
<tr>
<th>BID PRICE</th>
<th>10.20</th>
<th>10.24</th>
<th>10.28</th>
<th>10.32</th>
<th>10.36</th>
<th>10.40</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.20</td>
<td>1,091,791</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>10.24</td>
<td>485,888</td>
<td>1,082,042</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>10.28</td>
<td>-</td>
<td>476,139</td>
<td>1,072,292</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>10.32</td>
<td>-</td>
<td>-</td>
<td>466,389</td>
<td>1,062,543</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>10.36</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>456,640</td>
<td>1,052,793</td>
<td>-</td>
</tr>
<tr>
<td>10.40</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>446,890</td>
<td>1,043,043</td>
</tr>
</tbody>
</table>

### Table 6: Probabilistic Trading Strategies
F. SUMMARY AND CONCLUSIONS

Over the last decade or so, the securities industries have experienced heart felt needs to systematize various trading technologies. Because of improved computer technologies in their processing time and efficiency, many trading software systems have emerged. Automated trading tools appear to be almost a necessary evil.

Two main concerns are often raised by institutional traders. One is to be able to put the trades through without adversely affecting their intended trades, as traders place large orders. Sometimes, even a few penny differences in a trade can make quite a difference in the bottom line numbers. The second concern is about the market depth to ensure that there are enough shares available on the other side of the trade. We believe that we have started a new ground rule in bringing trading technologies to a science and to a reality. Intraday notional equilibrium stock prices or returns are forecasted with associated probabilities to indicate the statistical confidence level. The purpose is to examine possible intraday changes in the structure of demand functions. Reflecting possible changes in the notional equilibrium price, intraday bid and asked prices are generated via Monte Carlo simulations. Simulated results are used to predict intraday transactions about when and at what prices such trades may occur in a given day.

Intraday stock price forecasting can be quite useful in formulating various trading strategies. An issue that we have been concerned about is about how a trader can put a trade through once the number of shares to trade has been given to them. The question is how to place the order. We have attempted to offer answers to these questions by a simple application of the theory of two-person, zero sum game played by and between the seller and the buyer. To this end, we have first estimated a total potential number of shares that are available in the market. Based on the simulated willing bid and ask prices, then, we have formulated various limit order strategies as a part of mixed strategies in the theory of game.

ENDNOTES

2 However, this should not be taken as a criticism on the Stigler’s study, because when an order cannot be filled due to unavailability of shares, people generally move along their demand-to-buy or supply-to-sell schedules by going down one notch higher in the bid or one notch lower in the asking.
THE EFFECT OF PROFESSIONAL JUDGMENT ON FINANCIAL REPORTING COMPARABILITY

Randall Rentfro, Florida Atlantic University
Karen L. Hooks, Florida Atlantic University

ABSTRACT

The Financial Accounting Standards Board (FASB 2002) released a proposal outlining a principles-based approach to standard setting. The proposal expresses concern that comparability in financial reporting could be reduced because principles-based standards rely heavily on professional judgment. This study responds to the FASB’s concern by examining the question, “Is financial reporting comparability adversely affected when standards allow high levels of professional judgment to be exercised?”

We test the study’s hypothesis by examining financial reporting decisions of 145 financial statement preparers in U.S. corporations. Experiment participants make two financial reporting decisions, one guided by an accounting standard requiring a relatively high level of judgment and one by a standard requiring a relatively low level of judgment.

The results support the hypothesis that financial reporting is less comparable when accounting standards rely more heavily on the exercise of professional judgment. The participant's years of experience, management level, gender, and age do not affect this finding. However, the results provide some evidence that comparability may improve as financial statement preparers become more experienced and hold higher organizational rank.
REPORTING EMPLOYEE STOCK OPTION EXPENSES:
AN ONGOING DEBATE

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ABSTRACT

In 1993, the Financial Accounting Standards Board (FASB) issued an exposure draft regarding a proposal that would require firms to report the value of non-qualified stock option grants issued to employees as compensation expense. It was met with resounding opposition. The resulting statement, FAS 123, encourages firms to expense options however they are allowed to continue reporting under APB 25, recognizing expense only if the exercise price is less than the stock price at the date of grant. In most cases, options are granted with an exercise price above current stock price, so for most firms, no compensation expense due to granting of stock options is reported in the income statement. The bull market of the 90's gave way to the bear market of the 2000's. Today firms are voluntarily agreeing to expense options. Some firms have even stopped issuing options. In this paper I examine how employee stock options are reported on the income statement and statement of cash flows. I look at the current reporting requirements, discuss the arguments for and against expensing and describe the proposed expensing requirements currently under consideration by FASB.

INTRODUCTION

In 1993, the Financial Accounting Standards Board (FASB) issued an exposure draft regarding a proposed reporting change that would have required firms to report the value of stock option grants issued to employees as compensation expense in the year the grant was made. It was met with resounding opposition. Companies claimed that the dramatic hit to earnings would have detrimental effects on competitiveness and innovation. The final regulation, FAS 123, encourages firms to adopt this reporting approach, however it allows firms to continue reporting under Accounting Principles Board Statement No. 25 (APB 25) rules so long as footnotes contain a pro-forma presentation of earnings as if FAS 123 had been adopted. The APB 25 rules require compensation expense be reported only if the exercise price is less than the extant stock price at date of grant. In most cases, options are granted with an exercise price at or above the current stock price. The result is, for most firms, no compensation expense due to granting of stock options being reported on the income statement.

Firms experience no cash outlay upon granting of stock options. Upon exercise by the employee, the firm is allowed to deduct, for
tax purposes, compensation in the amount of the difference between the exercise price and the actual stock price, resulting in (often large) tax savings. The compensation is not, however, included in the income statement as an expense. It is reported as an adjustment to equity. As reported in USA Today (Krantz and Jones, 2002), David Zion, an analyst at Bear, Stearns & Co., estimated that S&P 500 firms would have reported an average of 9% less earnings in 2000 if options had been expensed on the income statement. For tech companies, this reduction would have been even greater. For some firms, profits would have turned to losses. Zion’s colleague Patricia McConnell is cited in the International Herald Tribune (Morgenson, 2002) as having examined 287 of the S&P 500 firms and found that option compensation expense has more than doubled from $21 billion dollars in 1999 to $47 billion dollars in 2001. When some firms expense stock options and others do not, comparisons of financial statements become more difficult.

In this paper I examine how employee stock options are reported on the income statement and statement of cash flows. I look at the current reporting requirements, discuss the arguments for and against option expensing and describe the proposed expensing requirements currently under consideration by FASB.

This study may be of interest to practitioners trying to make sense of these complex and rapidly-changing reporting requirements as well as investors who need to understand the impact on performance measures due to expensing or not expensing compensation due to options.

History
For many years firms have been incorporating employee stock options into the compensation plans of their executives. During the Sixties, qualified stock option plans were the primary form of long-term incentive offered. Use of qualified plans allowed for capital gain treatment by the employee upon the subsequent sale of stock obtained through the plan if held for three years. Since the top marginal personal tax rate on ordinary income was 70 percent compared to a capital gains rate of 25 percent, this was a particularly attractive form of compensation for the executive. As per Accounting Principles Board (APB) Opinion No. 25, the firm did not report compensation expense at date of grant or at exercise, nor did they receive a tax deduction, however, the savings to the employee far outweighed the cost to the firm of the lost tax deduction.

In the Seventies, we saw a move away from qualified options toward a diverse set of compensation components, notably non-qualified stock options (NQOs), to address the incentive issue. Issuance of NQOs requires no compensation to be reported by either the employee or the firm at the time of grant. When (and if) the employee exercises these options, he will report income and the firm will receive a compensation expense tax deduction in the amount of the spread between the exercise price and current market price of the stock (the intrinsic value). Hite and Long (1982) attribute this change in compensation plans to a reduction of personal tax rates to the point where the combined tax of the employee and the firm is reduced by moving to a plan which allows for a tax deduction to the firm.

An additional impetus for change in compensation plans was the growing concern for the amounts being paid to top executives. Throughout the Eighties and early Nineties an outcry for more correlation between pay and performance was being heard. In 1992, the Securities and Exchange Commission (SEC) began to require that a firm’s proxy statement contain details of compensation for the Chief Executive Officer (CEO) and four highest-paid executives. In 1993, the Internal Revenue passed code section 162(m) which denies a tax deduction for compensation in excess of $1 million which is not in the form of incentive compensation. Non-qualified employee stock options fall into the category of incentive compensation eligible for the deduction, heightening the popularity of this form of compensation in the Nineties.

In 1993, the FASB issued an exposure draft on share-based compensation. The draft called for recognizing the fair value of stock options granted to employees making option-
reporting consistent with reporting for other forms of compensation. This would also “level the playing field,” between fixed and variable awards. Options regarded as fixed that is, those options wherein all factors are known at the grant date, are not adjusted once reported. Alternatively, if the options have an unknown (adjustable) exercise price or other uncertain factor, these options might be considered variable options and increases in value would be reported periodically as compensation.

The Exposure draft met with immense opposition. Reasons include substantial hits to net income, the current availability of the information, inability to reliably value employee stock options, claims that “at the money” options have no value, and uncertainty as to whether options would ever be exercised. Other potential effects might include and fears that firms would discontinue stock option programs if they were forced to include the value in net income, costs associated with closeness to debt covenant restrictions resulting from decreases in reported net income due to increased compensation, or costs of increased political or shareholder pressure on managers due to the added exposure of compensation magnitudes.

Even though the FASB discounted most of these arguments, the board agreed to allow firms the choice of continued application of rules under APB 25 while encouraging adoption of FAS 123. In 1995, the Financial Accounting Standards Board (FASB) issued FAS 123 “Accounting for Stock-Based Compensation.” Although not as tough as the exposure draft, the final ruling requires a pro-forma presentation of earnings as if the value of the current period’s option grants had been reported as an expense.

The bull market of the 90’s gave way to the bear market of the 2000’s. With stock prices plummeting, stock options are no longer the “millionaire-makers” they once were. As fewer options are being exercised, firms are not getting the huge tax benefits (based on market price – exercise price) they once were getting. And recent scandals have shown how corrupt managers have cashed in and left investors with nothing. In 2001, only 2 firms in the Standard and Poor’s 500 reported stock option compensation expense as described in FAS 123. Today the press is full of firms voluntarily agreeing to expense options. Some, like Microsoft, have even stopped issuing options in favor of actual shares of stock. The proponents for mandatory expensing are again being heard, but this time, the opponents are fewer and not as vocal.

Renewed arguments
Currently, when one reads an income statement, it is hard to tell what the compensation cost of the options was, and comparing the result for different firms becomes more difficult. Under APB 25, there would be no compensation expense in the income statement but the notes would indicate a “pro-forma” net income (as if options had been expensed). The prospective method would have current option costs in the income statement, ignoring earlier awards. The pro-forma disclosure would reveal the full effect. The modified prospective approach places the costs for current and past awards into the current income statement. Finally restatement is the best option, since previous years are restated and comparison is enhanced.

Even if you know what method was used to disclose the option cost, valuation methods differ. FAS 123 states

For stock options, fair value is determined using an option-pricing model that takes into account the stock price at the grant date, the exercise price, the expected life of the option, the volatility of the underlying stock and the expected dividends on it, and the risk-free rate of interest over the expected life of the option. Nonpublic entities are permitted to exclude the volatility factor in estimating the value of their stock options, which results in measurement at a minimum value. The fair value of an option estimated at the grant date is not subsequently adjusted for changes in the price of the underlying stock or its volatility, the life of the option, dividends on the stock, or the risk-free interest rate.

For FASB ‘fair value reporting,’ options are valued using the Black-Scholes option pricing
model, a binomial model or other acceptable model with modifications allowed for early exercise and other factors not considered in the original models. Left to the firms’ discretion is the determination of the parameters to be used to calculate these values (risk-free interest rate, expected volatility, expected duration and dividend yield). Akresh and Fuerisch (1994) show how small decreases in the estimated life of the option or estimated volatility can result in large reductions in the computed value. Since these estimated values are not subsequently adjusted, initial valuation is especially important.

The Black-Scholes and other binomial pricing models are typically used to compute the initial valuation. These models, however, were developed to assess the value of traded options, not employee stock options. ESOs are often subject to vesting requirements; they may be forfeited completely if the employee terminates employment. ESOs are also not transferable and are often exercised long before the expiration date. These differences prompted Marquardt (1997) to examine the accuracy of these models for use in valuing ESOs. Using the option’s actual market price at exercise, Marquardt compares this to the estimated valuation obtained from the models. Her results indicate that using methods suggested by FAS 123 overstates ESO fair values by 15-20%. This result is consistent with a study of employee stock option exercises conducted by Huddart and Lang (1996) which found that employees typically exercise options shortly after vesting (long before expiration) even though these options would have been worth far more had they been held until expiration. Cuny and Jorion (1995) also look at the endogenous departure factor on ESOs. They find that executive departures are negatively correlated with stock price and suggest that Black-Scholes values should be adjusted for the probability of departure when assessing values.

Opponents to expensing argue that current disclosures are sufficient. The FASB has always held that disclosure is not equivalent to recognition. Disclosure alone requires users of the financial information to become experts in finding and analyzing the data. Those that reject expensing on the grounds that valuation is imprecise forget that many reported amounts are based on estimates. Warranties, doubtful accounts, depreciation, and pension costs are not left out of the income statement because of uncertainties inherent in each of them. Options are instruments of value given to employees in return for service with reasonably estimable values. There is no reason to allow inconsistent treatment.

Current Reporting
Exhibit 1 illustrates the reporting requirements under both APB 25 and FAS 123 for fixed stock options where the exercise price is equal to the market price at the time the options are granted. This is the most common scenario. Issues with exercise price above market price tend to be qualified incentive plans wherein no compensation cost is reported. The employee receives capital gain treatment and does not report income. The firm does not report compensation expense or receive tax benefits at time of exercise. Exhibit 2 illustrates the entries for exercise price less than market at time of grant under APB 25.

Assumptions in Exhibit 1 include 100,000 options being granted which vest in 3 years, no expected forfeitures and a market price equal to the exercise price of $50. For computing the fair value at grant date, I assume a risk-free rate of 7.5 %, expected volatility of 30%, expected dividend yield of 2.5% and a 6 year life. The firm is assumed to have sufficient net income to use all tax benefits and a tax rate of 30%. As indicated in FAS 123, Appendix C, paragraph 290, this set of assumptions will result in a fair value of $17.15 per option under the Black-Scholes option pricing model modified for dividends. (The value using a binomial model is slightly higher at $17.26). I also assume all options are exercised at the end of three years when the market price is $70.

A comparison of compensation reported under APB 25 and FAS 123 reveals that for each of the three years net income would be higher under APB 25 by $400,167 (compensation cost $571,667 less tax benefit of $171,500 reported under FAS 123; nothing reported under APB 25). The cost of the options under APB 25 would be disclosed in a note.
EXHIBIT 1: REPORTING FIXED STOCK OPTIONS

Exercise Price = Market Price

<table>
<thead>
<tr>
<th>Options granted</th>
<th>100,000</th>
<th>Life of options</th>
<th>6 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expected forfeitures</td>
<td>0</td>
<td>Risk-free rate</td>
<td>7.5%</td>
</tr>
<tr>
<td>Market price at time of grant</td>
<td>$50</td>
<td>Expected volatility</td>
<td>30%</td>
</tr>
<tr>
<td>Exercise price</td>
<td>$50</td>
<td>Expected dividend yield</td>
<td>2.5%</td>
</tr>
<tr>
<td>Vesting period</td>
<td>3 years</td>
<td>Tax rate</td>
<td>30%</td>
</tr>
</tbody>
</table>

Fair value of options using a modified Black-Scholes option-pricing model $17.15

APB # 25  
FAS # 123

Yr. 1  No entry

Yr. 2  No entry

Yr. 3  No entry

If market price is $70 at exercise:

<table>
<thead>
<tr>
<th>Cash</th>
<th>$5,000,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Common Stock</td>
<td>$2,000,000</td>
</tr>
<tr>
<td>PIC – common</td>
<td>3,000,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cash</th>
<th>$5,000,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>PIC – stock options</td>
<td>1,715,000</td>
</tr>
<tr>
<td>Common Stock (par $20)</td>
<td>$2,000,000</td>
</tr>
<tr>
<td>PIC – Common Stock</td>
<td>$4,715,000</td>
</tr>
</tbody>
</table>

Deferred Tax Expense | $514,500 |
Deferred Tax Asset | $514,500 |
Taxes Payable | $600,000 |
PIC – common | $600,000 |
showing pro-forma net income, but neither the compensation nor the tax effect would appear on the income statement.

If forfeitures are expected, compensation cost may be adjusted annually to reflect current estimates of number of options expected to vest. If options are not exercised, the Paid-in Capital (PIC) from options would be closed to another PIC account but previously recognized compensation cost would not be reversed.

Exhibit 2 illustrates the required entries under APB 25 when the exercise is less than the market price at the time options are granted. The intrinsic value is reported as compensation expense over the vesting period. Compensation expense is not adjusted for subsequent changes in market prices of the underlying stock.

Official pronouncements did not clearly specify where in the Statement of Cash Flows a firm must report the tax benefits received due to the exercise of non-qualified employee stock options. Both APB 25 and FAS 123 (paragraph 228) state that “the additional tax benefits are attributable to an equity transaction” implying that the proper placement for the tax benefits is Cash Flows from Financing. In practice, however, firms place these tax benefits in Cash Flows from Operations, Cash Flows from Financing or even in Non-cash Transactions. Some clearly label the origin of the cash flow as tax benefits from exercise of employee stock options, others simply include the amount with “other” cash flow effects.

Reporting tax benefits as cash flows from operations may be justified since taxes may fall into this category and this is simply a reduction in taxes. Using the indirect method of adjusting accrual-basis income to a cash-basis, a manager may justify a decrease in deferred tax assets or taxes payable to be an adjustment (increase) in operating cash flows. The implication of reporting a transaction as operating is that it may be perceived to be continuing, affecting future cash flows by which market price is believed to be derived.

To report as cash flows from financing is perhaps more accurate. Sales of stock are traditionally recorded in this category. It is also less likely to be perceived as a recurring transaction when placed thusly. FASB Statement of Standards 123 (Accounting for Stock-Based Compensation) indicates that the tax benefits from exercise of employee stock options are attributable to an equity transaction, lending authoritative support to this choice. Paragraph 228 states:

The amount of stock-based compensation that is deducted on the tax return may exceed the compensation cost recognized for financial reporting. This statement requires that the tax benefits of deductions in excess of compensation cost be recognized as additional paid-in capital when they are initially recognized. The Board agrees with the conclusion of the Accounting Principles Board in Opinion 25 that the additional tax benefits are attributable to an equity transaction.

In addition, FAS 95 (Statement of Cash Flows, paragraph 24) indicates that when a transaction has characteristics of more than one classification, it should be placed in the section that relates to its principal source. Since the source of the tax savings is the exercise of stock options, and the tax benefit is clearly an increase in Additional Paid-in Capital, Cash Flows from Financing seems to be the obvious category in which to place this transaction.

Finally, some firms report the tax benefits as non-cash transactions. This classification is appropriate for purchases of assets with long-term liabilities or equity or payment of liabilities with equity. At exercise, taxes payable are reduced and paid-in capital is increased due to the compensation expense allowed for tax purposes. Since no cash changes hands, non-cash transactions seems to be a logical placement on the Statement of Cash Flows.
**EXHIBIT 2: REPORTING FIXED STOCK OPTIONS**

**Exercise price < Market price**

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Options granted</td>
<td>100,000</td>
</tr>
<tr>
<td>Market value at exercise</td>
<td>$70</td>
</tr>
<tr>
<td>Expected forfeitures</td>
<td>0</td>
</tr>
<tr>
<td>Par value</td>
<td>$20</td>
</tr>
<tr>
<td>Market price at time of grant</td>
<td>$60</td>
</tr>
<tr>
<td>Exercise price</td>
<td>$50</td>
</tr>
<tr>
<td>Vesting period</td>
<td>3 years</td>
</tr>
<tr>
<td>Tax rate</td>
<td>30%</td>
</tr>
</tbody>
</table>

**APB # 25**

**Grant date**

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deferred Compensation on Options</td>
<td>$1,000,000</td>
</tr>
<tr>
<td>Common Stock Options Outstanding</td>
<td>$1,000,000</td>
</tr>
<tr>
<td>Calculation:</td>
<td></td>
</tr>
<tr>
<td>$(60-50) x 100,000 = $1,000,000</td>
<td></td>
</tr>
</tbody>
</table>

**Yr. 1 Compensation Expense**

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deferred Compensation on Options</td>
<td>$333,334</td>
</tr>
<tr>
<td>Income Tax Expense</td>
<td>$333,334</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deferred Tax Asset</td>
<td>$100,000</td>
</tr>
<tr>
<td>Income Tax Expense</td>
<td>$100,000</td>
</tr>
</tbody>
</table>

Note: the deduction is required for calculating book income but is not allowable for tax purposes until options are exercised.

**Yr. 2 Same as year one**

**Yr. 3 Same as year one and two**

**Exercise date:**

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Income Tax Expense</td>
<td>$300,000</td>
</tr>
<tr>
<td>Deferred Tax Asset</td>
<td>$300,000</td>
</tr>
<tr>
<td>Taxes Payable</td>
<td>$900,000</td>
</tr>
<tr>
<td>PIC – Common Stock</td>
<td>$900,000</td>
</tr>
<tr>
<td>Calculation:</td>
<td></td>
</tr>
<tr>
<td>$(70-50) less $10 reported = $30/share x 100,000 = $3,000,000 x .30)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Common Stock Options Outstanding</td>
<td>$1,000,000</td>
</tr>
<tr>
<td>Cash ($50 x 100,000)</td>
<td>$5,000,000</td>
</tr>
<tr>
<td>Common Stock (par)</td>
<td>$2,000,000</td>
</tr>
<tr>
<td>PIC – Common Stock</td>
<td>$4,000,000</td>
</tr>
</tbody>
</table>

**Net result for income statement:**

- $1,000,000 compensation
- 300,000 tax benefit
- $700,000 decrease in Retained Earnings
The Emerging Issues Task Force of the FASB addressed the issue of cash flow reporting for tax benefits due to the exercise of employee stock options in ETIF 00-15. Effective July 20, 2000 firms are required to report this tax benefit in the cash flows from operating activities (as an add-back to net income when using the indirect method). Gooch and Lipe (2003) report that many firms are still not complying with this directive.

Recent Developments and Proposed Changes (as gleaned from the FASB website, AccountingWeb, and current media reports)

- **July 2002** – Several major US firms have announced that they plan to begin expensing stock options. The IASB plans to issue a proposal requiring fair-value measurement with expense recognition over the vesting period of options.
- **August 2002** – The FASB reviews transition rules for recognizing stock option expenses. FAS 123 prohibits expensing any portion of awards granted in prior years except for grants which have been modified or settled. The FASB decides to allow several methods of expensing options a) prospectively (FAS 123), b) retroactively or c) prospective plus unvested portion of previous awards. If method other than FAS 123 is used, firms must show pro forma net income and e.p.s.
- **October 2002** – The FASB issues an exposure draft “Accounting for Stock-Based Compensation – Transition and Disclosure” calling for a) all firms adopting FAS 123 to report the full effect of options immediately and b) better and more frequent disclosure on stock options (interim reporting).
- **December 2002** – FASB Statement No. 148 “Accounting for Stock-Based Compensation – Transition and Disclosure – an amendment of FASB Statement No. 123” is issued. The statement provides alternative methods of reporting during transition, disallows prospective method after 12/15/03. Additional disclosure is also required in “Summary of Significant Accounting Policies” and a specific tabular format is proscribed for pro-forma disclosure.
- **March 2003** – Fifteen US senators urge FASB to reconsider expensing. They claim that FASB has simply assumed that expensing is correct format and have prematurely moved ahead to the next step of proscribing format. FASB adds expensing project to their agenda. In light of Enron and other scandals in which investors were harmed by insufficient information, the board feels that expensing should be mandatory, the approach should converge with global accounting standards and measurement should be improved.
- **April 2003** – The FASB votes unanimously to require expensing.
  - Apple Computers announces that they will begin expensing option costs.
- **May 2003** – The FASB agrees to allow firms to reverse expenses previously recognized in the case of forfeitures.
- **June 2003** – House of Representatives introduces “Broad-Based Stock Option Plan Transparency Act” requiring enhanced disclosures and calls for a three year moratorium on new expensing rules. It has 44 sponsors.
- **July 2003** – The FASB continues to work on option valuation issues with advisory board. This remains the most controversial issue for recognition.
  - Microsoft announces that it will stop granting employee stock options.
- **August 2003** – The FASB defines modifications in stock option awards as any change in terms or conditions occurring as a result of the employment relationship. Any incremental value should be regarded as compensation.
- **September 2003** – The FASB decides that valuation should be based on grant-date fair-value of the option. Option pricing models should take into consideration, at minimum, the six factors previously employed. Contractual life and the effect of early
exercise should be factored into the formula. Changes in the expected forfeitures (prior to vesting) should be recognized immediately. Issuance of any rules is pushed back nine months.

- 350 companies have indicated that they plan to expense options.

October 2003 – The FASB considers attribution rules and decides to retain SFAS 123 rule that ‘recognized compensation cost related to vested, unexercised awards that expire not be reversed.’ The FASB meets with IASB and AcSB to discuss convergence on share-based compensation income tax effects and value measurement for options with reload features. They agree that tax effects should be allocated between the income statement and equity. Awards granted under reload features will be treated as new awards.

- October 29, 2003 – The FASB decides that disclosures should communicate:
  - The fair value of the award
  - The effect of expensing on the income statement
  - Cash flows related to options
  - Effect of options on dilution

The effective date for the proposed Statement will be for grants, modifications or settlements after the beginning of the first fiscal year after 12/15/04. Transition reporting will apply a modified prospective method (expensing fair value for all grants awarded, modified or settled during the period).


REFERENCES


THE IMPORTANCE OF SITUATION-SPECIFIC ASSESSMENT

Jean B. Price, Marshall University

Throughout the country, educators in many different academic areas have worked hard to develop curricular innovations and pedagogical improvements. Educational assessment has become an important issue in many fields. Although the example of situation-specific assessment described herein was developed within an accounting curriculum, characteristics of this approach are equally applicable to other fields as well.

Implementation of major changes in accounting education became widespread during the early 1990’s. Soon thereafter, educators identified the need to assess the resulting impacts on student learning, enhancement of various student skills and graduates' preparedness for their place in the accounting profession.

Within the field of accounting education, the call for increased attention to the need for assessment of educational outcomes was quickly heeded. National organizations recognized this need and responded with the creation of various committees and task forces charged with guiding and encouraging the assessment activities of accounting educators. Books have been written. Conferences have been held. Universities have departments devoted entirely to the endeavor of assessing educational outcomes.

Educational assessment continues to be an important process. Accounting educators have responded to the need for new educational changes in their field, but for many, assessing the impacts of these changes looms as a daunting task. Indeed, some assessment procedures have become quite complex, supporting the development of the field of assessment as a separate educational specialization.

What must be kept in mind, however, is that not all assessment procedures need to be complex to be effective. In fact, to best meet the needs faced in certain assessment situations, simplicity may be the key. One useful approach is situation-specific assessment. By its very nature, the tools used and the results achieved are familiar to academics teaching in the field—no educational background required!!
KEY FEDERAL INCOME TAX STRATEGIES FOR GROUP CAPTIVE INSURERS TAXED AS STOCK PROPERTY AND CASUALTY COMPANIES

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Steven T. Jones; School of Business; Samford University; 800 Lakeshore Drive; Birmingham, AL 35229; 205-726-4026; stjones@samford.edu

ABSTRACT

Given the decisions of many insurers to cease coverage of certain risks, and raise premiums for other risks, many risk bearing entities have opted to form group captive insurers (GCIs) as a means of pooling their risks. GCIs, being member-owned and therefore having no outside investors to satisfy, generally attempt to operate on an economic break-even basis. Because of this economic break-even orientation, the entities forming a GCI may assume that the GCI will incur no federal income tax liability. Unfortunately, the need to charge premiums sufficient to cover unexpectedly high losses generally creates a positive pretax income. Further, various features of the tax code exacerbate this situation, creating a positive taxable income even if the GCI’s pretax profit is zero. Many GCIs do not recognize the existence of these problems, while others may be inclined to assume that the problems are insurmountable. In fact, it often is possible to mitigate this problem substantially. This paper discusses several strategies for doing so.

OVERVIEW

Over the past three to five years the property, casualty, and liability (“P&C”) insurance markets have hardened significantly. Commercial insurers have reduced or even ceased the underwriting of some risks, and have dramatically increased premiums for other risks. The healthcare industry has been particularly hard hit, with many healthcare providers unable to acquire statutorily required professional liability coverages through the commercial insurance markets. In hard insurance markets, risk bearing entities frequently turn to member-owned P&C insurance programs, known as group captive insurers (“GCIs”), as an alternative to the commercial for-profit insurance market.

For a premium, a GCI assumes the P&C risks of its member-owners. Like a commercial for-profit insurance company, a GCI seeks to manage its pool of risks in the most cost efficient manner. Unlike a for-profit insurance company, however, a GCI generally has no outside investors for whom returns must be generated. Rather, GCIs generally exist solely for the benefit of their members. Consequently, GCIs frequently seek to operate on a near economic break-even basis, and ultimately return any excess premiums to the member-owners.

We believe that, because of this break-even operational focus, many start-up GCIs do not give adequate attention to the federal income tax issues inherent in the arrangement. That is, the management and members may assume that, due to the GCI’s intent to operate on a near economic break-even basis, federal income taxes will not be an important issue. There are, however, two problems with this assumption.

First, because a GCI cannot predict with certainty its future losses, solvency concerns will generally dictate that the GCI charge premiums in excess of those
actuarially projected to produce a break-even result. Hence, assuming that the GCI’s actual losses are as predicted, or less, the GCI is likely to generate a profit.

Second, under the applicable authorities, a GCI with break-even results generally incurs a significant federal income tax liability. Finally, we believe that, once the GCI’s management recognizes the significance of the tax issues involved, the complexity of the applicable authorities often prevents management from recognizing certain tax reduction strategies.

The remainder of this paper is organized as follows. First, we describe the basic scheme of federal income taxation generally applicable to GCIs, including the relevant authorities. Second, we illustrate the often unexpected results of the application of these authorities to a near break-even situation. Third, we outline several innovative and often overlooked strategies for minimizing a GCI’s federal income taxes.

BASIC SCHEME OF FEDERAL INCOME TAXATION GENERALLY APPLICABLE TO GCIs

Congress considers the provision of insurance to private entities to be a distinctly commercial activity, ordinarily carried on for profit. Hence, GCI’s providing insurance to private entities are generally taxed under the same authorities applicable to commercial for-profit P&C insurers. Under section 832, the starting point in the calculation of a P&C insurer’s taxable income is the insurer’s book income as reported in the annual statement form approved by the National Association of Insurance Commissioners (“NAIC”). Section 832 then prescribes several adjustments to the insurer’s annual statement book income (henceforth, “book income”). (All section references are to the Internal Revenue Code of 1986, as amended, unless otherwise indicated.)

Most significantly, section 832 generally requires P&C insurers (i) to reduce or “haircut” unearned premium reserves by twenty percent, and (ii) to discount loss and loss adjustment expense reserves (collectively, “loss reserves”) using Internal Revenue Service (“IRS”) prescribed methodologies and discount factors. Also significant, section 832 allows P&C insurers to deduct “dividends and similar distributions paid or declared to policyholders in their capacity as such.”

ILLUSTRATION OF THE OFTEN UNEXPECTED RESULTS OF SECTION 832’S APPLICATION

A P&C insurer bases its premiums principally on projections of the ultimate values and the timing of required loss and loss adjustment expense (“LAE”) payments. Other factors affecting premium rates include the insurer’s assumptions regarding future realized investment returns and operating expenses. Additionally, for-profit insurers will include a profit load in their required premium.

As earlier noted, because GCIs generally exist to provide insurance to their member-owners at cost, a GCI will generally not include a significant profit load in determining its required premiums. However, given the uncertain nature of the projections and assumptions on which premiums are based, solvency concerns dictate that a GCI set its premiums at a level in excess of the actuarially indicated break-even premium. Hence, a GCI’s annual statement will generally show an income if actual experience closely tracks original projections. For longer-tail risks, such as professional liability and workers’ compensation risks, ultimate or actual losses may not be known for several years following expiration of the policy term. Hence, the loss reserves established in the year of a policy’s issuance and on the books in the immediate succeeding years may not vary significantly from the loss projections on which the policy premium was based.

The following example illustrates the often unexpected results of section 832’s application to a GCI in a near break-even situation.

Company A was established in the current year to provide medical professional liability coverage to its member-owners. On July 1, Company A issues annual claims made policies to its ten initial members, charging an aggregate premium of $10M. The actuarially indicated break-even premium is $9.5M.

As shown in Table 1 below, Company A’s NAIC annual statement for the current year presents the a positive pre-tax income. Further, the required tax adjustments create a level of taxable income that significantly exceeds even this pre-tax profit number. As a result, Company A incurs a significant, and likely unexpected, federal income tax liability in its first year of operations. However, with proper planning, Company A could have significantly lessened its federal income tax.
# Table 1
Calculations for Company A

## Balance Sheet
December 31, Current Year

<table>
<thead>
<tr>
<th>Assets</th>
<th>Liabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash and Investment Assets</td>
<td>Unearned Premium $5,000,000</td>
</tr>
<tr>
<td></td>
<td>Loss and LAE Reserves 3,800,000</td>
</tr>
<tr>
<td></td>
<td>Total Liabilities 8,800,000</td>
</tr>
<tr>
<td></td>
<td>Contributed Surplus 1,000,000</td>
</tr>
<tr>
<td></td>
<td>Earned Surplus 500,000</td>
</tr>
<tr>
<td></td>
<td>Total Surplus 1,500,000</td>
</tr>
<tr>
<td>Total Assets $10,300,000</td>
<td>Total Liabilities and Surplus $10,300,000</td>
</tr>
</tbody>
</table>

## Income Statement
Current Year

- Written Premium $10,000,000
- Unearned Premium 5,000,000
- Earned Premium 5,000,000
- Losses and LAE Paid and Incurred 4,300,000
- Operating Expenses 500,000
- Total Expenses 4,800,000
- Underwriting Income 200,000
- Investment Income 300,000
- Income before Federal Income Taxes $500,000

## Federal Taxable Income Calculation

- Annual Statement Income before Federal Income Taxes $500,000
- Add 20% of Change in Unearned Premium Liability 1,000,000
- Add Effect of Tax Discounting of Loss and LAE Reserves 450,000
- Federal Taxable Income $1,950,000
- Tax on Taxable Income at 34% $663,000
STRATEGIES FOR MINIMIZING A GCI’s FEDERAL INCOME TAXES

Minimizing the Collection of Excess Premiums Through Increased Capital Requirements

Note that Company A’s $500,000 book income arises because Company A, for solvency reasons, set its premiums higher than the actuarially indicated break-even premium. Alternatively, a GCI may address the solvency issue by increasing members’ required capital contributions. That is, the financial cushion needed to absorb worse than projected losses can be provided by members’ capital contributions rather than by excess premium payments.

Assume, for illustrative purposes, that Company A had increased its members’ required capital contributions from $1M to $1.5M and had reduced its premium charges from $10M to the actuarially indicated break-even premium of $9.5M. As a result of this strategy, Company A’s book income would decrease, in both the current year and immediately succeeding year, by $250,000.

Additionally, Company A’s unearned premium liability at the end of the current year would decrease by $250,000, resulting in a $50,000 reduction in the amount of the required twenty percent unearned premium “haircut” adjustment. Hence, Company A’s current year taxable income would decrease $300,000 and its succeeding year taxable income would decrease $250,000.

Because of the uncertainty involved in the prediction of future events, a GCI’s capital and premium requirements can only be estimated within ranges. Thus, management has some flexibility in determining a GCI’s required capital and premium levels. However, in all cases, the levels of required capital contributions and premiums must be reasonable and appropriate based on “arms length” valuation concepts, or the IRS may seek to recharacterize amounts between the two categories.

Further, taxable member-insureds will likely be biased toward characterizing payments as premium – to best perfect their deduction for the payments. On this point, the authors note that a position exists that all payments required to be made for the issuance of an insurance policy, including required capital contributions, may be characterized as premium. However, taxpayers are more likely to prevail on an issue when their characterization of a transaction follows its form.

In summary, a GCI and its members have some flexibility as to the characterization of required payments as either capital contributions or premium. GCIs whose members are tax-exempt entities (e.g., tax exempt hospitals) and thus not biased toward characterizing payments as deductible premiums may find this strategy an effective means of minimizing the collection of excess premiums.

Strategies for Returning Excess Premiums to the GCI’s Member-Owners

Based on its goal of providing coverage to its members at cost, Company A can be expected to return any excess premiums, ultimately determined to exist on the current year policies, to its member owners. Company A’s method of returning any excess premiums to its member-owners will have a significant effect on its federal income tax liability.

One strategy is to return excess premiums as policyholder dividends. As noted above, section 832 allows P&C insurers to deduct “dividends and similar distributions paid or declared to policyholders in their capacity as such.” By authorizing the deduction of dividends “paid or declared” (emphasis added), section 832 clearly contemplates the deductibility of accrued but unpaid policyholder dividends.

However, the relevant statutory and regulatory authorities leave open two significant issues with respect to the timing of a P&C insurer’s deduction for accrued but unpaid policyholder dividends: (1) the effect of contingencies with respect to (a) the existence of the dividend liability and/or (b) the absolute amount of the dividend liability (i.e., the applicability of the “all events” test or other relevant authorities) and (2) the required timing of payment of accrued and deducted policyholder dividends (i.e., the applicability of the “economic performance” test or other relevant authorities). The significance of these issues can be illustrated through a continuation of the prior example.

The ultimate adequacy, or inadequacy, of the premiums charged by Company A for the policies issued in the current year will only be determinable once Company A’s liability exposures under the current year policies are fully settled. If the policy risks are longer-tail risks, such as professional liability risks, Company A’s ultimate losses under its current
year policies may not be known for several (as many as 8 to 12) years.

Thus, Company A’s current year book income is merely a tentative measure of the premiums that Company A collected in excess of those necessary to service the risks under the policies. Adverse loss experience in subsequent years may substantially reduce or eliminate the current year measure of excess premium. Under these circumstances, the declaration in the current year of a policyholder dividend for a significant fixed or absolute amount, payable within a relatively short period after the close of the current year, would be financially imprudent, and likely unacceptable to Company A’s regulators.

As an alternative to a dividend for a significant fixed amount, Company A could consider declaring in the current year a policyholder dividend for a fixed formula based amount, payable within a specified and reasonable period of the end of the current year. For example, Company A could declare, before the end of the current year, a dividend for the amount of “excess premiums” (as defined by a fixed formula) existing with respect to the current year policies and to be paid to the current year policyholders as follows:

- at the end of the eighth year subsequent to the close of the current year, 1/4 of the excess premiums as then determined under the fixed formula would be paid;
- at the end of the ninth year subsequent to the close of the current year, 1/3 of the excess premiums as then determined under the fixed formula would be paid;
- at the end of the tenth year subsequent to the close of the current year, 1/2 of the excess premiums as then determined under the fixed formula would be paid; and
- at the end of the eleventh year subsequent to the close of the current year, the remaining excess premiums as then determined under the fixed formula would be paid.

The intended effect of the above declaration would be to create an absolute liability as of the end of the current year to return any excess premiums arising with respect to the current year policies to the current year policyholders. The payment schedule is intended to correlate with the tail of the risks. That is, Company A would have set the dividend payment dates based on the expected maturation of the risks under the policies.

During the period running from the declaration date through the payment dates, the amount of the dividend liability would fluctuate with the company’s experience on the policies. Adverse experience under the current year policies would reduce, and could eliminate, the liability. Conversely, favorable experience would increase the amount of the liability.

Because payment of the liability is deferred until future dates by which actual losses under the policies should be known and because, prior to payment, the liability is reduced (as a result of the fixed formula) by the effect of adverse experience, Company A’s management and regulators should not view the declaration as financially imprudent.

The declaration of a policyholder dividend of an absolute amount and the satisfaction of that dividend liability, through either a distribution of cash or other property (such as a note of the entity), within a relatively brief period (e.g., within one year) after the close of the tax year represents a conservative approach toward establishing the validity of the federal income tax deduction for the dividend in the year of declaration. However, for the reasons explained above, a GCI will not be able to control its tax liability in its early years through the declaration of such dividends.

Alternatively, the practical advantages of the formula based policyholder dividend declaration described in preceding paragraphs are significant. Such a declaration would allow the GCI to zero out or reduce significantly the taxable income arising from Current Year policies in the Current Year and subsequent years – avoiding the permanent loss to the GCI’s members of the federal income taxes otherwise payable in the Current Year and subsequent years until management was otherwise comfortable declaring a dividend of an absolute amount.

Based on the analysis of various authorities (e.g., Bituminous Casualty Corporation v. Commissioner of Internal Revenue), a reasonable basis exists for the deductibility, upon declaration, of reasonable estimates of amounts accrued under formula based policyholder dividend declarations structured as described in the preceding paragraphs. The declaration should establish a fixed date or dates on which the dividend or specified portions thereof will be paid and the future satisfaction of the dividend liability.
on this date (or dates) should not be contingent upon future regulatory approval and should not be subject management's discretion.

The formula for determining the amount of excess premium to be returned as dividends should take into account the actual loss experience on the Current Year business through the date of each calculation and/or payment. Hence, should the GCI experience adverse developments on the Current Year business prior to the specified dividend payment date, under the dividend formula, the amount of the GCI's Current Year dividend liability would be automatically reduced by such developments. Dividends payable under such a declaration should be allocable to the entity's policyholders in any reasonable fashion permitted by the entity's charter and any applicable state regulatory authorities.

Another approach would be to return excess premiums as retrospective rate credits. A GCI's policies may provide for the return of excess premiums to its members under a formula based approach similar to that described above with respect to policyholder dividends. Because the federal income tax authorities regarding (i) the timing of a taxpayer's deduction for additions to a rate credit reserve, and (ii) the permissibility of deducting accruals of estimates of contingent amounts under a rate credit plan, are more direct, GCIs desiring to return excess premiums to policyholders under a plan similar to that described in the preceding section (i.e., formula based policyholder dividends) can improve their positions with respect to the federal income tax deductibility of the amounts accrued by seeking to qualify such accruals under the authorities applicable to both policyholder dividends and retrospective rate credits.

Avoiding the Twenty Percent Unearned Premium “Haircut” Adjustment

Most commercial market insurance policies covering risks typically underwritten by GCI's (i.e., business related risks) are for an annual term. Further, commercial for-profit insurers seek to spread their policy issuance dates evenly throughout the year – to avoid the market risks and administrative burdens associated with having all policies incept on the same date. As a consequence, many GCI's will originally issue annual policies with terms corresponding to the terms of the insureds' prior commercial market policies.

It is therefore typical for GCIs to have significant unearned premium balances at the end of the calendar year – the required tax year for most GCIs – and therefore a large addition to taxable income arising from the unearned premium haircut adjustment. By simply adjusting its policy terms to coincide with the calendar year (such as by issuing an initial stub period policy ending December 31), a GCI can generally avoid this significant tax cost. Further, the reasons behind commercial insurers' reluctance to have all policies on a calendar year basis are generally not relevant to GCIs. GCIs generally have a "captive" membership and issue a limited number of policies.

Other Strategies

Other strategies for controlling a GCI's federal income taxes exist, including strategies for minimizing the effect of the required discounting of loss reserves. These other strategies are technically complex and of limited application, and are therefore beyond the scope of this paper.

CONCLUSION

In conclusion, with proper planning a GCI can avoid significant federal income taxes that otherwise may come as an unwelcome surprise to the GCI's management and members. Illustrating this point, Company A's implementation of the strategies described above would have resulted in the following financial results, as shown in Table 2. Note the significant tax savings to Company A, and thus to its member insureds.
### Table 2
Revised Calculations for Company A

#### Balance Sheet
December 31, Current Year

<table>
<thead>
<tr>
<th>Assets</th>
<th>Liabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash and Investment Assets</td>
<td>Unearned Premium</td>
</tr>
<tr>
<td>$10,300,000</td>
<td>$ 5,000,000</td>
</tr>
<tr>
<td></td>
<td>Loss and LAE Reserves</td>
</tr>
<tr>
<td></td>
<td>3,800,000</td>
</tr>
<tr>
<td></td>
<td>Accrued Policyholder Div./Rate Credit Reserve</td>
</tr>
<tr>
<td></td>
<td>Total Liabilities</td>
</tr>
<tr>
<td></td>
<td>9,300,000</td>
</tr>
<tr>
<td></td>
<td>Contributed Surplus</td>
</tr>
<tr>
<td></td>
<td>1,000,000</td>
</tr>
<tr>
<td></td>
<td>Earned Surplus</td>
</tr>
<tr>
<td></td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Total Surplus</td>
</tr>
<tr>
<td></td>
<td>1,000,000</td>
</tr>
<tr>
<td>Total Assets</td>
<td>$10,300,000</td>
</tr>
<tr>
<td>Total Liabilities and Surplus</td>
<td>$10,300,000</td>
</tr>
</tbody>
</table>

#### Income Statement
Current Year

- Written Premium: $5,000,000
- Unearned Premium: 0
- Earned Premium: $5,000,000
- Losses and LAE Paid and Incurred: 4,300,000
- Operating Expenses: 500,000
- Total Expenses: 4,800,000
- Underwriting Income: 200,000
- Investment Income: 300,000
- Income before Policyholder Div. / Rate Credit Accrual: 500,000
- Accrued Policyholder Dividend / Rate Credit: 500,000
- Income before Federal Income Taxes: 0

#### Federal Taxable Income Calculation

- Annual Statement Income before Federal Income Taxes: $0
- Add 20% of Change in Unearned Premium Liability: 0
- Add Effect of Tax Discounting of Loss and LAE Reserves: 450,000
- Federal Taxable Income: $450,000
- Tax on Taxable Income at 34%: $153,000
REFERENCES

Internal Revenue Code of 1986, section 832.

ABSTRACT: ALM managers use Earnings at Risk (EAR) and Economic Value of Equity at Risk (EVEAR) as measures of the dollar amount of potential loss to net interest income and common shareholders' equity as a result of unforeseen interest rate changes. These two interest rate risk management metrics are now recognized benchmarks for measuring interest rate risk exposure, and its potential impact on a bank's financial position. At the explicit request of regulators, financial analysts and competitive pressures, more commercial banks are now reporting EAR and EVEAR numbers in their annual financial reports.* To examine preliminary evidence on the information content of such public disclosures, we composed a sample of some of North America's largest commercial banks. The Canadian peer group is based on Canada's seven largest banks, and the U.S. peer group is composed of twelve of its largest banks. In particular, we investigate if "ex ante" EAR and EVEAR numbers help regulators, financial analysts and investors to explain the subsequent variability of commercial banks' net interest income and net income over time.

Keywords: ALM, earnings at risk, economic value of equity at risk, interest rate risk, market risk disclosures, Basel Committee, FRB, OSFI, SEC.

Data availability: The data used in this study can be obtained from public sources.

- Partial References:


I. INTRODUCTION

ALM managers use Earnings at Risk (EAR) and Economic Value of Equity at Risk (EVEAR) as measures of the dollar amount of potential loss to net interest income and common shareholder's equity as a result of unforeseen interest rate changes. These two interest rate risk management metrics are now recognized benchmarks for measuring the non-trading exposure to interest rate risk, and its potential impact on a bank's financial position. Similarly, the Value at Risk (VAR) measure is the recognized benchmark for measuring the trading exposure to all market risks, including interest rate risk, and its potential impact on a bank's financial position.

At the explicit request of regulators, financial analysts and competitive pressures, more internationally active commercial banks are now reporting EAR and EVEAR numbers in their annual financial reports. Lopez (2003) explains the ongoing international efforts to improve the regulation and supervision of banking institutions to reflect advances in financial risk management techniques. His analysis supports the view that improved public disclosures regarding their conditions, operations and risk management information lead to increased transparency and should lead to more effective market discipline.

The evolution of bank disclosure standards in the United States has been described in a study published by the BGFRS (2000). The SEC and the FASB together set the core disclosure requirements for publicly traded banks. Moreover, all banks in the U.S. are required to file quarterly regulatory reports.

In a recent publication, the Basel Committee on Banking Supervision (BCBS, 2003) provides an overview of the disclosure practices of a sample of internationally active commercial banks. The BCBS survey focuses on the annual reports of 54 banks headquartered in the committee's member counties. It included 104 questions addressing quantitative and qualitative disclosures in 4 various categories: capital adequacy, market risk internal modeling, derivatives, accounting and presentation policies... The survey reveals that many banks have continued to expand the extent of their disclosures. The main findings of the disclosure survey that relate more directly to the focus of this study are the following: Firstly, disclosure of information on internal risk models was much more common for market risk than for credit risk. Secondly, the most noteworthy improvement is the increase in the disclosure of information on other risks (operational and legal risks, liquidity risk and interest rate risk in the banking book (non-traded). Thirdly, regarding individual disclosure items, the survey results indicate that market risk internal modeling (e.g. the type used) was one of the most common items disclosed.

The rest of the paper is structured as follows: section two defines the EAR and EVEAR non-trading exposure measures; the VAR trading exposure measure is also examined as well as its predictive power. The third section describes the research methods, the bank sample data, and formulates hypotheses on the usefulness of EAR and EVEAR numbers to explain the subsequent variability of commercial banks' earnings and economic value of equity. Section four presents and discusses the study's empirical results. Finally, the conclusion, limits of the study and suggestions for further research are drawn in the fifth section.

II. IMPROVED MARKET RISK INFORMATION DISCLOSURES

Recently, several authors have examined if improved market risk information disclosures lead to increased transparency and more effective market discipline. Wong (2000) studied the association between SFAS no. 119 derivatives disclosures and the foreign exchange risk exposure of manufacturing firms. Christofferson, Hahn and Inoue (2001) tested, compared and combined value at risk measures. Berkowitz and O'Brien (2001) evaluated the accuracy of VAR at commercial banks. In another study, Linsmeier, Thornton, Venkatachalan and Welken (2002) analyzed the effect of mandated market risk disclosure on trading volume sensitivity to interest rate, exchange rate and commodity price movements.

Of more direct importance to the focus of this study, Lopez (2003) summarizes the conclusion of a case study reported by the BGFR (2000) regarding SEC requirements for disclosure of market risk exposures. The author defines market risk exposures as potential financial losses due to
adverse movement in securities market prices. Most often, commercial banks report such risks with value-at-risk (VAR) estimates that summarize the potential losses that might occur with a specified probability (95 % or 99 % of the time) over a given time horizon like one or 10 trading days. A bank disclosing, for example, that its daily VAR is $25 million at the 99 %level, indicates that there is only a 1 % chance the bank will incur more than a $25 million trading loss over the next day. "In the case study, bank VAR disclosures were found to vary in detail across banks and to have an unclear connection with actual trading performance during the turbulent third quarter of 1998". The author finds that even though such heterogeneity is present in these types of public disclosures, the academic literature still suggests that market participants can assess bank risks accurately.

In another more recent study of VAR disclosures, Jorion (2003) found that VAR numbers in quarterly and annual reports, from 1995 to 2000, of 8 publicly traded U.S. commercial banks provided reasonable predictions of the subsequent variability of their trading revenues. Thus, the empirical results presented in the Jorion study suggest that VAR disclosures are informative in that they predict the variability of trading revenues. Thus, analysts and investors can use VAR disclosures to compare the risk profiles of banks' trading portfolios.

Figure 1 shows an example of Sun Trust Banks' EAR and EVEAR disclosures. Notice that this bank uses Net Interest Income-at-Risk instead of the more common EAR measure; nevertheless, both measures are compatible. In addition, management's discussion provides valuable disclosures into the interest risk modeling process at Sun Trust Banks.
FIGURE 1

Market Risk Management
Market risk refers to potential losses arising from changes in interest rates, foreign exchange rates, equity prices, commodity prices and other relevant market rates or prices. Interest rate risk, defined as the exposure of net interest income and economic value of equity (EVE) to adverse movements in interest rates, is SunTrust’s primary market risk, and mainly arises from the structure of the balance sheet (non-trading activities). SunTrust also exposed market risk in its trading activities, mortgage servicing rights, mortgage warehouse and pipeline and equity holdings of The Coca-Cola Company common stock. The Asset/Liability Committee (ALCO) monitors regularly and is responsible for reviewing the interest-rate sensitivity position of the company and establishing policies to monitor and limit exposure to interest rate risk. The policies established by ALCO are reviewed and approved by the company’s Board of Directors.

Market Risk from Non-Trading Activities
The primary goal of interest rate risk management is to control exposure to interest rate risk, both within policy limits approved by the Board and within internal guidelines established by ALCO. These limits and guidelines reflect SunTrust’s tolerance for interest rate risk over both short-term and long-term horizons.

The major sources of the company’s non-trading interest rate risk are (i) interest rate risk arising from changes in the maturity and repricing characteristics of assets and liabilities, changes in relationships between rate indices (basis risk), changes in the shape of the yield curve, and the potential existence of embedded options. SunTrust monitors these risks and their impact by identifying and quantifying exposures through use of sophisticated simulation and valuation models, as well as gap analysis.

The primary tool that SunTrust uses to quantify and manage interest rate risk is simulation analysis, which is used to model net interest income, loan assets, liabilities, and derivative positions over a specified time period under various interest rate scenarios and balance sheet structures. The analysis measures the sensitivity of net interest income over a relatively short time horizon (two years). Key assumptions in the simulation analysis (and in the valuation analysis discussed below) relate to the behavior of interest rates and spreads, the changes in product balances and the behavior of loan and deposit customers in different rate environments. Material assumptions include the repricing characteristics and balance fluctuations of indeterminate, or non-contractual, deposits.

As the future path of interest rates cannot be known in advance, management uses simulation analysis to project net interest income under various interest rate scenarios including unexpected, or “most likely,” as well as deliberately extreme and perhaps unlikely, scenarios. The analyses may include rapid ramping of interest rates, gradual ramping of interest rates, spread narrowing and widening, and yield curve twists. Usually, each analysis incorporates what management believes to be the most appropriate assumptions about customer behavior in an interest rate scenario, but in some analyses, assumptions are deliberately changed to test the company’s exposure to a specific event or set of events. Specific strategies are also analyzed to determine their impact on net interest income levels and sensitivities.

The following table reflects the estimated change in net interest income as a percent of net interest income forecasted under alternative rate scenarios for the next twelve months due to a gradual change in interest rates (2% basis points per quarter). Estimated changes set forth below are dependent on material assumptions such as those previously discussed.

<table>
<thead>
<tr>
<th>Percent Change in Net Interest Income</th>
<th>2002</th>
<th>2003</th>
</tr>
</thead>
<tbody>
<tr>
<td>+100%</td>
<td>0.6%</td>
<td>0.5%</td>
</tr>
<tr>
<td>-100%</td>
<td>-0.9%</td>
<td>-0.4%</td>
</tr>
</tbody>
</table>

As indicated, a gradual 100 basis point decrease in interest rates would reduce net interest income, but by an amount that is within the policy limits. A gradual 100 basis point increase would tend to enhance net interest income. Thus, the company’s interest rate sensitivity position is modestly asset-sensitive. While simulations of more rapid changes in interest rates indicate more adverse changes in net interest income, the company is still within the policy limits.

Estimated net interest income exposures at December 31, 2002 differs from those at year-end 2001, reflecting changes in the balance sheet, economic environment, and level of interest rates. The increase in asset sensitive position from 2001 reflects the continued restructuring of the securities available for sale portfolio in 2002, which had the effect of reducing the duration of the portfolio, as well as significant growth of lower cost customer deposits (NOW and MMDA) enhancing the company’s exposure to interest rate risk.

SunTrust also performs valuation analysis, which is used for discerning levels of risk present in the balance sheet and derivative positions that might not be taken into account in the net interest income simulation analysis. Whereas net interest income simulation highlights exposures over a relatively short time horizon, valuation analysis incorporates all cash flows over the estimated remaining life of all balance sheet and derivative positions. The valuation of the balance sheet, at a point in time, is defined as the discounted present value of asset cash flows and liability cash flows minus the discounted value of liability cash flows, or net worth, which is referred to as EVE. The sensitivity of EVE to changes in the level of interest rates is a measure of the long-term repricing risk and options risk embedded in the balance sheet. Changes in EVE are sensitive to net interest income simulation, which assumes interest rates will change over a period of time. EVE values fluctuations in changes in rates. EVE values the current balance sheet, and does not incorporate the growth assumptions that are used in the net interest income simulation model. As with the net interest income simulation model, assumptions about the timing and variability of balance sheet cash flows are critical in the EVE analysis. Particularly important are the assumptions of non-payment and the expected changes in balances and pricing of the indeterminate deposit portfolios. As of December 31, 2002, an instantaneous 100 basis point increase in rates is estimated to increase the EVE 2.7% versus the EVE in stable rate environment. An instantaneous 100 basis point decrease in rates is estimated to decrease the EVE 7.2% versus the EVE in a stable rate environment. These changes are within the established policy limits. As of December 31, 2001, these estimates were a 2.3% increase and a 2.7% decrease, respectively.
III. TESTING THE INFORMATION CONTENT OF EARNINGS-AT-RISK AND ECONOMIC VALUE OF EQUITY-AT-RISK PUBLIC DISCLOSURES

EARNINGS-AT-RISK (EAR)

The EARNINGS-AT-RISK measure represents an ex ante estimate of changes in earnings over the next twelve months should interest rate change by + or – 100 basis points. This formulation of short-term interest sensitivity analysis is performed and disclosed by most financial institutions and facilitates comparisons between peers.

ECONOMIC VALUE OF EQUITY-AT-RISK (EVEAR)

The ECONOMIC VALUE OF EQUITY-AT-RISK measure represents an ex ante estimate of net change between the present value of assets and the present value of liabilities should interest rate change by +/- 100 basis points. This formulation of longer-term interest sensitivity analysis is also performed and disclosed by many financial institutions and further facilitates comparisons between peers.

Proposed Testing Procedure

We postulate that those institutions with the lowest (highest) ex ante relative EAR measures should display the lowest (highest) ex post relative changes in their earnings as a result of a given change in interest rate levels. To do so, the following equation is estimated:

\[ \text{Rank (i)} \frac{\Delta E_{t+1}}{E_t} = a + b \frac{\text{EAR}_t}{E_t} \]

Where \( \Delta E_{t+1} \) measures the dollar change in net interest income from period t to period t+1, \( E_t \) measures the period t net interest income in dollars, \( \text{EAR}_t \) represents the short-term interest rate risk dollar disclosure at period t. Expressing both the l.h.s. and r.h.s. of equation (1) in relative values allows comparisons to be carried out over time with the same institution, and between institutions which have different earnings. We propose to test equation (1) empirically using the OLS regression method.

As shown further on, our data sample consists of twenty North American commercial banks. Here, we postulate that those institutions with the lowest rank (highest rank) in their ex post relative changes in earnings as a result of a given change in interest rate levels. To do so, the following equation is estimated:

\[ \text{Rank (i)} \frac{\text{EAR}_{t+1}}{\text{EAR}_t} = a + b \frac{\text{EVEAR}_t}{\text{EVEAR}_t} \]

Where Rank (i) varies from one (lowest ex ante relative EAR measure or lowest relative change in earnings) to twenty (highest ex ante relative EAR measure or highest relative change in earnings). Expressing both the l.h.s. and r.h.s. of equation (2) in rank values allows more general comparisons to be carried out over time between institutions. We propose to test equation (2) empirically using the Spearman rank correlation coefficient.

Since the procedure for testing the information content of EAR and EVEAR public disclosure measures are practically similar, they are not repeated here for EVEAR.

Sample Description

To examine preliminary evidence on the information content of banks’ EAR and EVEAR public disclosures. I composed a sample of some of North America’s largest commercial banks. The Canadian bank peer group is based on Canada’s seven largest domestic banks, and the U.S. peer group is composed of thirteen of its largest commercial banks. Table 1 shows for each bank in the data sample its ticker symbol, total assets expressed in U.S. dollars, senior long-term debt credit ratings, EAR and EVEAR annual data availability.
### TABLE 1
DATA SAMPLE DESCRIPTION

<table>
<thead>
<tr>
<th>Bank</th>
<th>Ticker Symbol</th>
<th>Total Assets U.S. ($ Billions)$1</th>
<th>S&amp;P S.L.T.D. Ratings$2</th>
<th>EAR Year Available</th>
<th>EVEAR Year Available</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. CIBC</td>
<td>CM</td>
<td>$174.5</td>
<td>A+</td>
<td>1998</td>
<td>1998</td>
</tr>
<tr>
<td>4. National BoC.</td>
<td>NA</td>
<td>$47.6</td>
<td>A</td>
<td>1999</td>
<td>1999</td>
</tr>
<tr>
<td>5. Royal BoC.</td>
<td>RY</td>
<td>$243.9</td>
<td>AA-</td>
<td>1996</td>
<td>1996</td>
</tr>
<tr>
<td>7. TD Bank</td>
<td>TD</td>
<td>$177.5</td>
<td>A+</td>
<td>1995</td>
<td>1995</td>
</tr>
<tr>
<td>8. Bank of America Corp.</td>
<td>BAC</td>
<td>$660.5</td>
<td>A+</td>
<td>1999</td>
<td>Not disclosed</td>
</tr>
<tr>
<td>9. Bank One Corp.</td>
<td>ONE</td>
<td>$277.4</td>
<td>A</td>
<td>1997</td>
<td>+/- disclosed</td>
</tr>
<tr>
<td>11. Fleet Boston F. Corp.</td>
<td>FBF</td>
<td>$190.5</td>
<td>A</td>
<td>1994</td>
<td>1996</td>
</tr>
<tr>
<td>12. JP Morgan Chase</td>
<td>JPM</td>
<td>$758.8</td>
<td>AA-</td>
<td>1993</td>
<td>+/- disclosed</td>
</tr>
<tr>
<td>13. Key Corp.</td>
<td>KEY</td>
<td>$85.2</td>
<td>A</td>
<td>1994</td>
<td>+/- disclosed</td>
</tr>
<tr>
<td>14. Mellon F. Corp.</td>
<td>MEL</td>
<td>$36.2</td>
<td>A+</td>
<td>1994</td>
<td>Not disclosed</td>
</tr>
<tr>
<td>15. National City Corp.</td>
<td>NCC</td>
<td>$118.3</td>
<td>A</td>
<td>1993</td>
<td>1993</td>
</tr>
<tr>
<td>17. Sun Trust Banks</td>
<td>STI</td>
<td>$117.3</td>
<td>AA-</td>
<td>2000</td>
<td>1999</td>
</tr>
<tr>
<td>18. US Bancorp.</td>
<td>USB</td>
<td>$180.0</td>
<td>A</td>
<td>1997</td>
<td>+/- disclosed</td>
</tr>
<tr>
<td>19. Wachovia Corp.</td>
<td>WB</td>
<td>$341.8</td>
<td>A</td>
<td>1993</td>
<td>Not disclosed</td>
</tr>
<tr>
<td>20. Wells Fargod Cy.</td>
<td>WFC</td>
<td>$349.3</td>
<td>A+</td>
<td>1994</td>
<td>Not disclosed</td>
</tr>
</tbody>
</table>

1 Canadian banks' total assets as of October 31, 2002 were translated at 0.6385 x Canadian $ into U.S. funds.

2 Moody’s long-term debt credit ratings were also available.

### TABLE 2
EAR RESULTS - CANADIAN BANKS

<table>
<thead>
<tr>
<th>Variables</th>
<th>Value</th>
<th>F Test</th>
<th>T Test</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>R.Sq.</td>
<td>4.528</td>
<td></td>
<td>0.041</td>
</tr>
<tr>
<td></td>
<td>12.1 %</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a</td>
<td>.0735</td>
<td>1.430</td>
<td>0.162</td>
<td></td>
</tr>
<tr>
<td>b (std.)</td>
<td>-0.3470</td>
<td>-2.128</td>
<td>0.041</td>
<td></td>
</tr>
</tbody>
</table>
As can be gathered from Table 1, the average size of the seven Canadian banks at $143 B is not that different from the thirteen U.S. at $329.1 B if we remove the three largest U.S. banks (BAC, C and JPM). It is also possible to compute the average default risk of the seven Canadian banks and to compare it to the average default risk of the thirteen U.S. banks. In order to carry out this analysis a bank's senior long-term debt credit rating is simply replaced by a number. For example, AAA equals 1, AA+ equals 2, AA equals 3, AA- equals 4, A+ equals 5, A equals 6, and A- equals 7. The Canadian bank sample has an average credit rating of 4.79; that is, a shade lower than the U.S. bank sample at 4.69. Also important is the fact that all twenty North American banks in our sample make EAR disclosures in their annual reports. All seven Canadian banks also make EVEAR disclosures in their annual reports. In the U.S. bank sample, four banks disclose EVEAR numbers, one other bank, Citigroup, discloses an equivalent number using another measure, four banks make sporadic disclosures, three banks do not disclose EVEAR numbers, and finally one bank (Mellon F. Corp.) carries out EVEAR computations but they are not disclosed in its annual report. Since EAR disclosures are more complete and frequent in our data sample than EVEAR disclosures, it stands to reason that more analysis can be carried with EAR disclosures in this study.

IV. THE EMPIRICAL RESULTS

The objective of the empirical tests is to examine if commercial banks' ex ante EAR numbers are related to ex post variations in net interest income for the complete bank sample, the U.S. bank sub-sample, and the Canadian bank sub-sample during the study period. Similar tests were also carried out to examine if commercial banks' EVEAR numbers were related to ex post variations in net interest income for the Canadian and U.S. sub-samples, and also the complete commercial bank sample.

OLS regression results indicate that ex ante EAR numbers were not closely related to ex post variations in net interest income for the complete bank sample and the U.S. bank sub-sample. As shown in Table 2 below, the results were only statistically significant for the Canadian bank sub-sample (at the 96 % level).

In addition, OLS results also lead us to conclude that ex ante EVAR numbers were not closely related to ex post variations in net interest income for the complete bank sample, nor for the U.S. and Canadian bank sub-samples during the study period.

Given the general tone of the results presented above on ex ante EAR and EVEAR numbers and subsequently observed variations in commercial banks' net interest income, the Spearman rank correlation coefficient analysis which was proposed earlier was not carried out.

V. CONCLUSIONS

The study documents that EAR public disclosures were made in their annual financial reports by all commercial banks in our sample. In comparison, EVEAR public disclosures were made by all Canadian banks, but by only a fraction of U.S. banks in our sample. ALM managers use EAR as a short-term measure, and EVEAR as a longer-term measure of the dollar amount of potential loss to net interest income and common shareholders’ equity as a result of unforeseen interest rate changes. These two interest rate risk management metrics are now recognized benchmarks for measuring the exposure to interest rate risk, and its potential impact on a bank’s financial position. At the explicit request of regulators, financial analysts and competitive pressures, more commercial banks are now reporting EAR and EVEAR numbers in their annual financial reports. In addition, some banks like JPMorgan Chase in the U.S. have been reporting non-trading portfolio VaR numbers for investment portfolio and A/L activities.

To examine preliminary evidence on the information content of such EAR and EVEAR public disclosures, we composed a sample of some of North America's largest commercial banks. The Canadian bank sub-sample is based on Canada's seven largest domestic banks, and the U.S. sub-sample is composed of twelve of its largest commercial banks. In particular, we investigated if ex ante EAR and EVEAR numbers help regulators, financial analysts and investors to explain the subsequent variability of commercial banks' net interest income and net income over time.
Unlike in Jorion's (2003) study of commercial banks' VaR public disclosures, the preliminary results presented in this paper indicated that banks' EAR and EVEAR public disclosures did not explain the subsequent variability of their net interest income over time. Canadian banks' EAR public disclosures were found to provide some indication of the subsequent variability of their net interest income during the period under study.
REFERENCES


Substitutes for Leadership:  
The Impact on Public Accounting Firm Subordinates  

by  
Kathy S. Pollock  
Indiana University - Purdue University Fort Wayne

ABSTRACT
This study examines the relationship between leadership style and subordinate satisfaction and job performance as moderated by Kerr and Jermier’s (1978) substitutes for leadership. This study extends prior research by employing two theories of leadership not previously tested in public accounting firms. Additionally, this study includes all functional areas and hierarchical levels. To gather data, a questionnaire was distributed to the members of two large regional CPA firms. The results indicate that in several situations, the supervisor’s efforts to direct or lead have less effect on the subordinate because of subordinate’s traits or the circumstances. Overall, this study provides insights into how to improve subordinate satisfaction and performance.
Online Annual Report Project:
The effect on motivation, satisfaction, and interest in accounting

Kathy S. Pollock and
Michael D. Slaubaugh
Indiana University - Purdue University Fort Wayne

ABSTRACT

The "perilous future" touted by Albrecht and Sack (2000) has put accounting educators on notice about the need to aggressively find ways to attract more students into the accounting profession. One suggestion, frequently raised, is to enliven the introductory accounting course so that a better image about the nature of the accounting profession is put forth to students who have chosen to be business majors.

The purpose of this article is to discuss an innovative project undertaken to enrich our introductory accounting course. Specifically, we created an online annual report project. Students completing the online project found it to be more motivating, satisfying and interesting than students who did a paper version of the same project. Unfortunately, but in concurrence with the findings of Albrecht and Sack (2000), the students' interest in accounting was not significantly affected.
KEY ELEMENTS TO DEVELOPING AN EFFECTIVE WRITING COMPONENT FOR AN ACCOUNTING PROGRAM

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KEY ELEMENTS TO DEVELOPING AN EFFECTIVE WRITING COMPONENT FOR AN ACCOUNTING PROGRAM

Abstract

Numerous reports, surveys, and articles tout writing skill as an essential element of success for accounting professionals. Some accounting programs have responded by implementing rationalized, coordinated writing-skill improvement initiatives. Others lack the time, resources and perhaps faculty buy-in to initiate a systematic writing-improvement curriculum component. We believe that an understanding of the specific functions for writing in business contexts and the resultant “values” that distinguish business writing from writing in other disciplines, coupled with an easily applied framework focusing on those values will facilitate faculty buy-in and perhaps encourage broader participation in writing-improvement efforts across accounting programs.

This paper proposes a set of business writing values, based on specific functions for writing in the discipline, and provides a framework for integrating these values into accounting program writing initiatives. It also provides guidance for developing and communicating program goals, developing and grading writing assignments, and developing and managing resources. We emphasize maximizing teaching and learning effectiveness while recognizing the limited financial and time resources that increasingly characterize many learning institutions.
INTRODUCTION

Numerous reports, surveys, and articles tout writing skill as an essential element of success for accounting professionals. For example, in their landmark study of accounting practitioners and faculty, Albrecht and Sack (2000) found that both practitioners and faculty ranked written communication skills second on a list of 22 skills, in terms of how much class time should be spent developing each. A Robert Half International Study of 1,400 Chief Financial Officers shows that, other than financial expertise, strong communication skills including written communication, are the skills most critical to an accounting professional’s career success (Robert Half International, 2003). The Accounting Education Change Commission (1990) exhorts accounting faculty to employ teaching methods that expand and reinforce basic communication skills including the “ability to present, discuss, and defend views effectively through formal and informal, written and spoken language (pg. 314).”

While strong written communication skills are not “accounting skills” per se, they are clearly critical to steady career progress and ultimate professional success. Some accounting programs respond to this critical success factor by implementing rationalized, coordinated writing-skill improvement initiatives throughout their curriculum. Some programs leave writing skill development to a general education course or other required course outside of the college of business and/or the accounting program. This approach misses some important opportunities for several significant reasons. First, the most effective writing instruction is that which is tied to an authentic and specific context. As John Bean (2001) notes, for students to develop their critical writing and thinking abilities, they “must develop the mental habits that allow them to experience problems phenomenologically, to dwell with them—to understand, in short, what makes a problem problematic.” Bean goes on to note that these mental habits, which fundamentally underlie sound writing skills, are “discipline-specific, since each discipline poses its own kinds of problems and conducts inquiries, uses data, and makes arguments in its own characteristic fashion.” In short, the best way to develop strong writing skills in accounting students is to have them engage in their programs the same kinds of writing that professional accountants typically encounter on a day-to-day basis.

A second reason not to leave writing skill development to general education courses housed outside the college of business and/or the accounting program centers around the instructors typically called on to teach those courses, i.e. graduate teaching assistants and part-time instructors in English or humanities departments. Since writing tends to function differently in the humanities disciplines than it does in the business disciplines, the values for writing that each community hold tend to be quite different, even given broad areas of overlap. Mark Waldo (2004) notes, for instance, that three of the most common values for writing in English disciplines center around “voice—the expression of the writer’s self,” vividness of detail and originality,” and “meta-consciousness of language (intentional use of diction, syntax, rhetorical figures, etc.).” At worst, coupling these discipline-specific values for writing with the nascent abilities of the relatively inexperienced general education teachers to recognize them as such sets a strong stage for
business students to become proficient in writing *as practiced in English departments* rather than *as practiced by accounting professionals*. At best, the students gain a conscious awareness of how to solve writing problems in a variety of contexts, but no specific preparation to think and write as accountants.

This particular tendency also highlights the final reason that responsibility for writing skills development should be housed in colleges of business and/or accounting programs. Recent neurobiological research strongly suggests (Leamnson, 1999) that the neural nature of learning involves the building and stabilization of neural connections; to produce long-term meaningful learning in a specific context requires enough of these neural connections to form a neural network that is stable over time. In other words, to build and stabilize context-specific writing-related neural networks, context-specific writing opportunities must be employed over time.

Still other accounting programs, while perhaps recognizing the importance of writing skills and accepting the programmatic responsibility for them, have yet to undertake a systematic writing improvement initiative due to constraints such as time, financial and infrastructure resources and perhaps even faculty buy-in.

We believe that an easily applied framework might encourage more writing skill development within accounting programs. Moreover, a clearly articulated approach to developing an effective writing component for an accounting program might also help mitigate some of these constraints listed above and perhaps facilitate faculty buy-in, thereby encouraging broader participation in systematic writing-improvement efforts across accounting programs.

This paper provides a framework for developing and communicating program goals, developing and grading writing assignments, and developing and managing recourses. We emphasize maximizing teaching and learning effectiveness while recognizing the limited financial and time resources that increasingly characterize many learning institutions.

**BUSINESS WRITING (DEFINED): THE FUNCTIONS**

Successful written communication results from the writer’s ability to effectively structure ideas on paper, toward a given purpose and for a specific audience. Purposes for writing in accounting contexts, that is, the way that writing functions in professional accounting, ranges from [Bob, fill this in] to [this to]. This writing is aimed at a variety of specific audiences from other accountants to clients, both other business professionals and members of the general public. In its fundamental form, effective *business* writing is evidenced by appropriate content; critical thinking, including anticipating a reader’s questions and objections; coherence; conciseness; clarity; and grammatical correctness (May and May, 2003). These writing *values* distinguish business and accounting writing from other disciplines such as scientific or creative writing. While some commonalities exist across disciplines, the writing values of each professional community reflect the underlying function of writing within that community. Consequently, an important first step in designing a business writing program for accountants is identifying the functions that writing serves in accounting and articulating the resultant values that will be introduced,
emphasized, and reinforced throughout the program.

**WRITING VALUES**

We define writing values as the attributes of a written communication style and the evidence or structures of a thought process that lend effectiveness to a written communication effort in a specific discipline. Not surprisingly, writing and critical thinking are intricately entwined. Effective writing is a two-fold: first, it involves the process of doing critical thinking, and second, it involves communicating the results of critical thinking (Bean, 2001).

Moreover, writing as a specific mode of critical thinking differs significantly from other language-based learning. The cognitive psychologist L.S. Vygotsky noted long ago (1986) that because writing is addressed to an absent audience, effective written communication relies on “the formal meanings of words and requires a much greater number of words than oral speech to convey the same idea.” As such, he goes on to observe of writing, “Even its minimal development requires a high level of abstraction.”

Since each discipline is immersed in a particular language environment, explores a unique set of problems and crafts arguments in its own way, it follows that the thought process and written communication styles of each discipline are also somewhat unique. The unique attributes of these thinking and writing styles are the discipline-specific writing values.

Examples of writing values for an accounting program include effective document design, purposeful structure, appropriate content, evidence of critical thinking, coherence, clarity, conciseness and error free sentence construction. Exhibit 1 provides examples of discipline-specific writing values for an English Department, a Biology Department, and an Accounting Department.

Defining and articulating writing values is key to setting and communicating program, course, and assignment expectations, and they provide a template for developing a consistent and effective writing component for an accounting program.

**SETTING EXPECTATIONS**

A comment we often hear from students is “This is supposed to be an accounting course, not a writing course.” Obviously those students don’t equate writing skills with accounting career success. They expect to become expert accountants but perhaps not proficient writers. Consequently, one of our challenges is to narrow that “expectations gap.” A first step in setting expectations involves systematically communicating the importance of writing skills to career success in all business professions, and particularly in accounting. Effective writing must be touted as a key skill both at the program level and at the course level. Establishing a writing “culture” is a significant step in laying the groundwork for a successful writing initiative.

Culture is established and maintained through systematic communication and support of core values. An accounting department or college’s strategic plan or “value cluster” is an excellent place to highlight effective writing as a key skill for the program’s students (Exhibit 2). Lectures highlighting the importance of writing skills and continual reinforcement throughout the semester in all courses, not just the writing-intensive courses reinforce a writing culture and helps set performance expectations. A section of a course syllabus or separate course handout emphasizing the importance of writing skills and clearly articulating
writing values further establishes writing as an important and “normal” component of an accountant’s skill set. External validation of the importance of writing skills to accountants is readily available. The Albrecht and Sack study (2000) reports that both accounting practitioners and accounting faculty rate writing skills as one of the most critical skills necessary for success in the accounting professions. A study of accounting firms in California reports that poor writing skills were a major reason for job terminations in these firms (Cherry and Wilson, 1987). Another study of 1,400 chief financial officers indicates that writing skills are critical to an accountant’s success because accountants are continually interpreting and communicating the implications of financial and non-financial data (Robert Half International, 2003). Finally, the American Institute of Certified Public Accountants (AICPA) (1997) lists effective business writing skill as a personal attribute that is required to enable a CPA to function as a strategic business partner and to remain a relevant force in today’s business world. This level of emphasis from the financial professions brings some urgency to the task of integrating a writing component into accounting programs and helps set and support the expectation of writing skill development.

STRUCTURING THE EXPERIENCE

For reasons mentioned briefly above, a cognitive perspective on writing skill development suggests that a systematic and integrative approach to developing an effective writing component for an accounting program requires the identification of specific writing intensive courses at various stages of academic progression and which are built on a foundation of contextually relevant assignments. For example, Anderson’s (1982) theory of cognitive skill acquisition emphasizes skill acquisition and development through repeated practice. According to Anderson’s theory, skill acquisition begins by learning about specific steps in a skill. Then, through repeated practice, the knowledge about the skill “transfers” into knowledge about how to use the skill. As practice progresses, “knowledge compilation” condenses many small steps into fewer compiled and more automatic steps resulting in skill acquisition and a higher level of performance. Robert Leamnson (1999) characterizes this skill acquisition and development process as the building and stabilizing of neural networks and suggests that the process can take up to two years. These theories suggest that repeated practice is key to acquiring and developing writing skill.

Several studies in the accounting discipline show that contextually rich and professionally relevant experiences are also important to cognitive skill development (Bonner and Walker, 1994; Johnstone and Briggs, 1998; Stone and Shelly, 1997), suggesting that contextually relevant writing experiences might enhance writing skill development. Johnstone, Ashbaugh, and Warfield (2002) tested this premise by conducting a study of students in an accounting program. Their findings demonstrated that 1) repeated practice of non-business writing assignments facilitated students writing skills, and 2) after controlling for repeated writing in a non-business context, contextually relevant writing experiences were positively associated with writing skill improvement.

This body of research suggests that the writing component of an accounting curriculum should be characterized by a number of contextually rich and professionally
relevant writing assignments experienced over an extended period. This can effectively be accomplished by identifying writing intensive courses at different levels of the curriculum. Also, because students develop writing skills over time, we find it is helpful to identify and articulate performance expectations at various levels of development. Identifying and acknowledging incremental developmental levels facilitates and signals a program, rather than an individual, commitment to and responsibility for developing this professionally important skill. Exhibit 3 provides an example of performance expectations at three levels.

DESIGNING FOR RESULTS

Articulating preferred outcomes is a precursor to designing writing assignments. Preferred outcomes can be articulated both in terms of developmental level and course objectives. Then, particular writing assignments can contain specific performance criteria that are clearly part of an integrated program, increasing the likelihood of student acceptance and commitment. Moreover, these carefully crafted assignments promote conceptual understanding and application while enhancing writing and critical thinking skills (Bean, 2001; Weaver, 1996).

Characteristics of effective writing assignments include (University of Maryland University College, 2003):

- Assignments are provided and explained in writing
- Writing assignments are linked to significant course objectives
- Notices of assignments specify the purpose for writing, the audience, the mode or form of the writing, and its length
- Assessment criteria are specified
- Due dates are specified
- Longer writing projects are organized in stages

Explaining assignments in writing and specifying assessment criteria sets expectations and fosters early engagement and self-assessment on the part of students. Providing models of the forms or modes, especially in initial assignments, sets the stage for skill acquisition and development. These models can be provided through a specified writing manual, by distributing examples, by arranging for reserve materials at the library, or by providing examples through a course or instructor web page.

Assignment design characteristics derive from course objectives and learning goals. Questions that can guide the design of a writing assignment include:

- What are my main learning goals for this course, this unit, and this assignment?
- How do I intend to build on the outcomes of this assignment for future learning?
- What writing values do I want to focus on with this assignment?
- What learning or critical thinking am I intending to facilitate with this assignment?
- What is the appropriate form or mode for this writing?
- How will I assess the writing process and the final product?

Some writing assignment and exercise ideas follow.
ASSIGNMENT AND EXERCISE IDEAS

Writing instructors often differentiate between writing-to-learn assignments and learning-to-write and/or writing-to-communicate assignments (Bean, 2001; Bishop and Fulwiler, 1997; Waldo, 2004). Writing-to-learn assignments for an accounting course might be characterized as short critical thinking tasks with the purpose of progressing towards a course objective or accomplishing a learning goal. Two examples of this type of assignment follow. One is from a financial accounting course and the other from a management accounting course.

Example 1
You are in an investment club with your dentist, who is the president of the club. On a recent visit to her office to have your teeth cleaned, she was discussing the recent spate of corporate misconduct cases and asking you about some related legislation she had been reading about but didn’t fully understand. She asked you to write a short piece for the club newsletter describing the main elements of the Sarbanes-Oxley Act and whether and how it might restore some confidence in the accounting profession and the attest function. Keep your audience in mind and remember that the effectiveness of your communication will depend at least in part on the level of coherence, conciseness and clarity of our work.

Example 2
Your boss stops by your office to tell you about a conversation he had yesterday with a friend of his at a Young Presidents Organization meeting. His friend was talking about a concept called Activity Based-Costing that somehow is supposed to lead to better decision making in firms that offer various products or services. In particular his friend was telling him how some of his products weren’t nearly as profitable as he used to think while others were more profitable. He asks you to write him a short memo that he could take to his advisory board explaining whether there is anything to this idea and how it works. Keep your audience in mind and remember that the effectiveness of your communication will depend at least in part on the level of coherence, conciseness and clarity of our work.

The final sentence in each of the preceding examples adds an element of learning-to-write to a writing-to-learn exercise. Clear grading criteria should accompany each of these exercises. Grading criteria for the first exercise might include the following, for example:

- Quality of overview/coherence (brief but clear picture of the Sarbanes-Oxley Act): 10 points
- Quality of the logical extension of your conclusion (based on your reasoning is the reader likely to agree with your conclusion about the effect of the Act on confidence in the accounting profession): 5 points
- Readability (is the level of writing appropriate to the intended audience, is it clear and concise): 5 points

Written Case Analysis

Written case analysis is another instructional method that provides students with repeated practice in a contextually rich and professionally relevant setting. Assigning multiple written case studies over the course of a semester provides instructors and students with opportunities to address
several key learning objectives (writing-to-learn) and to apply writing feedback to subsequent similar assignments. To manage workload and encourage professionally relevant length constraints, assignment criteria might require a memo with exhibits where the narrative portion cannot exceed two pages. These requirements encourage students to use exhibits for their intended purpose: to summarize a great deal of information and help readers (and writers) focus on key points (May and May, 2003). Early in the semester of a case course, facilitating a collaborative class exercise that allows the class to develop performance criteria for a case sets the stage for future performance and self-assessment. This type of exercise requires that students read the case at least one class period prior to the criteria discussion. Exhibit 4 provides an example of class developed case assignment criteria.

Sentence Lifting

Sentence lifting is a useful exercise for learning-to-write. Sentence lifting is a technique that helps students learn to write by recognizing and correcting issues in their own work and that of their peers. It keeps examples contextually rich and offers the instructor opportunities for clarifying or reinforcing course concepts. Sentence lifting involves recognizing a predominant writing issue (or two) in a particular assignment and then taking actual sentences from student papers that highlight those issues and placing them on an assignment sheet. All students are then asked to identify the issue for each sentence and improve the sentence by re-writing. This exercise can be done in-class or as a take home assignment and individually or in small groups. Individuals or groups can then be asked to share one of their improvements with the class. Exhibit 5 provides an example of a sentence lifting exercise.

ASSIGNMENT ASSESSMENT, EVALUATION, AND FEEDBACK

Assessment involves observing a process or outcome, comparing it to a set of criteria, and making a judgement about the significance of the variance between actual performance and the specified criteria. Evaluation, on the other hand, entails assigning an actual grade or similar ranking for a given assignment based on the assessment which has taken place. Feedback is the content and style of communication about the assessment and/or evaluation results. An important element of assessing written work is distinguishing between assessing a writing process and assessing a final product. It is less appropriate to note writing errors if a work is being assessed as it is being developed (early- or middle-stage assessment) unless noting such errors is a specific and agreed upon purpose of an early review. This is because many writing issues are addressed in later stages of the writing process (rewriting and revision) whereas the focus in earlier stages is on issue identification, idea development and content. In any event, specific assessment criteria should be provided in the written assignment instructions.

When assessing a final product, a feedback rubric can serve two purposes. First it can save grading time and provide a vehicle for more consistent feedback across students and over time. Second, it focuses students’ attention on feedback relative to the assessment of how well their assignments met the criteria or functions specified by the assignment, rather than on feedback relative to justifying a given grade or other evaluative mark. Specific writing values can be reflected in a rubric keyed to a numbering or lettering scheme. Then, passages of a student’s paper
where specific writing value issues occur can be easily identified and noted by the referencing scheme. A feedback rubric can be applied to reflect level-specific expectations and can even be adjusted to include specific learning objectives of a particular assignment if warranted. Designing a feedback rubric to easily integrate with a required writing manual facilitates a student’s self-learning and self-improvement. For example, if a student receives feedback that she is consistently experiencing conciseness problems, she can easily trace the topic or subtopic to the designated writing manual. Exhibit 6 provides an example of a feedback rubric designed to integrate with Effective Writing: A Handbook for Accountants, by May and May.

**RESOURCES AND SUPPORT**

Support is an essential ingredient of any writing improvement initiative. Support includes high quality and readily available feedback and reference materials. Student frustration and diminished program effectiveness are sure to result from a lack of either. High quality and readily available feedback can originate from course instructors, partnerships with college or university sponsored writing centers, and with Writing Across the Curriculum (WAC) and/or composition specialists in English departments. When developing relationships with English department colleagues and writing center tutors, the importance of articulating and communicating writing values cannot be overemphasized. The difference between a committed, energized student and a frustrated, disengaged student can be the consistency of feedback between a writing center tutor and the course instructor. It is the accounting department’s responsibility to develop, articulate, and communicate discipline-specific writing values to everyone involved in the writing component of an accounting program. Working with writing center directors to develop and attend training meetings with writing center tutors is one way to accomplish quality and consistent writing support. A program coordinator might even go as far as designating specific tutors as the accounting program tutors of choice and then facilitate training and coordination with that group of tutors.

Identifying and requiring a writing handbook that adequately addresses the program’s writing values is another valuable asset to an accounting program’s writing improvement initiative. Providing a single resource that can be referenced across several courses adds consistency and perhaps a degree of reliability to instructors’ and students’ writing improvement efforts. Valuable information and support can also be obtained from online writing labs (OWLs). Purdue University’s OWL (http://owl.english.purdue.edu/) and the virtual writing center at Rensselaer Polytechnic Institute (http://www.rpi.edu/web/writingcenter) are excellent examples.

**ASSESSING COURSE AND PROGRAM OUTCOMES**

Perhaps one of the most daunting challenges facing educators is the task of assessing program outcomes. Program outcome assessment is time and resource intensive but it is critical to evaluating the impact we are having on our students’ cognitive skill acquisition and development. Outcome assessment feeds the process of determining learning objectives and designing and redesigning curriculum to meet those objectives.

**Writing Portfolios**

One assessment model forwarded by the University of Nevada (Waldo,
Blumner, and Webb, 1995; Waldo, 2004) involves departmental assessments of writing done by students in a given major during their junior and senior years. The departmental assessments are based on a set of criteria developed from the department’s writing values. Scores are based on the percentage of papers evaluated that were deemed satisfactory for each writing value. The university writing center, in close coordination with the departments involved, conducts the evaluations. Only a random sample of students is included in the analysis, and it is performed on a portfolio basis, where all of the written work of these students is collected and reviewed for any given semester over the two-year assessment period.

**Quality Circles**

Another very different approach to outcome assessment is Classroom Assessment Quality Circles (Angelo and Cross, 1993). This approach, adapted from industry, generates information from students regarding their learning and attitudes towards teaching techniques. The approach requires that each class elect representatives to the Quality Circle (QC). Class members commit to providing these representatives with input on instructional processes and learning outcomes and the Quality Circle representatives pledge anonymity. Students who are still concerned about anonymity are encouraged to provide the professor or QC representative with anonymous written feedback.

QC representatives and their professors meet regularly outside of class where they discuss any and all feedback provided to them by class members. The professor can also direct the QC representatives to ask for feedback from their peers on specific issues.

This method has the advantage of providing a continual feedback loop enabling a professor to make real time adjustments in response to student concerns. It also provides an ongoing subjective measure of perceived student learning. The disadvantages include the logistics and the fact that the method assesses perceived rather than actual student learning.

**Standardized Test**

A third approach to outcome assessment is to administer an internally or externally developed standardized test. Ashbaugh, Johnstone, and Warfield (2002) provide a description of a similar approach used in evaluating the results of their field experiment. These tests are usually timed tests comprised of both direct and indirect components. The direct component requires completion of a professional writing assignment such as a memo, for example, in response to a general but discipline-specific question (a discipline-specific question that doesn’t pose any technical difficulty for the student). Two instructors who have synchronized an analytic scoring technique based on discipline-specific writing values then evaluate these memos. The average of the two instructors’ scores is used as the direct component writing score.

The indirect assessment component includes multiple-choice questions relating to a discipline-specific writing passage and testing grammar, punctuation, and other technical skills. Scores on the direct and indirect components are weighted according to perceived importance and used as an overall measure of success.

While standardized tests provide an “objective” assessment of writing skills, they are susceptible to criticism that no one test can reliably measure writing ability. Moreover, English and writing instructors have believed for at least four decades that there is no
correlation between objective knowledge of written English and writing ability (Braddock et al., 1963; Shaughnessy, 1979; Hartwell, 1985; Waldo, Blumner, and Webb, 1995).

All forms of program assessment present challenges. However, to “not assess” is not an acceptable alternative. Businesses routinely make choices based on cost/benefit analyses with the goal of making incremental improvements in processes and competitive position. Business educators must also work within our constraints to aggressively seek ways to enhance our curriculum to meet the evolving demands of our stakeholders. In fact some of these stakeholders, particularly the Association to Advance Collegiate Schools of Business (AACSB), articulate concrete expectations which can be tied directly to assessment efforts. For instance, new AACSB standards require specification of learning goals and objectives for each accredited program and emphasize outcomes assessment for each learning objective. Assessment guidance is increasingly available from AACSB and AACSB accredited programs as more programs see outcomes assessment as the most meaningful path to continuous improvement.

SUMMARY
## EXHIBIT 1: Examples of Discipline-Specific Writing Values

<table>
<thead>
<tr>
<th><strong>English Department</strong></th>
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<tr>
<td>Voice, the expression of the writer’s self in the piece of writing</td>
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<td>Independence, thinking demonstrated in the writing which distinguishes it from the writing of others</td>
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<tr>
<td>Meta-consciousness of language (intentional use of diction, syntax, and figures, etc)</td>
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<tr>
<td>Vividness of detail; originality</td>
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<td>Awareness of rhetorical purpose and audience</td>
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<tr>
<td>Evidence of thinking critically (effective summary, interpretation, analysis, argumentation)</td>
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<tr>
<td>Appropriate organization</td>
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<tr>
<td>Few or no sentence level problems</td>
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<tr>
<th><strong>Biology Department</strong></th>
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<tr>
<td>Clarity in statement of purpose (paper’s abstract include a clearly stated hypothesis)</td>
</tr>
<tr>
<td>Adherence to appropriate form (abstract, introduction, methods and materials, discussion, and conclusion)</td>
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<tr>
<td>Coherent integration of and accurate citation of secondary sources</td>
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<td>Accurate depiction of graphs and tables</td>
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<tr>
<td>Evidence of critical thinking (problem solving, data analysis and interpretation, argumentation)</td>
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<tr>
<td>Evident commitment to experiment and to its written description</td>
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<td>Few or no sentence level errors</td>
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<tr>
<td>Design for effective communication (professional appearance; appropriate formatting including headings, lists and set-off material, and pagination; use and clarity of exhibits and graphic illustrations)</td>
</tr>
<tr>
<td>Purposeful structure (introduction, development and conclusion, focused by major points)</td>
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<tr>
<td>Appropriate content (accuracy, appropriate application of theory or framework)</td>
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<tr>
<td>Evidence of critical thinking (evidenced-based problem identification and analysis, demonstrates understanding of alternatives, analysis leads to appropriate conclusion or recommendation)</td>
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<td>Appropriateness to intended audience</td>
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<tr>
<td>Coherence (maintains focus by consistently articulating the relationships between points of development)</td>
</tr>
<tr>
<td>Clarity (concrete and precise word choice and sentence structure)</td>
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<tr>
<td>Conciseness (includes no unnecessary words, phrases, sentences or paragraphs)</td>
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<tr>
<td>Few or no sentence level errors</td>
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(English and Biology values from University of Nevada, Reno University Portfolio Assessment Project, 1997-1999. as described in Waldo, 2004)
EXHIBIT 3: Level-Specific Performance Expectations for Students

L1: Level 1: First Year/Sophomores
L2: Level 2: Juniors/Seniors
L3: Level 3: Senior/Grad 1

1. Appropriate content (accuracy, appropriate application of theory or framework, appropriate citations, key elements identified, synthesis, etc.)

   L1: Articulate ideas accurately
   L2: Demonstrates appropriate application of selected ideas
   L3: Articulates applications, syntheses, and/or evaluations of frameworks/theories, validating them with substantiated thinking and appropriately citing valid sources

2. Critical thinking evident

   L1: Supports opinions and/or recommendations
   L2: Generally considers alternative points of view and demonstrates support for one
   L3: Demonstrates an understanding of different views and alternatives and leads the reader to the correct choice or argues persuasively for a preferred course of action

3. Appropriateness to intended audience.

   L1: Shows ability to use examples and/or evidence meaningful to audience
   L2: Supports most generalizations with examples and/or evidence
   L3: Uses development of appropriate length and of sufficient interest to convince audience of worth of message

4. Coherence

   L1: Presents a message with a recognizable introduction, development and conclusion
   L2: Establishes and maintains focus on a clear purpose, providing transitions to clarify relationships between most points of development
   L3: Without digression from the focus of the work, consistently articulates relationships between the points of development

5. Clarity

   L1: Uses language that shows some awareness of appropriate word choice
   L2: Uses language that shows general awareness of concrete and precise word choice and sentence structure
   L3: Uses language that demonstrates a refined awareness of concrete and precise word choice and sentence structure

6. Conciseness

   L1: Generally limits digressions and unnecessary detail
   L2: Avoids digressions and includes only relevant detail and content
   L3: Writing contains no unnecessary elements (words, phrases, sentences, or paragraphs)
EXHIBIT 4: Example of Class-Developed Case Assignment Criteria

ORGANIZATION AND CONTENT

1. Introduction will identify competitive position and issues relevant to the case.

2. Memo body will address X number of issues in turn, according to relevancy to analysis.

3. Restate/synthesize issues and make recommendations based on relevancy and evidence.

4. Include value chain analysis to identify cost savings and value-adding opportunities.

5. Memo supported by appropriate exhibits tailored to the case.

MECHANICS

1. Mechanics should advance, not impede, memos effectiveness (see scoring rubric). In particular, for this assignment:
   a. Sentence and paragraph structure reflects logical, sound thought processes.
   b. Usage, spelling, and punctuation are clear and error free.
   c. Word choice and usage are appropriate to intended audience.
   d. Technical terms/concepts are explained appropriately for intended audience.
The following sentences are taken from last week’s case write-ups. For each sentence, identify the writing issue(s) and improve the sentence with a rewrite.

The reason she would need information for these, and not for product and service costing would be due to the fact that the business is expanding large enough that it would be difficult for one person to manage.

She has recently expanded in her business and has done well with the expansion having grown tremendously in her client base.

The chance of the company being caught is fairly good, then not only do they have legal problems with the government and customers alike but they have a tarnished image.
EXHIBIT 6: Example of a Written Case Analysis Scoring Rubric

Written Component**

<table>
<thead>
<tr>
<th>Key</th>
<th>Feedback</th>
<th>3</th>
<th>2</th>
<th>1</th>
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<tbody>
<tr>
<td>1</td>
<td>Coherent Organization</td>
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<td>2</td>
<td>Conciseness</td>
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<tr>
<td>3</td>
<td>Clarity</td>
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<td>4</td>
<td>Word Choice</td>
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<td>5</td>
<td>Grammar (other than below)</td>
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<td>5a</td>
<td>- Fragments</td>
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<td>5b</td>
<td>- Comma splices</td>
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<td>5c</td>
<td>- Fused sentences</td>
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<td>5d</td>
<td>- Verb tense</td>
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<td>- Subject-verb agreement</td>
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<td>5f</td>
<td>- Parallel structure</td>
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<td>5g</td>
<td>- Problems with modifiers</td>
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<td>6</td>
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<td>7</td>
<td>Spelling</td>
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<td>8</td>
<td>References and citations clearly documented</td>
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Feedback Key:
1 = Significantly detracts from communication effectiveness.
2 = Opportunity for improvement.
3 = No significant issues noted.

Analytical/Critical Thinking Component

<table>
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<th>Feedback</th>
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<tr>
<td>Clearly identifies key issues</td>
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<td>Supports key points with specifics/evidence</td>
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<td>Considers alternative points of view and strengths and weakness of each</td>
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<td>Provides and supports recommendation(s)</td>
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<td>Exhibits -</td>
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<td>Specific to case</td>
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<td>Referenced in narrative</td>
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<td>Relevant to key points</td>
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<td>Clearly labeled</td>
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<td>Easy to understand</td>
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Feedback Key:
1 = Significantly detracts from analytical effectiveness.
2 = Opportunity for improvement.
3 = No significant issues noted.
REFERENCES


A STRUCTURED AND PRACTICAL APPROACH TO TEACHING EXCHANGES IN LONG-TERM ASSETS

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A STRUCTURE AND PRACTICAL APPROACH TO TEACHING EXCHANGES OF LONG-TERM ASSETS

This paper presents a framework for the understanding and application of proper accounting procedures for exchanges of similar and dissimilar long-term assets for financial accounting purposes. The framework is based on rules provided by APB Opinion 29 and incorporates modifications made by the EITF. The framework is geared toward providing the student with a more practical, structured approach to understanding the causes for recognizing or not recognizing gains and losses, and reasons for adjusting the cost basis, in certain instances, for the new assets acquired. This more structured approach provides the students with information they can more easily understand, retain, and eventually use in their accounting careers.
The purpose of this research is to determine if the manipulative buying and selling of investment securities by banks was deterred upon SFAS 115 adoption. Disaggregation of bank earnings provides a means to examine various managerial incentives to realize securities gains and losses. Using an early and late adopter research design, this study will examine key financial ratios to document discriminating characteristics of each group. Ordinary least squares will proxy three managerial incentives to realize securities: regulatory capital management, earnings management, and tax management incentives. This research will add to positive accounting theory research.

**STATEMENT OF THE PROBLEM**

In May 1993 the Financial Accounting Standards Board (FASB) issued SFAS 115, "Accounting for Certain Investments in Debt and Equity Securities", effective for fiscal years beginning after December 15, 1993, with earlier application of the Statement permitted. Early adopters represented those banks that adopted SFAS 115 for calendar year-ending December 31, 1993. In an effort to enhance consistency and comparability amongst banks in financial reporting, the FASB required adoption of SFAS 115. Specifically, the FASB was concerned with the manipulative buying and selling of investment securities. This research study seeks to determine if managerial incentives to realize securities gains and losses were deterred upon SFAS 115 adoption.
Unique to the banking industry is the separation of earnings into two components. Earnings before securities gains and losses (EBSGL) is the primary earnings component, while realized securities gains and losses (RSGL) is the secondary earnings component. Historically, security analysts emphasized the primary bank earnings component, EBSGL, to the exclusion of the secondary bank earnings component, RSGL. The implication of RSGL as information value-irrelevant provided the impetus for this line of research. A seminal study testing the differential information content of bank earnings components was conducted by Barth, Beaver, and Wolfson (1990). By regressing individual bank stock prices on respective EBSGL and RSGL earnings components, the market's expectation of each component was evaluated. Evidence supported the hypothesis that EBSGL seemed to explain the structure of bank stock prices more fully than the RSGL earnings component, suggesting that the market perceived the EBSGL earnings component as information value-relevant. In the same study, Barth et al. (1990) hypothesized that market expectations for the secondary income component, RSGL, would be lower than the expectations for the primary earnings counterpart, EBSGL - possibly reaching zero. This hypothesis failed to be rejected.

The RSGL earnings component reflects a time lag between the amortized (unrealized) value of securities using historical cost accounting and the realized fair market value of the securities at the time of sale. In other words, gains and losses of financial instruments are reported on the face of the income statement only in the period in which they are sold, thereby delaying recognition of the change between the amortized cost and current market value. The RSGL earnings component reveals realized gains and losses, not unrealized. If a security is not sold in the same period in which its value declines from amortized cost, then the RSGL earnings component carries an error. Thus, the explanatory power of RSGL is reduced. The efficient market hypothesis suggests that the market will discount the information content of the RSGL earnings component accordingly (Barth et al. 1990; Barth, 1994; Barth, Landsman, & Whalen, 1995).

Separation of bank earnings into separate components further suggests a distinction between expected and unexpected earnings. Barth (1994) argued that the EBSGL carries some degree of expected or "permanent" earnings, thus the higher level of differential information that this component provides to the market. Barth's (1994) results supported the contention that the EBSGL provides more relevant and reliable information to the market than the RSGL because this component represents earnings, which are more permanent in nature. Warfield and Linsmeier (1992) agreed that the RSGL earnings component is of a transitory nature, lacking timeliness.

Disaggregation of earnings allows for more refined testing of management discretion and the reflection of management's private information. By separately examining the secondary earnings component, RSGL, a means is provided to empirically test management's motivations to sell securities. Many researchers on the topic of fair value accounting have hypothesized that management selectively sells securities to reveal management's private information (Niswander, 1993; Barth & Landsman, 1995).
example, Scholes, Wilson, and Wolfson (1990) suggested
that bank managers may effectively lower their cost of capital by using earnings to convey private information to investors. Thus, the incentive for discretionary buying and selling of investment securities appears plausible. However, this accounting discretion induces a timing problem when the users of financial statements attempt to ascertain the fair market value of the securities investment portfolio.

Extensive research has sought to test various managerial incentives to realize securities gains and losses (Moyer, 1990; Scholes et al., 1990; Warfield & Linsmeier, 1992; Niswander, 1993; Barth, 1994; Collins, Shackelford, & Whalen, 1995; Beatty, Chamberlain, & Magliolo, 1996). An extension of these studies and my own previous research is to ascertain if the characteristics of an early or late adopter of SFAS 115 contributed to the explanation of RSGL that was reported by a sample of banks upon SFAS 115 adoption.

SIGNIFICANCE OF THE RESEARCH

In a recent study Papiernik, Meier, and Rozen (2003) documented the relationship between risk-based regulatory capital ratios and portfolio spread (fair value minus amortized cost of the securities portfolio) in the context of SFAS 115 adoption. In the pre-adoption period, risk-based regulatory capital ratios of sample banks were positive and significantly associated with portfolio spread. Subsequent to SFAS 115 adoption, the relationship was no longer significant as portfolio spreads declined after SFAS 115 adoption. In the same study, it was also documented that banks in the experimental group (early adopters) characteristically maintained lower regulatory capital ratios than those in the control group (late adopters). Given that the majority of banks were experiencing net unrealized holding gains at 1993 calendar year-end, early adoption of SFAS 115 would permit banks to report an increase in stockholders' equity. Regulatory capital is a function of stockholders' equity. Early adoption of SFAS 115 would effectively increase stockholders' equity for the period, thereby effecting an increase in regulatory capital.

If regulatory capital and portfolio spread are significantly related, it appears that bank managers would have an incentive to maintain higher levels of portfolio spread. The practice of gains trading abuses, also known as "cherry picking" or "snacking", whereby securities reflecting unrealized holding gains are sold and those securities reflecting unrealized holding losses are held, would eventually cause the portfolio spread to decline, possibly to a negative level. This in fact did occur in the 1980's when double-digit interest rates caused bond values to decline to a minimum, and bank managers sold only those securities with capital gains. Securities portfolios went "underwater" in value, adding to the decline and ultimate bankruptcy of many banks. In light of SFAS 115 adoption, banks restructured and somewhat downsized the securities investment portfolio as the classification requirements and subsequent trading restrictions from the held-to-maturity classification were imposed (Papiernik, Meier, and Rozen 2002). Given that the evidence indicates that banks did
restructure and downsize the securities portfolio, this study seeks to determine if management incentives to realize securities gains and losses were deterred in light of SFAS 115 adoption. This research extends and adds to the line of research known as positive accounting theory.

**RESEARCH METHODOLOGY**

Models testing for gains trading abuses by banks have been employed by Scholes, Wilson, and Wolfson (1990) and Collins, Shackelford, and Whalen (1995). The model for this study will employ variables used in the Scholes et al., (1990) model, which proxies three primary motivations for SGL realization: management of regulatory capital; earnings management; and tax management. Further analysis of these incentives in the context of SFAS 115 adoption, and refinement by bank size seeks to extend current research as suggested by Collins et al., (1995). This study will draw from these models, using a sample of banks and related data during the time period that SFAS 115 was adopted.

**TEST DATA**

This study will use a sample of banks randomly selected from the BankSource database, representing call report data originally compiled by Sheshunoff Information Services (1993-1994). The data is available and formatted for statistical analysis. The final sample consists of approximately 189 banks, representing three bank size peer groups. Grouping by size ensures that all the large banks were selected, an important consideration given that these banks represent a significant portion of financial activity and economic influence in the U.S. economy. The Disclosure database reveals when a particular bank adopted SFAS 115 via the bank's parent holding company.

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differences in the coordination of regulatory capital, earnings, and taxes. Journal of Accounting 
Research, 33(2), 263-291.

statement no. 115, accounting for certain investments in debt and equity securities. FASB: Norwalk, CT.


The Application of ABC Analysis for Inventory Control in a Computerized Environment: The Nigerian Approach

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ABSTRACT

Using databases for inventory management involves risks (under-valuation, overstocking, misstatement of inventory, etc.) which need to be evaluated for effective management. The types of controls often adopted depend highly on the type of system that a particular company has and the nature of their operation. In this paper, data from Computace PLC (a multi-national computer hardware and software dealer) will be analyzed using the ABC system to evaluate its effectiveness. The firm uses Accounting and Financial Management System (AFMS) that integrates Order Processing and Inventory Management with Financial and Management Accounts, Payroll and Project Management. AFMS also handles multiple currency business and could be run on network of IBM PCs.

Introduction

Kohler (1975) defines inventory control as “the control of merchandise, materials, goods in process, finished goods and supplies on hand by accounting and physical methods.” Accounting control includes the proper measurement of inventory amounts as well as the application of internal control. Physical control implies the physical movement of inventories and consists of proper safeguards for storing, handling, issuing and inventory taking. For the purpose of this paper, the concentration will be on merchandise inventory.
Inventory control is important to almost all types of business enterprise. If inventories are piled up due to slow demand, capital is tied up and cannot be used for other purposes. Alternatively, sales may suffer as inventory on hand is inadequate.

Several techniques of inventory control can be used by organisations. ABC method, one of the commonly used was documented by Vilredo Pareto, a 19th century scientist. Under this method, inventory items are ranked according to investment in each item inventory classified as items A, B and C. Inventories of different classifications are then controlled in a different manner based on their relative importance.

In this paper, data from Computace PLC will be analysed using ABC analysis. The case study is done in order to understand the application of ABC method in controlling inventory in a computerized environment. Computace is a dealer in IBM and Apple computers and related software. It uses a software system called Accounting and Financial Management System (AFMS) to run its business. The system integrates Order Processing and Inventory Management with Financial and Management Account, Payroll and Project Management. AFMS handled multiple currency business and could be run on network of IBM PCs.

Before going into further details of the case study, this paper will look into the ABC method and the inventory control in a computerized operating environment.

**THE ABC METHOD**

Many business firms have introduced a system of analyzing inventory stocks by value categories known as ‘ABC Analysis’. The large value items are grouped together into one class, ‘A’ for inventory control purposes. ‘Middle’ class items are grouped together under class ‘B’ and the lowest value items are grouped under class ‘C’.

It is easier to identify the most important inventory unit using ABC method. This is important since management can concentrate on those items and maximize the control being exercised. According to Greene (1970), the ABC concept is meant to reduce control effort from low value items (class C) so that it can be focused on high value-items (Class A). Greene (1970) also stated that management often had limited resources such as management attention, time and effort, and record maintenance for inventory updating. Doubling the resources of class C-items may have less effect on inventory levels than doubling the resources of class A-items. Greene (1970) also suggests that class A-items should have a very tight control, while B items should have a normal amount of control, and C items should be given a minimum control effort in the inventory management system.

Fogarty et al. (1991) explain several criteria to be used in classifying inventory items. They are annual Naira volume of the transaction for an item and cost of stockout. Greene (1970) further indicates that most management uses the annual Naira volume of the transaction for an item or annual Naira usage to classify inventory items.
INVENTORY CONTROL IN A COMPUTERIZED ENVIRONMENT
A good integrated software system or databases allow companies to perform inventory planning and control efficiently. Management can either build a system from scratch or adopt softwares in the market. However, it is advisable for medium-sized firms to use software packages, because they take less time to install and involve less development cost.

According to Jobbling and Senior (1986, pp. 91), a stock control package generally aims at maintaining a record of stock transactions on numerical basis and to provide feedback on the physical stock at any time. The reports may highlight any stock lines which are below minimum order level or above maximum stock level. The systems can also provide activity reports for each inventory item which can assist management in making decisions based on costs, prices, profits, inventory turnover and Naira sold for various products.

ABC analysis in a computerized environment helps to maintain accurate and timely records economically on all items. According to Hornak (1994), the main objective of inventory management is accuracy and it is important that the database has all the information of the stored items. The information comes from the entries required upon receiving, put away, packing, staging and shipping (Hornak, 1994). The databases may also provide control for amendment and maintenance of costs or prices. The processing of adjustment, such as stock-taking difference will also be formalised and subjected to input and updating controls. According to Coopers and Lybrand (1985), the stocks records maintained on computer will be more regularly evaluated than in non-computer systems.

Other advantages of ABC analysis on computerized environment are the minimization of redundancy and data duplication because data is recorded once. This should be very useful for the problem of overstatement and missing inventory. Moreover, the software programme and data in the databases are data independent which increases flexibility since the application program can be changed more easily, more quickly and is less expensive. Built-in controls database software packages also help to ensure data integrity.

However, most software packages lack good control procedures therefore, a good integrated accounting package must be used instead of an independent inventory control package (Leitch and Davis, 1992). With an integrated system, the posting of a transaction in one module will automatically update the accounts, which are affected in other modules. In order to really understand the application of the ABC method in controlling inventory especially in a computerized environment, inventory data files from Computace will be used.

BACKGROUND OF THE COMPANY – COMPUTACE PLC
Computace, a dealer in IBM and Apple Computers and related software was founded in 1980 and went public in 1983. The company consists of a parent holding company and three subsidiaries. The parent holding company was the main dealership for sale and
service and the subsidiaries were small and unprofitable. There were a managing director, a Technology and a Finance Manager.

Computace’s main clients were small business and individual professional users of PCs. Computace used the so-called Accounting and Financial Management Systems (AFMS) to run its business. The system worked well and had a number of advanced features which were always being added to such integration of Order Processing and Inventory Management with the Financial and Management Account, Pay-roll and Project Management. Computace planned a database for follow-up of its customers in order to manipulate relationships and boost business.

After years of profitable growth, Computace suffered disastrous losses in the early 1990’s. A programme of expansion did not generate the expected sales volume and the departure of several of the sales force weakened the selling effort. Heavy competition from sales of PC compatibles caused losses in volume and a fall of 40% in price per unit. Computace needed to sell nearly twice as much physical product as before to achieve the same total contribution as the margin per sale weakened.

According to International Data Corporation a worldwide unit PC shipments are expected to increase in the future and PC sales are being spurred by strong demand for notebook computers. The competition within industry is likely to intensify as customers press for better deals and faster service. The major players could push unit volumes higher, add value wherever possible and continue to maintain a tight lid on costs.

This paper will only concentrate on the consultation for inventory control in Computace. This is done to assist Computace in categorizing the inventories according to the value of investment.

**METHOD OF ANALYSIS**

In analysing the inventory management of Computace, this paper follows the steps in ABC analysis. Steps in the ABC analysis are:

1. Determine the annual usage based on history for each item in inventory. The basis for analysis is the records where the inventory items are valued at cost and are sold in the last 12 months [sold year to date (YTD)].

2. Multiply the annual usage of each item by the cost item to obtain the total annual Naira usage of each item.

3. Add the total annual Naira usages of all items to determine the aggregate annual Naira inventory expenditure.

4. Divide the total annual Naira usage of each item by aggregate annual expenditure for all items to obtain the percentage of total usage for each item.

5. List the items in rank order on the basis of the percentage of aggregate usage.

6. Examine annual usage distribution and group items on basis of percentage of annual usage by plotting a ‘Pareto’ graph.
DATA ANALYSIS
There are 1,184 items which have the total value of N212,751,422 identified in the Computace inventory datafiles. Since Computace used AFMS system, it is easier to consider every single item for analysis without sampling. The corresponding values of the cumulative percentages of total usage and the cumulative percentage of the total number of inventory items are plotted on graph shown in Figure 1.

Figure 1: Pareto Graph

From the graph, ABC categories are defined. Table 1 shows the summary of the ABC analysis based on cost prices. The range of values for class A items is above N303,836. The interval of class B items are from N26,277 to N303,835 and for class C items are below N26,276. The total Naira per group for class A items are N170,133,142, for class B items are N36,550,816 and for class C items are N6,087,464. Table 2 shows the percentage of items. 10.22% of A items represent 80% of the annual usage, 32.09% are class B items represent 18% of the annual usage and 58% of the class C items represent 3% of the annual usage.
Table 1: Summary of A, B, C analysis

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<th>Class</th>
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<th>₦ per group</th>
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<td>A</td>
<td>Above ₦303,836</td>
<td>10.22</td>
<td>170,133,142</td>
<td>79.97</td>
</tr>
<tr>
<td>B</td>
<td>₦26,277 to ₦303,835</td>
<td>32.09</td>
<td>36,530,816</td>
<td>17.17</td>
</tr>
<tr>
<td>C</td>
<td>Below ₦26,276</td>
<td>57.69</td>
<td>6,087,464</td>
<td>2.86</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>100</td>
<td>212,751,422</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 2: Percentage of A, B, C items

<table>
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<tr>
<th>Class</th>
<th>% of Items</th>
<th>% of ₦</th>
</tr>
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<tbody>
<tr>
<td>A</td>
<td>10.22</td>
<td>79.97</td>
</tr>
<tr>
<td>B</td>
<td>32.09</td>
<td>17.17</td>
</tr>
<tr>
<td>C</td>
<td>57.69</td>
<td>2.86</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

The class A items include popular brands of personal computers, laser printers, memory expansion, typewriter, keyboard and softwares. On the other hand, the class B items consist of paper feeder, mouse, ribbon, video cards and less popular brands of personal computers, laser printers, memory expansion, typewriter, keyboard and softwares. Class C items consist of other items such as floppy disks, calculators, ribbons, cable, power supply, etc. Table 3 shows the first fifteen items of each class.

Table 3: The first fifteen items of each class items

<table>
<thead>
<tr>
<th>Class A items</th>
<th>Class B items</th>
<th>Class C items</th>
</tr>
</thead>
<tbody>
<tr>
<td>At 3 Enhanced – 30mb</td>
<td>Mac Li 1-4 Bit Video Card</td>
<td>Ibm 3278/79 emulation</td>
</tr>
<tr>
<td>Pc/Xt 286</td>
<td>Ms Excel Nederlands</td>
<td>Letter Gothic 12-6746/47/70</td>
</tr>
<tr>
<td>Mac Se Harddisk System</td>
<td>3270 Emulation Pgm Versie 3.0</td>
<td>Rampage 1 Mb</td>
</tr>
<tr>
<td>Ps/2 8550-021 Syst 80286-20mb</td>
<td>20mb Slimline Harddisk Seagate</td>
<td>Nylon Ribbon Black Lq 1500</td>
</tr>
<tr>
<td>Ps/2 8550-041 Syst 80286-44mb</td>
<td>Autom. Paper Feeder Quietwriter</td>
<td>Macserve For Mac+</td>
</tr>
</tbody>
</table>
DISCUSSIONS

Computace seems to have a good integrated software packages. With these systems, Computace can highlight any stock lines which have low minimum order level or above maximum stock level. Computace can also identify slow moving stocks or where stock sales are higher during a certain period. The package also enables Computace to sort inventory in many different ways for inventory management. Using this system, Computace can use reports provided by the systems for decision making based on inventory on hand, on order, optimum order quantity, and price for purchasing. Interestingly, with the integrated system, the posting of the transactions in one of the modules will automatically update the accounts which are effected in other modules. The software also generates and displays a Pareto graph (ABC analysis) of cumulative sales against the number of inventory items. With good integrated software packages, Computace gains advantages in inventory management and it is easier to do analysis in its data files.

Fogarty et. al. (1991, pp.176-179) agree that the degree of control provided by management should be based on items’ classifications. In Computace, class A-items are popular brands of personal computers, laser printers, memory expansion, typewriter, keyboard and softwares (refer to tables 3). For these items, management should frequently evaluate its forecasts and forecasting methods to ensure that the supply of these items will match their demands. The demand, order quantities and safety stocks for these items should be frequently reviewed. The order quantities usually are small with close follow-up and expediting to reduce lead time. The records should also be updated daily and cycle counting should be employed to maintain accurate inventory balances.

On the other hand, class B-items in Computace consist of paper feeder, mouse, ribbon, video cards, other brands of personal computers, laser printers, memory expansion, typewriter, keyboard and softwares (refer to tables 2). Fogarty et.al (1991, pp.176-179)
suggest that the control for B-items should be similar to the A-items with most control activities taking place less frequently. Class C-items in Computace consist of other items which are not in the A or B items such as floppy disks, calculators, ribbons, cable, power supply, etc. Fogarty et.al (1991, pp.176-179) suggest that C-items can have simple records with a periodic review of physical inventory, large order quantities and safety stock. The C-items can be stored in areas readily available to order fillers. The items can be counted infrequently either annually or semi-annually. It is acceptable if weighing rather than counting is used for physical count.

Because of low operating margins in the computer industry, Computace needs to keep operating cost as low as possible. ABC analysis is one way that management used to maintain low operating costs by concentrating its control effort on fast moving items. Management also has to provide good customer services because of higher competition within industry and higher expectation from customers for better deals and faster service. Through ABC analysis, management can frequently review demand, order quantities and safety stocks on the important items. As one of the control in meeting demand, Management can reduce lead-time by maintaining small order quantity and close follow-up.

Hax and Candea (1984, p.189) are right when they stated that computer industries normally show class A-items have a small percentage (5 to 15 per cent) of total items and a large share (50 to 60 per cent) of total annual sales. As shown in Table 3, class A items have a small percentage of items and high percentage of annual sales.

The ABC concept could also be applied in internal control process, especially in the verification of stocks. Slow moving, damaged or obsolete stock should be appropriately identified and valued. The materiality of items applies the concept of ABC. Auditor used his own judgment in determining the materiality of the items, taking into account the amount of value, nature of an item, and form of disclosure.

CONCLUSION

In summary, the type of system or software used in daily operation influences the process of inventory control. Computace seems to have a good integrated software that allows for a smooth process of planning and controlling inventory.

For Computace, fast moving items include Enhanced-30MB, Mac Se hard disk system Flemish and slow moving items include IBM 3278/70 and Nylon Ribbon black Lq1500. The management should perform different levels of control and planning system for these types of items. More resources such as time, effort and maintenance of updating inventory should be allocated for fast moving items. The demand, order quantity and safety stocks for the fast moving items should be frequently reviewed to avoid stock out. If cost of stock out could be avoided, the companies could improve their profitability level significantly.
The process of planning and control inventory is more efficient if integrated database or software is used. Accurate and timely records of data could be maintained at all times. However, Computace should beware of the risks and control problems in the computerized environment. Errors in data processing, data input and data output, should be avoided. As long as Computace have independent parties that could review all the control procedures and application, those errors could be reduced or eliminated. Computace could also introduce an automatic identification such as reading bar code which uses a laser scanning device to visually read symbols. Using this type of automatic identification can reduce error in data input and assure accurate real time data.

It is important for Computace to improve its information system to the extent that there is integration among companies in the same industry, suppliers and customers. Problems with vendors, especially the availability information and delivery could be solved with the data integration. The benefits that the companies might gain especially in order delivery can compensate the cost of installing the system. Lastly, to impose all the necessary tools in managing inventory, top management must be committed. Good inventory control also requires follow-up.

REFERENCES


WAGNER, H.M. (1962), *Statistical Management of Inventory Systems*, USA, John Wiley and Sons Inc.


The worker classification question - whether an individual is an employee or an independent contractor, continues to be a controversial issue between taxpayers and the Internal Revenue Service (IRS). There are no clear and simple rules for determining worker classification. The complexity of the rules to determine worker classification and the inconsistent application of these rules has created the potential for catastrophic results. Small business owners forced to reclassify independent contractors as employees could be financially devastated by the resulting delinquent payroll taxes and penalties. This paper examines classification methodologies and strategies used in applying current tax law, regulations, and recent judicial interpretations in determining worker classification.

Section 530 of the Revenue Act of 1978 provides several safe harbors to businesses that disagree over worker classification with the Internal Revenue Service. If a business can meet one of these safe harbors, then the IRS cannot reclassify workers to the status of common law employee.

If a business cannot rely on one of the above safe harbors, then the IRS determines whether a worker is an employee using common law rules. The IRS historically used a list of 20 factors as an aid in determining worker status, but then unofficially modified their criteria for determining worker classification in their most recent training manual. Introducing another set of non-authoritative criteria into the worker classification issue contributes to the confusion and controversy of the worker classification issue.

This paper explores several measures small businesses should take to reduce its exposure to the risk of IRS reclassification and the potentially catastrophic tax liability resulting from worker classification. By preserving Section 530 safe harbors, using contracting and incorporation, and limiting aspects of control, a small business can avoid not only the tax liability of worker reclassification, but also the litigation expenses of defending a position in court.
A NEW METHOD TOWARDS BETTER COMPREHENSION OF VARIANCE ANALYSIS

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ABSTRACT  

_Variance Analysis_ is a performance evaluation tool for firms and divisions to measure the variances from standard costs. This topic of cost and managerial accounting has been treated alike in literature and academics, and the general consensus is that it is cumbersome both for practitioners and students of the subject. We believe one of the main reasons for this difficulty is in the way the variances are computed. This inconsistency arises from the discrepancy between the numerical value of the computed variance and the logical inference as to the nature of the variance. For example, when the numerical values for the variances are negative, students are taught that the variances should be considered favorable.  

This paper proposes a new method to resolve this confusion. The method rearranges the way information is presented to compute variance analysis. The result is when the numerical value of a particular variance is negative then the variance is identified as unfavorable or vice versa. This simple and elegant approach will not only enable both practitioners and teachers to be more efficient and effective in communicating the material, but also increases the comprehension of analytical results or outputs.
RANDOM WALK BETA AND POST-LISTING BEHAVIOR OF STOCKS CHANGING LISTING LOCATION-
AN EMPIRICAL STUDY

Lakshmi S. Narain,
Georgia College and State University

ABSTRACT

Statistically significant negative returns in the post-listing period of stocks changing listing location has remained an anomaly and considered an example of market inefficiency. However, the studies finding such results have treated systematic risk invariant in the estimation period. The current study estimates systematic risk, specifying a stochastic process. Excess negative returns for a sample of stocks, previously traded over-the-counter (OTC), and newly listed on the New York Stock Exchange (NYSE) are not statistically significant, based on the stochastic risk process. These results indicate that the return anomalies found in earlier studies may be the outcome of risk-specification bias.

INTRODUCTION

The anomalous return behavior of newly listed stocks (stocks previously traded over-the-counter and newly listed on organized exchanges) has received considerable attention in the finance literature. The positive abnormal returns of these stocks in the pre-listing period and their negative performance in the post-listing period are well recorded. For example, Ule (1937), Ying et al (1977), Fabozzi (1981), and Sanger and McConnell (1986) document and discuss the phenomenon. The positive abnormal performance, though an anomaly in terms of market efficiency, is explained by Grammatikos and Papaioannou (1986 a,b) and Edelman and Baker (1990) via expectations of improved liquidity and fairer prices. Van Horne (1970) and Goulet (1974) seek to explain the post-listing behavior, respectively, in terms of "profit-taking" and announcements of new issues around the listing period. Such explanations are not supported by the studies of Grammatikos and Papaioannou (1986 a,b).

Yet another possible explanation for the post-listing return behavior may be bias in the specification of the risk process, which might lead to negative abnormal returns due to positive biases in risk estimation. Reints and vandenbrg (1975), Ying et al (1977), Fabozzi and Hershkoff (1979), Sanger and McConnell (1986) and McConnell and Sanger (1987) study the pre-listing and post-listing betas of stocks changing listing locations uniformly conclude that the betas do not change between the two periods. Subsequent studies by Bhandhari et al (1989) estimate betas in the days immediately following the new listing for 90 rollover periods of 30 days each and find that beta actually increases immediately after the new listing, which confounds the puzzle.

A limitation of the above studies involving the estimation of newly listed stocks is that systematic risk (beta) is assumed to be constant within the estimation period. Fabozzi and Francis (1978), Chen and Lee (1982), and Bos and Newbold (1984), among others, have recorded the empirical fact that beta of a security estimated from the market model is stochastic. Also, Galai and Masulis (1976) develop a theory that stochastic changes in beta are caused by macroeconomic variables.

Given this background of evidence for the stochastic behavior of security betas, it is only appropriate that studies examining abnormal returns using betas estimated from the market model allow for the stochastic behavior of beta. The present study examines the post-listing and pre-listing return
behavior of stocks changing listing from the OTC to the NYSE by allowing their betas to follow a Random Walk (RW) process, for which Fisher and Kamin (1978), Sunder (1980) and Kryzanowski and To (1984) find ample evidence. Allowing beta to follow a random walk process should result in more efficient estimation of the systematic risk parameter, which, in turn, should result in more efficient estimation of market-adjusted excess returns. An examination of these betas and excess returns should result in a better understanding of the post-listing risk-return behavior of stocks changing listing from the OTC to the NYSE. The remainder of the paper is organized as follows. The next section sets forth the empirical hypothesis. This is followed by a brief presentation of the methodology. The section discussing the sample used is followed by a presentation of the empirical findings. Last, the summary and conclusions are given.

**EMPIRICAL HYPOTHESIS**

Based on the discussion in the previous section, it is hypothesized that the post-listing excess returns of stocks changing listing from the OTC to the NYSE will not be statistically significant, when their betas are estimated specifying a random walk process.

**METHODOLOGY**

This study uses the methodology set forth in detail by Lockwood and Soundararajan (1994), for the estimation of security betas following a random walk process. The random walk betas are used, in conjunction with the market model, to compute excess (abnormal) returns in the post-listing period. Average Abnormal Returns (AAR) and Cumulative Average Abnormal Returns (CAAR) are computed for the sample of securities for a period of 120 days following the new exchange listing. The AARs and the CAARs are tested for statistical significance using t-statistics as set forth in Brown and Warner (1984).

**Bayes Estimator of RW Beta**

Lockwood and Soundararajan (1994) develop the Bayes Estimator for a Random Walk Beta as follows. For any security i (subscript omitted), consider the time-varying market model in which

\[
R_i = \beta R_{mt} + e_i,
\]  

[1]

or,

\[
\beta_i = \beta_{i-1} + u_i,
\]

[2]

where \( R \) is the difference of the excess security return (over risk-free rate) from its mean in period t and \( R_{mt} \) is the difference of the excess return on the market index (over risk-free rate) from its mean for period t; \( \beta_{i-1} \) is the starting point for \( \beta_t \); and \( e_t, u_t \) and \( w_t = \sum u_s \) for \( s=1 \) thru \( t \) are normally distributed disturbances for which \( E(e_t) = E(u_t) = 0, E(e_t u_s) = d_{ts} s_5^5 \), \( E(u_t u_s) = d_{ts} s_u^5 \),and \( E(e_t u_s) = 0, d_{ts} = 1 \) for \( t = s \), zero otherwise.\(^1\)


\[
R_i = R_{mt} \beta_{i-1} + v_i,
\]

[4]

where \( v = Xw_i + e \). The model, in matrix form, becomes

\[
R = X\beta_{i-1} + v,
\]

[5]

where \( R \) is the T-vector of \( R_i \) values, \( X \) is the T-vector of \( R_{mt} \) values, and \( v = Zw + e \) is the T-vector of normally distributed disturbances, where \( Z \) is the \((T \times T)\) diagonal matrix whose \( t \)'th diagonal element equals \( R_{mt} \). The assumptions for \( u \) and \( e \) imply

\[
E(e'e') = s_5^5 I, \quad E(ww') = ? \]

[6]

\[
E(u'v') = Z?Z' + s_5^5 I = O, \quad \]

[7]

where \( ? \) is an \((T \times T)\) matrix \( s_5^5((?)_{ij}) \) where \( ?_{ij} = \min(i,j) \).

Using procedures from Hildreth and Houk (1968), Rao (1973), Sarris (1973), and Degroot (1974), the empirical Bayes estimator for the \((T \times 1)\) \( \beta \) vector is given by

\[
\hat{\beta} = ?\hat{\beta}_{i-1} + \hat{w},
\]

[9]

where \( \hat{e} = R - X\hat{\beta}_{i-1} \) and \( \hat{w} = \frac{\hat{e}Z^\prime O^{-1}\hat{e}}{\bar{v}} \).

Because the estimators for \( s_5^5 \) and \( s_u^5 \) are consistent, the empirical Bayes estimator for \( \beta \) is asymptotically minimum variance as shown by Hildreth and Houk (1968).

**DATA**

The study is conducted on sample data for the period 1982-1987. The choice of the sample period is to use recent data and also to match with the period used by Grammatikos and Papaioannou...
The choice of the sample size is to ensure a large sample, with an eye on computer resources, since the random walk beta estimation is quite CPU time intensive. Each firm in the sample has to satisfy the following criteria: 1) move from the OTC to the NYSE during the period 1st January, 1982 - 31st December, 1987; 2) be traded for at least 150 days without being delisted; 3) have no more than 5 missing returns. The sample data is obtained from the 1987 CRSP daily returns tape. The CRSP value weighted index (with dividends) is used as the market index.

EMPIRICAL FINDINGS

The betas for each of the 150 stocks in the sample, moving from the OTC to the NYSE are computed for the 120 days following the new listing (event period), using the empirical Bayes estimator developed in the Methodology Section for random walk beta. Using the market model and the computed betas the abnormal return for each stock is computed for each of the 120 days. AAR and CAAR along with t-statistics are computed for the event period, employing standard event time study procedures given in Brown and Warner (1984). Average betas are also computed. These results are shown in Table I.

It is seen from the results in Table I that the average beta declines over the 120 days. The decline is about 12% for the sample of stocks moving from the OTC to the NYSE. These results are different from earlier findings in Fabozzi and Hershkoff (1979), Reints and Vanderberg (1975) and Ying et al (1977), in which the betas in the post-listing period do not change, as well as the findings in Bhandari et al (1989), where the betas initially increase. The decline in beta should mitigate against the negative abnormal returns found in earlier studies.

The results from Table I also indicate that the AAR and CAAR are not statistically significant at the 5% level on any day. Thus the hypothesis that the AAR and CAAR in the post-listing period will not be statistically significant, if beta is specified to follow a random walk process, cannot be rejected.

SUMMARY AND CONCLUSIONS

Prior studies on newly listed securities, moving from the OTC to the NYSE, indicate significant negative abnormal returns in the post-listing period. Prior studies also fail to find any reduction in the systematic risk of such newly listed securities in the post-listing period. A shortcoming of these studies is that beta is allowed to be constant throughout the estimation period. By allowing beta to follow a random walk process as evidenced by the studies of Fisher and Kamin (1978), Sunder (1980), and Kryzanowski and To (1984) the current study examines the post-listing return behavior of a sample of 150 stocks moving from the OTC to the NYSE during 1982-1987.

An empirical Bayes estimator for a random walk beta is first developed. Betas are estimated using the empirical Bayes estimator for the random walk process. The average betas are found to decline by about 12% for the AMEX sample. Average and Cumulative Average Abnormal Returns computed from the random walk betas are not statistically significant at the 5% level for the sample in the event period. Thus, the present study shows that the significant negative abnormal returns found in earlier studies can be explained by a reduction in beta, when beta is estimated using a random walk prior process.

END NOTES

1. Returns are defined as deviations from means merely to remove the intercept, simplifying notation in the methodology sections.

2. Missing returns are replaced by geometric mean returns for the missing period.

REFERENCES


Rao, C., Linear Statistical Inference and its Applications (New York: John Wiley and Sons, 1973)


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<tr>
<th>DAY</th>
<th>AAR</th>
<th>t-AAR</th>
<th>CAAR</th>
<th>t-CAR</th>
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<td>32</td>
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<td>0.87</td>
</tr>
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<td></td>
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<tr>
<td>---</td>
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<td>70</td>
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<td>80</td>
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<td>0.010190</td>
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<td>0.86</td>
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<tr>
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<td>-1.36</td>
<td>-0.003921</td>
<td>-0.13</td>
<td>0.86</td>
</tr>
<tr>
<td>120</td>
<td>0.005848</td>
<td>1.80</td>
<td>0.008831</td>
<td>0.28</td>
<td>0.86</td>
</tr>
</tbody>
</table>
A PRELIMINARY EXAMINATION OF EARLY ADOPTION AND THE CHOICE OF ACCOUNTING METHOD WHEN EUROPEAN UNION COMPANIES ADOPT INTERNATIONAL ACCOUNTING STANDARDS

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ABSTRACT

This paper discusses an ongoing examination of European Union (EU) companies as they begin to comply with EU requirements to prepare financial reports using International Accounting Standards (IASs). The paper outlines the history of this requirement, project design and preliminary data. Comments and questions are encouraged.

BACKGROUND

The International Accounting Standards Committee (IASC) was created in 1973 with the purpose of improving the comparability of financial reporting across countries. Since its inception the organization has released 41 standards.

The acceptance of international standards has increased significantly over the past decade. Currently twelve stock exchanges require listed companies to report using International Accounting Standards (IASs). Another 27 exchanges allow companies an option of using IASs or local standards to file reports.

The committee, in 2001, created the International Accounting Standards Board (IASB). The Board is now responsible for standard setting. The Board is comprised of twelve full-time members and two part-time. Seven of the members are appointed as official liaisons to national standard-setting bodies. It is their goal to work with these organizations to increase the acceptance of international standards for the purpose of removing barriers for investment by improving the quality of financial reporting.

In 2001 the European Commission presented a proposal that would require publicly listed European Union (EU) companies to file using IASs by 2005. By the end of 2003, the Accounting Regulatory Committee had voted to adopt all IASs, except IASs 32 and 39. With this vote the Accounting Regulatory Committee has committed EU companies to filing using IASs by 2005 as originally proposed. The purpose of the proposal is to improve the comparability of financial reports among the EU countries and remove barriers to accessing global capital.

Early studies on the comparability of financial reporting across countries reported on the differences created by various accounting practices [see Davidson and Kohlmeier...
(1966), Abel (1969), Gray (1980), Choi et. al (1983), Weetman and Gray (1990), Hagigi and Sponza (1990), Weetman and Gray (1991), and Walton (1992)]. Other studies examined the use of financial statement ratios as a means of standardizing and evaluating companies in different countries. These studies [see Choi et al. (1983), Hagigi and Sponza (1990), Bavishi (1992) and Basu, Hwang and Jan (1998)] indicated that underlying environmental influences impact ratio analysis even with reconciled data and concluded that differences in measurement practices does impact analysts forecast errors.

Recent research has reported that the use of IASs has increased the degree of comparability among financial reporting across companies. Murphy (2003) reported that the degree of harmonization, as measured by the H index, increased over the six-year period examined. The study compared the accounting methods used for five accounting practices, for 69 companies across eleven countries. The results were statistically significant for four of the five practices: depreciation, financial statement cost basis, consolidations and goodwill. Inventory practices had a decrease in the H index, however fewer companies were choosing to not disclose. Other studies have reported similar results, see Emenyonu and Gray (1992), Herrmann and Thomas (1995), Emenyonu and Gray (1996) and Murphy (2000). Recent research would support the EU commission’s goal of improving the comparability of financial reporting across companies from various countries.

**PROJECT DESIGN**

Why have some companies adopted IASs and why are other publicly traded companies waiting? What benefits do companies gain from early adoption? This study will examine the impact on earnings and asset value as EU companies’ choose to adopt IASs. This study hypothesizes that the early adoption of IASs will result in favorable, income increasing, results for the company. The study will also examine the impact on the balance sheet. As Black and White (2003) reported the value relevance of the balance sheet is higher in more credit-oriented countries, where liquidity has more importance than earnings. Therefore, examining the affect of accounting method changes on the balance sheet will also be evaluated. Similar to the earnings hypothesis, it is anticipated that changes in accounting methods will have a positive, asset increasing, affect on balance sheet items.

Two of the hypotheses to be tested are

H1: companies who early adopt IASs will choose methods that are income increasing.

H2: companies who early adopt IASs will choose methods that increase assets.

The study will also examine the question of who adopts early. Similar to Murphy (1999) this study will look at the characteristics of firms who early adopt. This will expand the earlier study, which was limited to 16 Swiss companies.

H3: companies who early adopt are larger than companies who wait to adopt IASs.

H4: companies who early adopt have more business outside outside their domestic location than those who wait to adopt IASs.

Three samples will be collected; companies who adopted prior to the proposed announcement in 2001, companies who adopted between 2001 and 2005 and companies who adopted as required. Companies listed on EU stock exchanges will be selected from the Worldscope database. Worldscope provides descriptive information on 33 accounting practices. A subset of practices will be selected which impact earnings as well as asset valuation. The accounting methods and any changes to methods used will be evaluated for the EU sample choosing to use IASs. This will be compared to the control sample for the same time period to determine if similar patterns exist.

**PRELIMINARY DATA**

A search of the May 2001 Worldscope database resulted in 6,670 EU companies. Of these companies 143, 2%, reported using IASs. Table One lists the distribution of companies by country.

Preliminary data gather from a sample of Austrian companies indicate that the firms who
are using IASs are larger in size based on a number of measures, Table Two.

<table>
<thead>
<tr>
<th>Country</th>
<th>Total</th>
<th>IASC</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>133</td>
<td>15</td>
<td>11%</td>
</tr>
<tr>
<td>Belgium</td>
<td>191</td>
<td>2</td>
<td>1%</td>
</tr>
<tr>
<td>Denmark</td>
<td>250</td>
<td>7</td>
<td>3%</td>
</tr>
<tr>
<td>Finland</td>
<td>178</td>
<td>5</td>
<td>3%</td>
</tr>
<tr>
<td>France</td>
<td>1,021</td>
<td>6</td>
<td>1%</td>
</tr>
<tr>
<td>Germany</td>
<td>1,095</td>
<td>86</td>
<td>8%</td>
</tr>
<tr>
<td>Greece</td>
<td>235</td>
<td>3</td>
<td>1%</td>
</tr>
<tr>
<td>Ireland</td>
<td>96</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Italy</td>
<td>290</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Luxembourg</td>
<td>38</td>
<td>2</td>
<td>5%</td>
</tr>
<tr>
<td>Portugal</td>
<td>107</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Spain</td>
<td>217</td>
<td>1</td>
<td>0%</td>
</tr>
<tr>
<td>Sweden</td>
<td>353</td>
<td>3</td>
<td>1%</td>
</tr>
<tr>
<td>Netherlands</td>
<td>291</td>
<td>12</td>
<td>4%</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>2,175</td>
<td>1</td>
<td>0%</td>
</tr>
<tr>
<td>Total</td>
<td>6,670</td>
<td>143</td>
<td>2%</td>
</tr>
</tbody>
</table>

**TABLE TWO**

**AUSTRIAN COMPANY DATA**

<table>
<thead>
<tr>
<th>Averages</th>
<th>IAS Companies</th>
<th>Local Companies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>€ 15,765,855</td>
<td>€ 1,800,803</td>
</tr>
<tr>
<td>Net Income</td>
<td>€ 404,581</td>
<td>€ 74,083</td>
</tr>
<tr>
<td>Assets</td>
<td>€ 134,965,686</td>
<td>€ 9,784,804</td>
</tr>
<tr>
<td>Employees</td>
<td>6,132</td>
<td>521</td>
</tr>
<tr>
<td>Auditor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>KPMG</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Coopers</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Other</td>
<td>1</td>
<td>4</td>
</tr>
</tbody>
</table>

**SUMMARY**

This study will develop over time. The first phase and data gathering is continuing at this time. The first phase, comparison of use in 2001, when the proposal was announced, will be completed during 2004. Suggestions and comments are welcomed.

**REFERENCES**


PENSION AND SAVINGS CHANGES FOR 2003

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ABSTRACT

The passage of the Portman-Cardin Bill would have resulted in significant benefits to savers and investors by accelerating many of the benefits that had been previously passed in the Economic Growth and Tax Reconciliation Act of 2001. Unfortunately, the Bill met resistance and was tabled until the 2004 Legislative Session. This paper discusses the contents of the Bill.

INTRODUCTION

In July 2003, it seemed likely that pension and saving reform would be made this year. The House Ways & Means Committee passed the Pension Preservation and savings Expansion Act of 2003 (H.R. 1776) which has commonly become known as the Portman-Cardin Bill. H.R. 1776 sought to expand the pension provisions that were previously included in the Economic Growth and Tax Reconciliation Relief of 2001. In July, the Bill seemed to have bi-partisan support and was expected to swiftly pass both the House and Senate. Unfortunately, for reasons to be discussed later in this paper, it seems unlikely that any significant reform will occur this year. As such, these important changes to our pension and savings system will probably be taken up next year during the Presidential election year.

It is the purpose of this brief paper to outline and discuss the major features of Portman-Cardin which may indeed wait until 2004 (or even later) to be enacted.

DISCUSSION

The revised version of H.R 1776 would accomplish the following things:

1. Accelerate the scheduled increases in retirement plan and IRA contribution limits. If enacted, individuals could contribute $15,000 to their 403(b), 401(k) or 457 plans beginning in 2004. Currently, the limits are set at $13,000 for the 2004 year.

2. Accelerate to $5000 the contribution limits to IRA’s beginning in 2004. Also, the bill would allow for greater catch-up limits for savers age 50 and over.

3. Increase to $10,000 the limit for SIMPLE
4. Allow one spouse to roll IRA savings to another spouse’s IRA at any time. Presently, this is allowed only at death or divorce.

5. Presently, if a retirement participant dies, and the beneficiary is someone other than the participant’s spouse, the benefits must usually be distributed as a lump sum. Under H.R. 1776, these benefits may be transferred to the beneficiary and treated as an “inherited IRA” which would allow the beneficiary to keep the benefits tax deferred.

6. Direct rollovers could be made from a 403(b) and 401(k) to a Roth IRA.

7. Raise the minimum required distribution age to 72 in years 2004-2007 and 75 in 2008 and thereafter from the present 70.5.

8. Reduce costs for defined benefit plans by basing funding requirements on the long-term corporate bond rate versus the current 30 year Treasury bond rate.

9. Provides that a portion of annuity payments from defined contribution plans will be excluded from gross income.

It seems obvious that passage of this Bill would significantly aid most workers in saving for retirement and would promote more needed flexibility in retirement saving. Unfortunately, passage this year was stymied by the eruption of a bitter political dispute. Evidently, even though there were no Democratic objections to the content on the bill, representatives were angered when they were given only a short time to consider key revisions to the bill. Also, some Congressmen were upset that the Bill was reported from committee when no Democrats were in the room. In fact, police were summoned to the Committee meeting rooms. As such, there was an extraordinary debate on the House floor to disapprove the actions of the Ways and Means Committee Chairman Bill Thomas. The Bill was tabled and awaits discussion next year.
Test Item Quality: An Assessment of Accounting Test Banks

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ABSTRACT

Test items from test banks for five different courses typically found in a traditional accounting program were reviewed for adherence to the principles of multiple-choice test item construction. Two chapters from each test bank were randomly selected. The courses represented were Principles of Accounting I, Principles of Accounting II, Accounting Information Systems, Individual Income Tax, and Auditing. In total 684 items were analyzed with respect to item type, clarity, and clueing. Slightly more than half (55%) of the questions were of the sentence completion type, while 11% made use of the complex format. Experts recommend that both of these forms of multiple-choice items be avoided. Two features of stem construction that hinder clarity include negative wording and “window dressing”. All test banks had some items that included negatively phrased stems and “window dressing” or superfluous information. Negatively worded items were found in 33% of the items from the auditing test bank, whereas, approximately 25% of the multiple-choice items in the systems and tax test banks included window dressing. Response features that hinder item clarity involved illogical ordering and word overlap. The Principles of Accounting test banks had the highest occurrence of illogically ordered responses; whereas the other three test banks had very few incidences of this feature. Overlapping wording appeared rather infrequently and in only 7% of the items. The four features of clueing examined involved specific determiners, answer length, grammatical parallelism, and key word clues. The use of specific determiners occurred in 25% of the test questions and nearly all of the tax items. The other three forms of clueing occurred in less than 7% of the items. Implications for faculty are words of caution to carefully review items before including them on exams. Reasons should exist for violating recommended guidelines. When test items are inappropriately created, they may not be reliably measuring intended outcomes and leave students with feelings that the test consisted of trick questions.

INTRODUCTION

The multiple choice examination is the most widely used form of achievement testing found in both educational and professional settings. For accountants all of the designations that can be added to one’s credentials include the passing of examinations that utilize the multiple-choice item format. Test item writers who have been trained to apply principles of test item construction generally develop the multiple-choice items selected for inclusion on professional examinations. In educational
settings, however, accounting faculty often rely on the test banks provided by the publishers of accounting textbooks as a source for the items they use to evaluate learning in the courses they teach.

**PURPOSE**
The motivation for this study was the new CPA exam that debuts in May 2004 and principles of test item construction applied to the development of the examination questions. The AICPA contracted with ACT, Inc. to train test item writers to develop the multiple-choice questions being used on the new exam. In 2001, ACT, Inc., and the AICPA published the manual “Guidelines for Item Writers and Reviews.”

As a result, we wondered to what extent authors applied the principles of multiple-choice test item construction to the questions included in the accounting test banks. Rather than trying to evaluate all facets of test item construction, we focused on three areas: question type, stem clarity, and clueing. Therefore, we posed the following questions:

1. Is a particular item type (correct answer question, best answer question, sentence completion, and the complex format) favored by accounting test bank writers?
2. How frequently is “window dressing” included in item stems?
3. How frequently are negatively worded stems used; is the negative wording highlighted, and are double negative response options avoided?
4. How frequently are response options illogically ordered?
5. How frequently are overlapping response options used?
6. To what extent does including specific determiners allow for eliminating a response option?
7. To what extent does response length provide a clue to the correct response?
8. To what extent does a lack of grammatical parallelism provide a clue to the correct response?
9. To what extent do key words in the stem provide a clue to the correct response?

**BACKGROUND**
Individuals, who pursue bachelors and masters degrees in Education, invariably are required to complete a course in tests and measurements. These courses generally include coverage of the principles of test item construction. People who pursue careers in higher education in Business, however, seldom, if ever are required to complete an equivalent type of course as part of their doctoral studies. Yet, business faculty are routinely faced with the task of reviewing or constructing test items to evaluate student learning. Experts in the field of educational measurement have developed guidelines to help individuals learn how to construct effective test items. While they agree that the rules need not be strictly adhered to, it is important for test item writers to have specific reasons for ignoring the guidelines. The quality of the test item affects the extent to which learning is reliably being measured.

Over the years many books (Osterlind, 1989; Ebel & Frisbie, 1991; Gronlund, 1993; Haladyna, 1994 & 1997; Popham, 2000) have been written that provide direction on the development of test items. For the multiple-choice format, the guidelines typically address stem and response option development. Question type, stem clarity, and clueing are just three of the several features important to the construction of well-designed multiple-choice items.

**Question Format**
Four types of the multiple-choice items exist: 1) the correct answer question, 2) the best answer question, 3) the sentence completion, and 4) the complex format. Research indicates the correct answer and best answer questions are preferable to the sentence completion or complex formats (ACT, Inc., 2001, Haladyna & Downing, 1989, Osterlind, 1989). The correct answer and best answer questions are more direct and less ambiguous than the other formats.

The sentence completion multiple-choice item should not be used for two reasons. First of all, test items should focus on measuring the attainment of knowledge instead of reading ability. With a sentence completion item, an unfocused stem is often created. As a result, the test taker has to read each option to figure out what the item is asking. Writing an interrogative stem is considered superior because the sentence tends to be worded with more grammatical rigor and communicates with greater clarity (Osterlind, 1989). The second reason for avoiding the use of sentence completion items is that they tend to
take the form of a fill in the blank statement. As a result the questions tend to assess lower levels of cognition (Haladyna, 1997). The exception to this recommendation is the mathematical problem type of multiple-choice item typically found in accounting test banks. However, with little difficulty, the stems for these items can easily be converted to an interrogative sentence.

Another type of multiple-choice item is known as the complex format. This format tends to test more than one concept at a time and can take on several forms: 1) the multiple true/false item, 2) the multiple yes/no or columnar item, 3) the multiple fill-in-the blank item, and 4) the multiple scenario. Experts in test item construction recommend that this format be used sparingly (ACT, Inc., 2001; Albanese, 1992; Downing, 1992; Frisbie, 1993; Haladyna, 1994). The multiple true/false items tend to take more time to answer and are generally highest in difficulty level. They also tend to increase test anxiety for those students who suffer from it. With the columnar format type of item, options usually can be eliminated based on partial knowledge as is illustrated in the following example:

<table>
<thead>
<tr>
<th>What is the result of failing to adjust unearned revenue that has been partially earned?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Revenues</strong></td>
</tr>
<tr>
<td>A. Overstatement</td>
</tr>
<tr>
<td>B. Overstatement</td>
</tr>
<tr>
<td>C. Understatement</td>
</tr>
<tr>
<td>D. Understatement</td>
</tr>
</tbody>
</table>

In addition two concepts are being tested and no credit is given for partial knowledge (choice C).

**Item Clarity**
The most important aspect of writing a test item is clarity (Haladyna, 1997). How the stem and response options are constructed impacts the clarity of the question being asked. Two aspects of stem construction that affect clarity include “window dressing”, and negative wording. A stem cluttered with superfluous information or excess verbiage that is neither related to the concept being tested nor used in any of the response options is said to include “window dressing.” The following test item has “window dressing” in the stem:

A number of edit checks should be performed to ensure that all parts of the data required to process an order have been collected and accurately recorded. The edit check that compares a quantity being ordered to past history for that items and customer is called a:

A. Validity check  
B. Reasonableness check ***  
C. Completeness check  
D. Limit check

A well-written stem should contain just enough information to support the responses and enable the reader to determine the correct answer.

Negatively phrased items confuse many examinees (Haladyna, 1997: Popham 2000), especially those whose first language is not English (ACT, Inc., 2001). The test taker is asked to identify the exception to a set of criteria using phrases such as “not true”, “least likely”, “true except for”, “false”, etc. The negatively phrased item is often created because it is easier to compose only one “not true” response instead of three or four. The problem with the negatively phrased stem is that the item assesses what students know to be false and may not be measuring the intended objective of the item. In addition, when used in large numbers, this format usually decreases test score validity (ACT, Inc., 2001). In some instances knowing what should not be done is an important learning outcome and a negatively worded stem is appropriate. In this situation, the negative wording should be highlighted (Gronlund, 1993) so that an anxious test taker doesn’t miss the true meaning of the item. However,

<table>
<thead>
<tr>
<th>Which of the following statements does not correctly describe the kiddie tax?</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. <em>It does not</em> apply to a child who reaches age 14 during the tax year</td>
</tr>
<tr>
<td>B. <em>It does not</em> apply to a child who has no unearned income</td>
</tr>
<tr>
<td>C. Any amount of unearned income will trigger the tax ***</td>
</tr>
<tr>
<td>D. If the tax applies, it may be computed on a return filed for the child or the parents</td>
</tr>
</tbody>
</table>

care must also be exercised to avoid responses that also include negative phrasing. Creating
double negative situations confuse test-takers and decreases item clarity as is the case with the kiddie tax example.

Two aspects of response construction that affect clarity are illogical ordering and overlapping response options. Numerical answers should be arranged in ascending or descending sequence. If choices overlap, they are unlikely to be correct. Similarly if an overlapping choice is correct, then the stem is probably ambiguous and may have more than one correct answer. An example of an item that has overlapping response options is illustrated below. Items in which clarity is hindered are often considered trick questions.

<table>
<thead>
<tr>
<th>Which batch totals are manually calculated for each batch in a typical sales order system?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A.</strong> The record count and hash total of the quantities ordered.  ***</td>
</tr>
<tr>
<td><strong>B.</strong> The financial total of the amounts billed to customers and hash total of the quantities ordered.</td>
</tr>
<tr>
<td><strong>C.</strong> The line count and record count.</td>
</tr>
<tr>
<td><strong>D.</strong> The record count and hash total of the sales order numbers.</td>
</tr>
</tbody>
</table>

**Clueing**

Clueing involves having an element in the stem or responses that allows the test-taker who lacks knowledge to guess the correct answer. Clueing occurs in the following situations: 1) specific determiners are used in response options, 2) the longest response is the correct one, 3) the correct response lacks grammatical parallelism, and 4) the wording in the stem and correct response are similar.

Specific determiners are words such as “always,” “never,” “invariably,” and “universally.” As a general rule, specific determiners should be avoided because the test wise student will immediately recognize the over qualification (Sarnacki, 1979). Osterlind (1989) recommends writing the response alternative with and without the specific determiner, and then considering how the examinee might react to it in order to determine whether the qualifiers actually enhance the quality of the item.

Response options that include “all of the above” or “none of the above” are another form of specific determiner. They are often used when test-item writers have difficulty creating that last alternative. This situation is not an appropriate use of the “all” or “none of the above” option because it results in a less discriminating test item. In the “all of the above” case, the test taker who recognizes two correct options automatically knows that “all of the above” is the intended answer. In addition, including “none of the above” as the correct response may be measuring nothing more than the ability to detect incorrect answers (Gronlund, 1993). As with the negatively phrased items, recognizing that certain answers are wrong is no guarantee that the student knows what is correct. An appropriate use of the “none of the above” option, however, would be with computational problems. The purpose, in this case, should be to reduce the likelihood of estimating an answer instead of performing the calculations.

Another form of clueing occurs when the longest response is predominantly the correct answer. As a result test writers need to consciously vary the length of the correct response or make sure that each response option is relatively the same size. Correct answers often tend to be longer than alternatives because of the need to quality statements to make them unequivocally correct. The following test item provides an illustration where response length and lack of parallelism are clues to the correct answer.

<table>
<thead>
<tr>
<th>The third step in drawing a REA diagram is:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A.</strong> To identify the events that are affected by agents.</td>
</tr>
<tr>
<td><strong>B.</strong> Analyzing each economic exchange event to determine whether it can be decomposed into a combination of one or more commitment and exchange events.  ***</td>
</tr>
<tr>
<td><strong>C.</strong> To identify economic exchange events which consist of a pair, one that increases a resource and one that decreases another</td>
</tr>
<tr>
<td><strong>D.</strong> To add information about the nature of the relationships between the various entities</td>
</tr>
</tbody>
</table>

When the correct response alternative lacks grammatical parallelisms with the others, a clue is provided to the test wise individual. In this situation a grammatical form is repeated in a
carefully balanced manner. The elements used in the responses need to be equal or nearly equal in grammatical structure and importance.

Sometimes key words found in the stem may be unintentionally repeated in the correct answer. Take the following item:

A system of accounting in which revenues and expenses are recorded only when cash is received is called:
   A. Revenue recognition accounting
   B. Accrual basis accounting
   C. Realization accounting
   D. Cash basis accounting ***

The word “cash” in the stem and correct response is likely to provide a clue to an uninformed test taker who guesses.

METHODOLOGY
The first step in conducting our assessment involved developing an evaluation rubric to use as we read test items. Next we randomly selected two chapters per test bank. We selected an Accounting Information Systems test bank and an Individual Income Tax test bank to test our process. Each author possessed expertise in one of these areas. Our concern was whether we would be able to discern test item design flaws in content areas beyond our primary teaching responsibilities. We reviewed each test item independently, compared our reviews and resolved any differences of opinions. Results were tallied using an Excel spreadsheet.

THE SAMPLE
Five test banks from five different publishers for courses found in a standard accounting curriculum were chosen. The test banks were for: Principles I, Principles II, Accounting Information Systems, Individual Income Tax, and Auditing. In total 684 test items were reviewed from the five test banks as follows: Principles I (229), Principles II (150), Systems (121), Auditing (93), and Tax (91).

RESULTS
Question Type
Based on question type, we identified 282 correct answer items, 24 best answer items, 378 sentence completion items, and 77 complex items. A summary of the frequency that each item type was used is provided in Table 1. Slightly more than half of the items created used the sentence completion format. A total of 315 of the items (46%) were phrases that required a response option to finish the statement. The other 63 items (17%) were math problems. Every test bank used the standard complete the sentence type of item. Only the Principles I (39 items) and Tax (24 items) test banks used the sentence completion computational problem type of item. The complex format type of multiple-choice item can take on at least five forms: 1) the multiple true/false question (29 items identified), 2) the multiple scenario (26 items identified), 3) the multiple fill-in-the-blank completion (10 items identified), 4) the multiple yes/no columnar format (6 items identified), and 5) the multiple true/false sentence completion (6 items identified). Less than 6% of the items in each test bank were of the multiple true/false type. All of the multiple yes/no columnar items were found in the auditing test bank. All of the multiple fill-in-the-blank items were in the Accounting Information Systems test bank, and 24 of the 26 multiple scenario items were in the Tax test bank.

<table>
<thead>
<tr>
<th>Test Bank</th>
<th>N</th>
<th>Correct Answer</th>
<th>Best Answer</th>
<th>Sentence Completion</th>
<th>Complex Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>Principles I</td>
<td>229</td>
<td>84 36.7%</td>
<td>0 0.0%</td>
<td>145 63.3%</td>
<td>6 2.6%</td>
</tr>
<tr>
<td>Principles II</td>
<td>150</td>
<td>95 63.3%</td>
<td>0 0.0%</td>
<td>55 36.7%</td>
<td>11 7.3%</td>
</tr>
<tr>
<td>Systems</td>
<td>121</td>
<td>33 27.3%</td>
<td>7 5.8%</td>
<td>81 66.9%</td>
<td>15 12.4%</td>
</tr>
<tr>
<td>Tax</td>
<td>91</td>
<td>46 50.6%</td>
<td>0 0.0%</td>
<td>45 49.5%</td>
<td>33 36.3%</td>
</tr>
<tr>
<td>Auditing</td>
<td>93</td>
<td>24 25.8%</td>
<td>17 18.3%</td>
<td>52 55.9%</td>
<td>12 12.9%</td>
</tr>
<tr>
<td>Combined</td>
<td>684</td>
<td>282 41.2%</td>
<td>24 3.5%</td>
<td>378 55.3%</td>
<td>77 11.3%</td>
</tr>
</tbody>
</table>
**Stem and Response Clarity**

The stems of each multiple-choice item were examined for the existence of window dressing and negative wording. In terms of window dressing, 88 or 12.8% of the total items included some form of window dressing. As for the use of negatively worded stems, 92 or 13.5% of this type were identified. Of the negatively phrased stems, 32 failed to have the negative wording highlighted. In addition 17 of the 92 items had a response option that also included negative wording causing a double negative situation to occur. A summary of stem construction features that hinder item clarity per test bank and in total is provided in Table 2.

<table>
<thead>
<tr>
<th>Test Bank</th>
<th>N</th>
<th>Negative Stem</th>
<th>Negative Not Highlighted</th>
<th>Double Negative</th>
<th>Window Dressing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Principles I</td>
<td>229</td>
<td>26</td>
<td>3</td>
<td>8</td>
<td>17</td>
</tr>
<tr>
<td>Principles II</td>
<td>150</td>
<td>18</td>
<td>18</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Systems</td>
<td>121</td>
<td>10</td>
<td>2</td>
<td>0</td>
<td>32</td>
</tr>
<tr>
<td>Tax</td>
<td>91</td>
<td>7</td>
<td>1</td>
<td>3</td>
<td>21</td>
</tr>
<tr>
<td>Auditing</td>
<td>93</td>
<td>31</td>
<td>8</td>
<td>9.6%</td>
<td>3</td>
</tr>
<tr>
<td>Combined</td>
<td>684</td>
<td>92</td>
<td>4.7%</td>
<td>17</td>
<td>88</td>
</tr>
</tbody>
</table>

Clarity problems associated with the construction of response alternatives occurred in 21% of the test items. A summary of the results per test bank is provided in Table 3.

<table>
<thead>
<tr>
<th>Test Bank</th>
<th>N</th>
<th>Ilogical Ordering</th>
<th>Overlapping Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Princ. I</td>
<td>229</td>
<td>41</td>
<td>7</td>
</tr>
<tr>
<td>Princ. II</td>
<td>150</td>
<td>43</td>
<td>3</td>
</tr>
<tr>
<td>Systems</td>
<td>121</td>
<td>7</td>
<td>19</td>
</tr>
<tr>
<td>Tax</td>
<td>91</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>Auditing</td>
<td>93</td>
<td>0</td>
<td>12</td>
</tr>
<tr>
<td>Combined</td>
<td>684</td>
<td>94</td>
<td>47</td>
</tr>
</tbody>
</table>

Illogical ordering appeared in 94 or 14% of the test items and primarily involved numerical amounts listed randomly instead of in ascending or descending sequence. The features occurred primarily in the test banks for the Principles of Accounting test banks. Items that repeated key words in two or more response alternatives were found in 47 or 7% of the total test items reviewed. However, approximately 16% of the Systems and 13% of the Auditing test items included overlapping responses.

**Clueing**

The four aspects of clueing examined were: 1) use of specific determiners, 2) the length of the correct response, 3) grammatical parallelism among the response options, and 4) the existence of keywords in the stem and correct answer. Out of the 684 test items reviewed, we found 173 instances of specific determiners being used; 51 instances where the correct answer was the longest response; 33 instances of parallelism clues; and 16 instances where the stem and correct response contained the same key words. Nearly every test item found in the two chapters of the Tax test bank included the “none of the above” answer response, yet very few items had this choice as the correct response. Therefore, the “none of the above” option was very likely filler so that every item had the same number of responses. At least
25% of the Systems and Auditing items also contained specific determiners. In terms of the longest answer being the correct response, this feature occurred more frequently in the chapters reviewed for the upper level accounting test banks than the principles courses. A violation of grammatical parallelism creates cluing when the inconsistent response option is the correct answer. This situation occurred the most frequently in the Systems test bank. Having keywords in the stem that are repeated in the correct response is known as keyword clueing. This feature of poor test item construction occurred very infrequently in the test banks reviewed. A summary of the clueing problems identified is provided in Table 4.

<table>
<thead>
<tr>
<th>Test Bank</th>
<th>N</th>
<th>Specific Determiners</th>
<th>Longest Answer Correct</th>
<th>Correct Answer Not Parallel</th>
<th>Key Words in Stem and Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Principles I</td>
<td>229</td>
<td>27</td>
<td>7</td>
<td>3%</td>
<td>9</td>
</tr>
<tr>
<td>Principles II</td>
<td>150</td>
<td>16</td>
<td>4</td>
<td>3%</td>
<td>2</td>
</tr>
<tr>
<td>Systems</td>
<td>121</td>
<td>31</td>
<td>13</td>
<td>11%</td>
<td>15</td>
</tr>
<tr>
<td>Tax</td>
<td>91</td>
<td>86</td>
<td>11</td>
<td>12%</td>
<td>3</td>
</tr>
<tr>
<td>Auditing</td>
<td>93</td>
<td>13</td>
<td>16</td>
<td>17%</td>
<td>2</td>
</tr>
<tr>
<td>Combined</td>
<td>684</td>
<td>173</td>
<td>51</td>
<td>7%</td>
<td>31</td>
</tr>
</tbody>
</table>

**CONCLUSION**

The test banks developed for the accounting courses that were reviewed are in need of improvement. Approximately 66% of the test items used the sentence completion or complex formats that are considered inferior by test construction experts. Every test bank except the Principles of Accounting II book used the sentence completion type of test item 50-67% of the time. According to test and measurement experts, sentence completion multiple-choice items should be avoided because they tend to lack focus and grammatical accuracy, assess lower levels of cognition, and take more time to read. Though occurring less frequently, every test bank included complex format items, with 36% of the Tax items taking on this form. The complex format type of items takes more time to answer and increase stress for students who suffer from test anxiety. In addition the complex format often allows for the elimination of two choices based on partial information.

The test banks for the Principles of Accounting courses had the best overall quality in terms of clarity and clueing. The illogical ordering of responses was the most noted test item construction problem, followed by questions that included absolute determiners and negatively worded stems. While other concerns were present, they occurred in less than 8% of the items. The majority of the illogical ordering was due to amounts displayed haphazardly rather than in ascending or descending sequence. All of the negatively worded stems in the Principles II test bank failed to have the negative wording highlighted. Both of the first two situations can easily be corrected.

The test banks for the upper level courses seemed to contain more rule violations. The Systems test bank appeared to have the most problems with a total of 123 concerns noted. Window dressing and the inclusion of specific determiners each were found in 26% of the items. Overlapping responses appeared in 16% of the items. In terms of clueing, response length and a lack of grammatical parallelism were found in 11% and 12% of the items, respectively. While the Tax test bank had the most concerns noted, they were due largely to one issue, use of specific determiners. Inclusion of the “none of the above” response option appeared in 86 questions as the fifth response option. However it was seldom the correct response and, therefore, could easily be
removed as a viable option. Besides the response length, the other features of concern appeared in less than 7% of the items. The Auditing test bank had the least instances of concern with 89 issues observed. Negatively worded stems comprised 33% of the Auditing items; 17% had the longest response as the correct answer; 14% used specific determiners, and 15% included window dressing. It should be noted that many times a single question contained multiple concerns.

Why were the Principles I and II test banks better? Results may be explained by the fact that the test items assess more simplistic concepts than the upper level accounting courses. In addition, more effort may be channeled into the development of the supplementary materials provided for Principles textbooks because larger numbers of accounting and non-accounting business majors take these courses compared to only the accounting majors enrolled in upper level classes.

In conclusion, for the test banks evaluated the test items provided for the three upper level accounting courses need the most improvement. Refining the test items for the upper level courses in most cases will require a rewrite of the entire question as opposed to mechanical modifications like highlighting negative words or reordering response options in ascending or descending sequence which is the case for the principles level test banks. While this study is not representative of all the test banks available for accounting courses, the results indicate that faculty, as users need to beware. Test items need to be selected with a discerning eye so that the assessments use measure the intended outcomes.

### APPENDIX A

**EXAMPLES OF REVISED QUESTIONS**

<table>
<thead>
<tr>
<th>Revised columnar format item</th>
<th>Window Dressing Eliminated from Stem</th>
</tr>
</thead>
<tbody>
<tr>
<td>What is the result on the Balance Sheet of failing to adjust unearned revenue that has been partially earned?</td>
<td>What type of edit check is used to compare a quantity being ordered to the past history for that item and the customer?</td>
</tr>
<tr>
<td>A. Understatement of revenue</td>
<td>A. Validity check</td>
</tr>
<tr>
<td>B. Understatement of assets</td>
<td>B. Reasonableness check ***</td>
</tr>
<tr>
<td>C. Overstatement of liabilities ***</td>
<td>C. Completeness check</td>
</tr>
<tr>
<td>D. Overstatement of equity</td>
<td>D. Limit check</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Negatively Phrased Item Reworded</th>
<th>Overlapping Responses Eliminated</th>
</tr>
</thead>
<tbody>
<tr>
<td>When does the kiddie tax apply to a child?</td>
<td>Which control total would most likely be calculated for each batch in a typical sales order system of a department store?</td>
</tr>
<tr>
<td>A. If the child reaches age 14 during the year</td>
<td>A. Hash total of sales order numbers ***</td>
</tr>
<tr>
<td>B. If the child fails to be a dependent ***</td>
<td>B. Record count of item numbers</td>
</tr>
<tr>
<td>C. If the child has no unearned income</td>
<td>C. Financial total for unit price</td>
</tr>
<tr>
<td>D. If the child has interest income over $500</td>
<td>D. Line count of invoice numbers</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Responses Parallel and Similar in Length</th>
<th>Revised key word clueing item</th>
</tr>
</thead>
<tbody>
<tr>
<td>Once attributes have been assigned to appropriate relations, what is the next activity performed to implement the REA model?</td>
<td>An absence of payables and receivables is found in which system of accounting?</td>
</tr>
<tr>
<td>A. Identifying events affected by agents</td>
<td>A. Accrual basis accounting</td>
</tr>
<tr>
<td>B. Determining where to include foreign keys***</td>
<td>B. Cash basis accounting ***</td>
</tr>
<tr>
<td>C. Creating cardinalities for each economic duality</td>
<td>C. Modified accrual basis accounting</td>
</tr>
<tr>
<td>D. Adding test data to the entities created</td>
<td>D. Revenue basis accounting</td>
</tr>
</tbody>
</table>
REFERENCES

ACT, Inc. and the AICPA. (May 2001). Guidelines for Item Writers and Reviewers.


AN INTERNATIONAL PROJECT FOR ACCOUNTING CLASSES

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ABSTRACT

This paper discusses a team-based international research project that has been incorporated into an intermediate financial accounting course and that would be appropriate for inclusion in other upper-division accounting classes with minor modifications. The project requires students to: obtain financial reports for non-U.S. companies with shares traded in the United States; compare the earnings data and principles followed to the earnings data that would have been obtained and the principles that would have been followed by U.S. companies; discuss possible reasons for the differences in accounting regimes and assess the potential impact of those differences on investors; and prepare both written and oral reports summarizing the findings. The paper discusses the pedagogical approach used, the procedures required to set up the project, the grading techniques employed, the results of the project, and suggestions for incorporating the project in other classes.

INTRODUCTION AND LITERATURE REVIEW

In 1990, the Accounting Education Change Commission, in pages 7 and 8 of Position Statement No. One, identified capabilities needed by accounting graduates, among which were:

- Communication skills, including the “ability to present, discuss and defend views effectively...[and] to locate, obtain, organize, report, and use information.”
- Intellectual skills, including “capacities for inquiry, abstract logical thinking, inductive and deductive reasoning, and critical analysis.”
- General knowledge, including “a sense of the breadth of ideas, issues, and contrasting economic, political and social forces in the world.”

A decade later, Albrecht and Sack noted that analytical/critical thinking skills and writing skills were ranked by practitioners and faculty as the most important priorities for accounting education (page 56), and that one of the problems with current accounting curricula was that “we do not use a global perspective to teach accounting” (page 51).

The project described in this paper seeks to address the needs identified above by incorporating an international accounting research project into a traditional intermediate accounting class at a small private liberal-arts university that emphasizes writing throughout the curriculum. The project requires students to: obtain currency data for the countries involved in the study; obtain the financial statements of non-U.S. companies with stock traded in the United States; identify specific earnings and reporting information included in the financial statements; identify, categorize, summarize, and analyze the differences between the accounting principles employed by the companies and the accounting principles that would have been employed by U.S. companies; and, analyze the potential impact of those differences on U.S. investors.
PROJECT OVERVIEW

This section describes the goals for the project, the procedures undertaken to set up the project, the project requirements and data source information, the introductory material discussed with the students, the data availability and technical issues encountered, and the grading techniques employed.

Project Goals
In keeping with the desire to develop students’ business knowledge and to develop their critical thinking, analytical, and communication skills, the primary goals of the project were: 1) to develop students’ understanding of the differences that exist between GAAP regimes and the economic environments and theoretical assumptions that give rise to those differences; 2) to develop students’ abilities to obtain and analyze financial information; 3) to develop students’ abilities to organize and summarize information and to report that information clearly and concisely; 4) to develop students’ abilities to present information orally and to defend positions taken; and 5) to develop students’ understanding of the importance of financial information and the impact of such information on financial statement users. To achieve these goals, groups were encouraged to discuss the projects with each other to determine patterns of similarity among countries.

Project Set-Up Procedures
Prior to each semester, the instructor obtained lists of non-U.S. registrants traded on NASDAQ and the New York Stock Exchange from the two websites and identified countries with at least 15 registrants. Next, market capitalizations were obtained for the remaining companies from a file available on the NASDAQ website, and the country list was reduced to countries with 15 or more registrants having market capitalizations of at least 100 million U.S. dollars. (This restriction was employed to focus the research on large companies that are of most interest in studies of foreign registrants.) Finally, the SIC codes of the remaining companies were obtained from the Securities and Exchange Commission website, and the population was once again reduced to countries having at least 15 registrants with market capitalizations over 100 million U.S. dollars and SIC codes from 2300 to 8700. (The SIC restriction was employed to avoid inundating students with natural resource companies and professional service providers.) In the first year, the study was limited to European and Canadian companies, as the majority of countries with at least 15 registrants were from Europe and the professor wanted to encourage students to explore North American/European contrasts in addition to U.S./specific country contrasts. In the second year, the study was expanded to include Mexican and Chilean companies so that Latin American differences could be considered as well. It is anticipated that by 2005, the study will be expanded to include Asian countries. (Currently, most Japanese countries report on the basis of U.S. accounting principles in the United States, so there are too few Japanese companies to include Japan in the project.) In the first year, all companies meeting the criteria from France, Germany, and the Netherlands were included in the project, and random samples of companies from Canada and the United Kingdom were included. In the second year, all companies meeting the criteria from Mexico and Chile were included in the project, and random samples of companies from France, the Netherlands, and Switzerland were included.

During the semester, after the first examination, the instructor organized students into groups of five or six people, with each group responsible for analyzing the financial statements from one country’s registrants. A drawing was held to determine which country each group would analyze. Groups were balanced based on performance in the class to date (including performance on the first examination, quizzes, homework, and written assignments). Other factors considered included country of origin, gender, and status as a major or minor in accounting. (Although students were not allowed to choose group members as a whole, prior to group selection students were permitted to indicate whether there was a person with whom they did not wish to work. During the two years only two students indicated a negative preference.)

Project Requirements And Data Sources
Once the groups were formed, the requirements for the project were discussed [Appendix] and the students were provided both hard copy and electronic versions of the initial spreadsheet listing all companies included in the study. (Both hard copy and electronic versions of the spreadsheet are available from the author by request). The
spreadsheet required students to supply each company’s report date, filing date, accounting principle regime followed, currency employed, applicable exchange rate, non-U.S. accounting-based earnings per share data for three years, and U.S. accounting-based earnings per share data for three years, and to calculate U.S. dollar-equivalent earnings data for companies that reported on the basis of another currency.

After handing out the assignment sheet, the professor briefly commented on four online sources for international financial data: the LexisNexis® and U.S. Securities and Exchange Commission (SEC) websites for financial reports; the Federal Reserve Bank of New York website for currency data; and the Bank of New York website (adrbny.com) for American Depositary Receipt (ADR) ratios and other ADR information. The students were directed to the Federal Reserve Bank of New York website for currency data so that all students would obtain currency information (the noon-buying rate, which is the rate typically used by companies for convenience translations) from the same source. Continuing students at the university were somewhat familiar already with the EDGAR archives on the LexisNexis® and SEC websites from the financial statement analysis project that they perform in their beginning financial accounting class, but most students had not explored the other two websites before.

**Introductory Material Discussed With Students**

After discussing data sources, the professor provided the students financial statement excerpts from several non-U.S. registrants not included in the study, and used the excerpts to introduce the documents (10-Ks and 20-Fs) and instruments (ordinary shares, American Depositary Receipts, and NYSE Global Shares®) such registrants typically employ when having shares traded in the United States. In addition, the professor briefly discussed the reporting obligations imposed upon foreign registrants in the United States and the manner in which shares might be traded, as described below.

Most Canadian companies have their ordinary shares traded in the United States in the same manner and using the same primary Securities and Exchange Commission (SEC) documents (10-Ks) as U.S. companies. Under the SEC’s Multi-Jurisdictional Disclosure System (MJDS), Canadian companies, as a group, are afforded special consideration by U.S. regulators and currently are the only foreign registrants permitted to file 10-Ks using their home-country accounting principles, with verbal explanations of “material” differences from U.S. accounting principles. At the time of the study, 10-Ks were available on both the LexisNexis® universe and SEC websites.

Non-Canadian foreign registrants typically have the option of: 1) filing their annual financial reports on the basis of U.S. accounting principles and submitting 10-Ks; or 2) filing their reports on the basis of home-country accounting principles and filing 20-Fs. While most of the registrants included in this study used 20-Fs, several companies from each of the non-Canadian countries employed U.S. GAAP, and students were invited to comment in their reports on the prevalence of, and possible reasons for, their registrants choosing to report on a U.S. GAAP basis in the U.S. market. 20-Fs, like 10-Ks, contain the companies’ financial statements, accompanying footnotes and supplemental data, as well as information on both the currency and GAAP basis used, and an additional footnote that quantitatively reconciles the earnings computed on the basis of home-country accounting principles to the earnings that would have been computed under U.S. GAAP. (The reconciliation footnote was not specifically discussed in the class introduction, as the professor preferred that students locate this footnote by themselves. All of the non-Canadian groups recognized the existence of this 20-F footnote within a few days of beginning the project; during the second week of the project, the professor discussed the existence of the footnote with the class as a whole.) At the time of the study, 20-Fs were available on the LexisNexis® website, but not on the SEC website. As of this writing, 20-Fs are now available on the SEC website as well.

Most non-Canadian foreign registrants in the U.S. use American Depositary Receipts (ADRs) when having their shares traded in the United States. ADRs are derivative securities issued by a U.S. bank that holds the company’s underlying shares in custody. ADRs generally pay dividends in U.S. dollars and often represent a multiple of a company’s underlying domestic shares; therefore, students need to be alert to ADR ratios when analyzing earnings data to ensure that Earnings Per Share comparisons are being made on an equivalent-share basis. Because the custodian
bank owns the underlying shares, the bank has voting rights, but the ADR purchasers do not.

Some foreign registrants (particularly German companies) issue NYSE Global Shares®, which are ordinary shares that are traded in multiple markets in the same form, with the same rights, but in each market’s local currency (New York Stock Exchange website). Since these shares are essentially equivalent from one market to the next, the use of global, rather than ordinary, shares typically has no impact, in and of itself, on required accounting disclosures.

Many European companies have corporate structures that concentrate governance in a coalition of managers, major creditors, and/or labor representatives. In order to preserve this structure, to insulate the companies from takeover concerns, to maintain home-country control and to encourage sensitivity to domestic labor and other issues, these companies often use nonvoting stock when entering a second national market through an issuance not involving ADR or global shares. The use of such nonvoting shares usually has no impact on required accounting disclosures, beyond a description of the nature of the shares.

Mexican and Chilean companies that report on the basis of their home currencies restate prior-year earnings numbers for changes in purchasing power. As a result, students need to be aware that comparative earnings per share data and other financial data presented in the current-year financial statements have been changed from the data originally reported. For this project, the professor allowed students to use the comparative data presented in current financial statements when completing their spreadsheets, rather than requiring students to obtain the original data. Theoretically, changes in exchange rates between countries should offset changes in interest rates (and therefore inflation rates) between countries, but empirically the restated earnings per share numbers translated using current exchange rates are not equal to the original earnings per share numbers translated using original exchange rates. Although the translated restated numbers are not identical to the original numbers, the trends in earnings are reasonably constant and the differences were considered acceptable for this project.

Students were encouraged to obtain the financial reports from any available source. During the project, most reports came from the LexisNexis® website, some 10-Ks came from the SEC website, some annual reports came from company websites, and a few reports came directly from U.S. offices of the companies being studied.

**Data Availability And Technical Issues**

During the semester, students from each group came to the professor at least once asking for help locating the financial statements for a few companies whose reports could not be located using one of the online archives, or the company websites. If the professor verified that the reports were not available from these sources, the students were encouraged to try contacting the companies, but if investor relation contact data could not be located or if the companies did not respond in a timely manner, the students were permitted to note in their reports the lack of data availability for those companies and to exclude such companies from the remainder of the research. (Lack of ready data availability is a consistent problem when conducting research on non-U.S. registrants.) Of the companies originally included in the project, reports could not be located for approximately one-fourth of the French and British firms in the first year of the study, but for no more than ten percent of the companies from any country in the second year of the study. In addition, in the first year of the study, one-third of the French companies and two-thirds of the German companies originally included used U.S. accounting for reporting purposes and thus were not subject to the analysis of differences with regard to principles employed, although differences in terminology and format were still subject to review. During the second year of the study, no more than one-fourth of the companies analyzed from any country used U.S. accounting principles, but the majority of the Swiss companies used International Accounting Standards (IAS) rather than Swiss accounting, so the group studying Switzerland concentrated on IAS/U.S. differences rather than Swiss/U.S. differences.

Representatives from each group also met with the professor to discuss the differences that the group had identified and to clarify areas with which the students were unfamiliar, such as the accounting for deferred taxes and pension plans, and the consolidation of foreign subsidiaries. Students were given brief introductions to these
topics, and were directed to FASB pronouncements and to textbook sources for further information.

**Grading**
The grading for the projects was broken into two parts—90 points were devoted to the written project and 10 to the oral presentation.

The written projects were graded in three phases:

First, the spreadsheets and lists of differences were reviewed for accuracy on a pass/fail basis.

Second, the papers were graded for basic content and composition on a pass/fail basis.

If any projects had failed either of the first two phases they would have had to be corrected and resubmitted and the written project grade would have been docked 20 points. During the two years, no papers failed these phases, although most papers had at least a few minor errors that required correction.

Third, the papers were reviewed for content and graded using the following rubric:

70-76 points: The spreadsheet is accurate. The paper does not have excessive grammatical or mechanical errors. The list of differences is complete but lacks structure. The report addresses the issues specified in the requirements, but demonstrates only moderate understanding and lacks integration.

63-69 points: The spreadsheet is accurate. The paper does not have excessive grammatical or mechanical errors. The list of differences is reasonably complete, but lacks structure. The report addresses the issues specified in the requirements, but demonstrates only minimal understanding of one or more of the issues.

0 points: The spreadsheet is not accurate or the paper is unacceptable due to remaining significant content or composition errors after a first resubmission. (During the two years no group received a zero.)

The oral presentations were graded based on the importance and relevance of the matters discussed, the professionalism of the presentation, and the responsiveness to questions. Scores ranged from 7 to 10 points.

**RESULTS**

Prior to beginning the project, the professor employed a brief survey in class, asking students to identify the differences that they believed might exist in financial statements prepared under U.S. versus non-U.S. accounting principles. Of the students surveyed, one third could not identify any potential differences in financial statements prepared under the two bases, and only ten percent of the students identified more than two. In addition, the differences that were identified tended to be very general in nature, such as differences in the order of presentation and differences in the currency employed. At the conclusion of the project, students were again asked to identify the differences that existed, and every student was able to identify multiple differences. Many of these responses demonstrated in-depth knowledge of specific differences and potential reasons for the differences. For example, students related foreign accounting regimes’ emphasis on the productivity, rather than the liquidity, of assets to the capitalization of research and development costs and students related differences in pension
accounting to the existence of state-controlled retirement systems versus corporate pension plans. In addition, students commented on the impact of differences on financial statement investors, and on the need for investors to understand the economic environment in which companies operate if they are to fully understand the financial statements.

Overall, in the reports, themselves, students did an excellent job of identifying the differences that existed, and demonstrated moderate understanding of the connection between the differences being analyzed and the potential causes and effects of the differences. For example, students commented on: 1) the use of asset revaluations and the relevance-reliability trade-off that such revaluations involve; 2) the relative flexibility of the regimes being analyzed and the difficulties that the flexibility might cause for investors when attempting to compare companies within an industry; and 3) the differences in asset/expense and asset/contra-equity classification among regimes and the impact of such variations on ratio analyses. In addition, students noted that while Chilean and Dutch companies tended to report somewhat higher earnings using home-country accounting principles, national patterns in the direction of U.S. versus non-U.S. earnings per share differences generally did not exist for other countries. Students also found, however, that individual corporations did generally have consistent patterns in earnings differences over the three-year comparison periods examined.

In the oral reports, students summarized their findings very well and demonstrated moderate understanding of regional differences in disclosures. For example, groups noted that U.S. accounting principles tended to be stricter with regard to pension and earnings per share presentations, European disclosures tended to be more thorough with regard to current values and forward looking data, and Latin American disclosures tended to provide more information on the general economic environment. In addition, consistent differences exist in the accounting for goodwill, treasury stock, share-based compensation, and consolidations across countries.

Finally, in the university-mandated anonymous teacher evaluations given at the end of class, approximately two-thirds of the students commented on the project over the two-year period. Of the students who commented, over 85% commented positively on the project and the concerns of those who commented negatively generally related to the workload or to the project being group-based. In addition, several students noted that the project had increased their understanding of U.S. accounting as well, by giving the students insight into the reasons underlying U.S. generally accepted accounting principles. Overall, the project was viewed as a success by both the students and the professor.

DIFFICULTIES ENCOUNTERED AND SUGGESTIONS FOR THE FUTURE

The major difficulty encountered in implementing this project was the lack of availability of financial statements for several of the companies originally included in the testing in the first year. The absence of reports from online archives and/or company websites tended to frustrate students and resulted in the professor having to spend a total of approximately two hours verifying that the financial reports could not be located. By the second year of the study, the number of firms with missing data declined substantially, but every country still had at least one company for which data could not be obtained. Since lack of data availability is a continuing problem for people seeking to conduct research on international companies, this was not seen as a limitation of the project, but rather as an introduction for students to the difficulties involved in obtaining information on foreign registrants in the United States.

A second difficulty encountered in the first year was the scarcity of German companies, in particular, that reported on the basis of home-country accounting principles in the U.S. market. The use of U.S. GAAP limited students’ abilities to assess differences in accounting principles from this regime, although the group still was able to comment on format and methodology differences in the reports. During the second year of the study, German companies were excluded from testing due to concerns about the limited number of firms reporting on the basis of German accounting principles. As cross-listing increases and more companies’ securities are traded in the U.S., more financial reports prepared on the basis of home-country and/or international accounting
principles should become available, and this issue should continue to decline in importance.

A final difficulty encountered was the typical group-project problem of freeriding on the part of some team members, even though students knew that they would be evaluated by their groups at the end of the semester, with a potential reduction in grade for freeriders. Because the professor anticipated that some companies would report on the basis of U.S. GAAP and that other companies’ reports would not be available, individual company assignments were not made to each student by the professor, out of concern that one or more students might be assigned only companies for which no analysis of differences was possible. In the future, the professor intends to require groups to submit initial team contracts specifying each member’s responsibilities, as well as a final log, detailing the work actually performed by each member. The contract, log, and team evaluations will form the basis for a reallocation of up to 15% of the points on the project from members who fail to meet their obligations to members who exceed their obligations. In addition, to eliminate the possibility of a student contributing nothing to the project and receiving only a 15% reduction, the professor intends to allow teammates to dismiss a member who consistently fails to contribute to the project after being given written notice from both the teammates and the professor that the student’s contribution is inappropriate.

CONCLUSION

This paper has described a group-based international accounting research project that was incorporated into a traditional intermediate accounting course, but the framework given could be adapted easily to other settings, in response to the needs of a particular course. The project could be adapted to higher-level courses by focusing on differences in specialized accounting areas, such as the accounting for pensions, leases, or consolidations, or could be adapted for individual student use by having each student identify and prepare a report on one foreign registrant that reports on a non-U.S. GAAP basis. In addition, as the number of foreign registrants in the United States expands, the project could be modified to include Asian and other regional groupings.

As world economies and stock markets become more integrated, it becomes increasingly important for students to gain an understanding of both the differences that exist in national accounting regimes and the potential impact of those differences on the investors who use corporate financial reports for decision making. Research projects such as the one described in this paper can improve students’ understanding of these global financial reporting issues, while enhancing students’ analytical and communication skills—in the process developing, in accounting students, the core capabilities that accounting graduates will need to compete in the 21st century.

APPENDIX

TEAM CASE REQUIREMENTS

Required: Written Project

1. Obtain the 2000 and 1999 20-Fs/10-Ks/and/or Annual Reports for the companies that you are analyzing.

2. Using the reports obtained in (1), complete the template that you have been given. If you cannot obtain data for one of your companies, state the reason for the lack of availability.

3. Using the reports obtained in (1), compile a list of differences in format, terminology, and methodology from the reports that each of your companies prepared on the basis of foreign accounting principles to the reports that would have been prepared under U.S. accounting principles.

4. Using the data obtained in (3), identify any patterns of differences that appear to exist between financial statements prepared under your country’s accounting principles and financial statements prepared under U.S. GAAP and discuss potential reasons for the differences.

5. Discuss the impact that the differences identified in (4) might have on an American investor trying to compare the financial statements of U.S. companies with the financial statements of foreign companies whose shares are traded in the United States; state whether you prefer the U.S. or foreign approach; and explain your reasons for the positions that you take.
Note:
1. Your written analysis related to requirements (4) and (5) is limited to 5 (five) pages not including appendices, and must be typed, double-spaced, and have at least a 10-point font.

2. Your project notebook should be organized as follows:
   
   Section 1: Written analysis and any appendices that you wish to include.
   
   Section 2: Hard copies of the completed EXCEL spreadsheet (1"Landscape” page wide) and the list of differences.
   
   Section 3: Individual appendices for each company containing supporting documentation for all data included in the spreadsheet and the list of differences, and any other relevant portions of financial reports used.

3. The assignment is due on the date specified in the syllabus. You must turn in your notebook in class and email the EXCEL spreadsheet to me as an attachment.

Required: Team Presentation
1. Prepare a 15 minute presentation for the class summarizing the results of your team’s project. Each member of the team MUST participate in the presentation, and after the presentation you will be expected to entertain questions for 5-10 minutes from both the class and the professor.

REFERENCES


ESTIMATES OF SENSITIVITIES OF THE VALUE OF THE FIRM TO PROFITABILITY, GROWTH, AND CAPITAL INTENSITY

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ABSTRACT

An extended valuation model for the firm shows explicitly how profitability, growth, and capital intensity are drivers of the value of the firm. The extended valuation model provides expressions for the sensitivities of the value of the firm to changes in the firm’s profitability, growth, and capital intensity. Sensitivities are presented in terms of both changes in the value of the firm per dollar of sales and total dollar changes. Changes in the value of the firm per dollar of sales show the relative responsiveness of the value of the firm to changes in the measures for profitability, growth, and capital intensity. Total dollar amounts show the dollar changes in the value of the firm resulting from changes in the profitability, growth, and capital intensity measures. These sensitivities provide expressions for quantifying the magnitudes of changes in the value of the firm for changes in the profitability, growth, and capital intensity measures. This information helps managers understand how to set the value drivers more effectively and determine desirable actions that will improve the wealth generating ability of the firm. The theoretical relationships for these value drivers provide expressions which can be used to estimate the sensitivities of the value of the firm to profitability, growth, and capital intensity for actual companies for 1983-2002 using financial information obtained from the Compustat database. This paper presents estimates of the sensitivities of the value of the firm to profitability, growth, and capital intensity for actual companies using financial information obtained from Compustat files for 1983-2002.

INTRODUCTION

Value-based management systems concentrate on actions that generate value for the shareholders in the wealth creation process (Fisher 1995; Lieber 1996; Walbert 1994). This paper focuses explicitly on profitability, growth, and capital intensity as drivers of the value of the firm by extending a free cash flow valuation model for the firm. The extended model is used to provide information about the sensitivities of the value of the firm to changes in the firm’s profitability, growth, and capital intensity. These sensitivities are presented in terms of partial derivatives and dollar changes. The partial derivatives show the changes in the value of the firm resulting from a small change in the measures for profitability, growth, or capital intensity. Each dollar amount shows the dollar changes in the value of the firm resulting from a small change in the profitability, growth, or capital intensity measures. These sensitivities show the impact of changes in the profitability, growth, and capital intensity measures on the value of the firm. This information is valuable in helping managers predict the results of actions to improve the wealth generating ability of the firm by managing these value drivers more effectively (Lehn and Makhija 1996). Value-based management systems which integrate valuation and action are discussed in the next section. A detailed analytical development of the theoretical valuation model used in this
research is presented in the third section of the paper. In this section, profitability, growth, and capital intensity are shown to be important drivers of free cash flow, the value of the firm, and the value of the firm per dollar of sales. The fourth section extends the valuation model for the value of the firm per dollar of sales to include expectations of the future values of profitability, growth, and capital intensity. These expectations are expressed as functions of current known values of profitability, growth, and capital intensity. The resulting highly nonlinear valuation model is approximated by a third-order Taylor series expansion for the value of the firm per dollar of sales in terms of profitability, growth, and capital intensity. The approximate model using the third-order Taylor series expansion is utilized in the fifth section to provide analytical expressions for the sensitivities of the value of the firm per dollar of sales to profitability, growth, and capital intensity. The sixth section uses the sensitivities presented in the fifth section to develop expressions for the sensitivities of dollar changes in the value of the firm per dollar of sales to changes in profitability, growth, and capital intensity and for the sensitivities of dollar changes in the value of the firm to changes in profitability, growth, and capital intensity. The seventh section of the paper presents empirical estimates for the coefficients in the third-order Taylor series approximation to the valuation model for the value of the firm per dollar of sales. The eighth section presents empirical estimates of the value of the firm per dollar of sales and of the sensitivities of the value of the firm per dollar of sales to profitability, growth, and capital intensity. These estimates are based on the estimates of the coefficients presented and the analytical expressions presented. The final section provides a summary and concluding comments.

**VALUE-BASED MANAGEMENT**

Value-based management focuses on the application of valuation principles. The system design and implementation promote and reward decisions that add value to investor-supplied funds (Copeland, Koller, and Murrin. 1995; Stern, Stewart, and Chew 1995; Ehrbar 1998; Rappaport 1998; Stewart 1991). Value-based management systems need valuation models that are expanded to include metrics for both the income statement and balance sheet. To be useful, these valuation models need to contain variables that are related explicitly to income statement and balance sheet items. In this study, profitability, growth, and capital intensity are treated as value drivers in the extended valuation models. To make the value-based management system operate effectively, components of the employees' work should be identified and linked to profitability, growth, and capital intensity. Performance targets must be established for these value drivers. Actual performance should be measured, evaluated, and rewarded in terms of the targets for profitability, growth, and capital intensity. If the value drivers are identified and modeled properly and actual performance is reinforced effectively, value-based management systems will produce business decisions that add value to investor-supplied funds if (Stern Stewart 1992).

**VALUATION MODELS**

Measures of future cash flows and the cost of capital are used in generally accepted valuation frameworks to provide measures of the value of the firm. The magnitude, timing, and riskiness of future cash flows, and the cost of capital determine the value of the business and the value added by a business to investors’ funds. A two-phase valuation model for free cash flow is shown by Equation (1) in Table 1. Equations (2), and (3) in Table 1 show expressions for the continuing value when constant growth with $g < r$ occurs after time $T$. The first $T$ periods in this model, phase one, represent an explicit forecast (transition) period during which varying behavior is possible and the remaining periods (phase two) are a continuing value (steady-state) period during which growth is constant and parameters have steady-state values (Copeland, Koller, and Murrin 1995; Stewart 1991; Stewart 1994). Free cash flow, $FCF_0$, is defined as equal to the net operating profit after taxes, $NOPAT_0$, less the required net investment, $NINV_0$. The model for free cash flow is given by Equation (4) in Table 1. Net operating profit after taxes is equal to earnings before interest and taxes, $EBIT_0$, after taxes. In this model, $\tau$ is the cash income tax rate. Equation (5) gives the expression for Net operating profit after taxes. The net investment is the required change in invested capital, $IC_0 - IC_{t+1}$. The model for net investment is given by Equation (6) in Table 1. The return on invested capital, $ROIC_0$, which relates net operating profit after taxes and invested capital, $IC_0$, is the measure of profitability used in this study. Equation (7) in Table 1 gives the expression for return on invested capital. Capital intensity, $c_i$, relates invested capital and
TABLE 1
Equations for Models Used in the Study

\[ V_0 = \sum_{t=1}^{T} \frac{FCF_t}{(1+r)^t} + \frac{V_T}{(1+r)^T} \]  
(1)

\[ V_T = \sum_{t=T+1}^{\infty} \frac{FCF_T \cdot (1+g)^{t-T}}{(1+r)^{t-T}} \quad \text{as } H \to \infty \]  
(2)

\[ V_T = \frac{FCF_T \cdot (1+g)}{r-g} = \frac{FCF_T + 1}{r-g} \quad \text{as } H \to \infty \]  
(3)

\[ FCF_t = NOPAT_t \cdot NINV_t \]  
(4)

\[ NOPAT_t = (1-t) \cdot EBIT_t \]  
(5)

\[ NINV_t = IC_t - IC_{t-1} \]  
(6)

\[ ROIC_t = \left( \frac{NOPAT_t}{IC_t} \right) \]  
(7)

\[ ci_t = \left( \frac{IC_t}{S_t} \right) \]  
(8)

\[ NOPAT_t = ROIC_t \cdot ci_t \cdot S_t \]  
(9)

\[ IC_t = ci_t \cdot S_t \]  
(10)

\[ NINV_t = ci_t \cdot S_t - ci_{t-1} \cdot S_{t-1} \]  
(11)

\[ S_t = (1+g_t) \cdot S_{t-1} \]  
(12)

\[ NINV_t = ci_t \cdot (1+g_t) \cdot S_{t-1} - ci_{t-1} \cdot S_{t-1} = [ci_t \cdot (1+g_t) - ci_{t-1}] \cdot S_{t-1} \]  
(13)

\[ FCF_t = ROIC_t \cdot ci_t \cdot S_t - [ci_t \cdot (1+g_t) - ci_{t-1}] \cdot S_{t-1} \]  
(14)

\[ FCF_t = \{ROIC_t \cdot ci_t \cdot (1+g_t) - [ci_t \cdot (1+g_t) - ci_{t-1}]\} \cdot S_{t-1} \]  
(15)
sales revenue and is defined by Equation (8) in Table 1. These relationships provide a model for net operating profit after taxes in terms of the return on invested capital, capital intensity, and sales revenue shown in Table 1 as Equation (9). The definition for capital intensity provides the model for invested capital in terms of capital intensity and sales revenue shown in Table 1 as Equation (10). Using this model for invested capital gives the model for required net investment in terms of capital intensity and sales revenue shown in Table 1 as Equation (11). The period-to-period growth rate for sales revenue is \( g \), and it related previous and current sales as shown by Equation (12) in Table 1. Net investment depends on sales revenue and the growth rate as shown by Equations (13) in Table 1. Free cash flow depends on the rate of return on invested capital, sales revenue, and the growth rate as shown by equations (14) and (15) in Table 1. Substituting the expressions for free cash flow into the valuation model shown in equations (1) and (3) gives a valuation model expressed in terms of the rate of return on invested capital, sales revenue, and the growth rate as shown in equations (16) and (17) of Table 2. The model for sales shown in Equation (12) can be expanded to model the sales for any year in terms of the sales at time 0 and the growth rates as shown in equations (18), (19), and (20) of Table 2. Substituting this expanded model for sales shown in equations (18) and (19) into the model for the value of the firm shown in equations (16) and (17) and dividing by \( S_0 \) gives the model for the value of the firm per dollar of sales as shown in equations (21) and (22). The time subscripts are removed from the symbols for return on invested capital, capital intensity, and sales revenue growth after time \( T \) to emphasize that steady-state values occur. This model shows how the return on invested capital, capital intensity, sales growth, and the cost of capital are drivers of the value of the firm per dollar of sales.

**Profitability, Growth, and Capital Intensity**

The models presented so far show that expected future values of profitability, growth, and capital intensity are important drivers of free cash flow and the value of the firm. The importance of profitability, growth, and capital intensity in the value generation process can be examined more closely by replacing the expected future values with functions for their future values expressed in terms of current known values. The notation shown in equations (23), (24), and (25) is used to express the future values of profitability, growth, and capital intensity in terms of current known values for the explicit forecast (transition) period and the notation shown in equations (26), (27), and (28) is used to express the future values of profitability, growth, and capital intensity in terms of current known values for the continuing value (steady-state) period. Substituting these expressions for expected future value into the extended valuation model for the value of the firm per dollar of sales shown in equations (21) and (22) of Table 2 gives the valuation model shown in equations (26) and (27) of Table 2. In this model, the relationship between the value of the firm per dollar of sales and \( \text{ROIC}_0, g_0, \) and \( c_i_0 \) is highly nonlinear. This nonlinear relationship incorporates the expectation formation process in which known values of profitability, growth, and capital intensity are used to form expectations about future values of profitability, growth, and capital intensity. A third-order Taylor Series expansion for a cross-sectional time series version of this valuation model shown in Table 3 as Equation (28) uses a relatively low-order polynomial equation is formulated to approximate the nonlinear relationship between the value of the firm per dollar of sales and \( \text{ROIC}_0, g_0, \) and \( c_i_0 \). In this model, the subscripts 0, y, j indicate that the value of the variable is measured at time 0 with respect to year \( y \) for firm \( j \). The Greek letters are the coefficients in the cross-sectional time series version of the valuation model. These coefficients measure the respective partial derivatives in the Taylor Series expansion for \( \text{ROIC}_0, g_0, \) and \( c_i_0 \). The alphas are the coefficients for the first-order terms, the betas are the coefficients for the second order terms involving \( \text{ROIC}_0, g_0, \) and \( c_i_0 \), and the gammas are the coefficients for the third order terms involving \( \text{ROIC}_0, g_0, \) and \( c_i_0 \). The scripts for the coefficients identify the associated variables, \( \text{ROIC}_0, g_0, \) and \( c_i_0 \), Epsilon measures the error for the approximation to the valuation model for value of the firm per dollar of sales.

**Sensitivities of Value per Dollar of Sales with Respect to Profitability, Growth, and Capital Intensity**

Sensitivities of value per dollar of sales with respect to profitability, growth, and capital intensity are given by the respective partial derivatives of
TABLE 2
Equations for Models Used in the Study

\[
V_0 = \sum_{t=1}^{T} \left( \text{ROIC}_t \cdot \text{ci}_t \cdot (1 + g_t) - \left[ \text{ci}_t \cdot (1 + g_t) - \text{ci}_{t-1} \right] \cdot S_{t-1} \right) + \frac{V_T}{(1+r)^T} \tag{16}
\]

\[
V_T = \frac{[\text{ROIC} \cdot \text{ci} \cdot (1 + g) - \text{ci}_T \cdot g] \cdot S_T}{r \cdot g} \tag{17}
\]

\[
S_{t-1} = \prod_{n=1}^{t-1} (1 + g_n) \cdot S_0 \tag{18}
\]

\[
S_T = \prod_{n=1}^{T} (1 + g_n) \cdot S_0 \tag{19}
\]

\[
0 = \prod_{n=1}^{T} (1 + g_n) = 1 \tag{20}
\]

\[
\left( \begin{array}{c}
V_0 \\
S_0
\end{array} \right) = \sum_{t=1}^{T} \frac{\left[ \text{ROIC}_t \cdot \text{ci}_t \cdot (1 + g_t) - \left[ \text{ci}_t \cdot (1 + g_t) - \text{ci}_{t-1} \right] \cdot S_{t-1} \right]}{(1+r)^t} + \frac{V_T}{(1+r)^T} \tag{21}
\]

\[
\left( \begin{array}{c}
V_T \\
S_0
\end{array} \right) = \frac{[\text{ROIC} \cdot \text{ci} \cdot (1 + g) - \text{ci}_T \cdot g] \cdot S_T}{r \cdot g} \prod_{n=1}^{T} (1 + g_n) \tag{22}
\]

\[
\text{ROIC} = f_{\text{ROIC}} (\text{ROIC}_0) \tag{23}
\]

\[
g_t = f_{g,t}(g_0) \tag{24}
\]

\[
\text{ci} = f_{\text{ci}}(\text{ci}_0) \tag{25}
\]

\[
\left( \begin{array}{c}
V_0 \\
S_0
\end{array} \right) = \sum_{t=1}^{T} \frac{\left[f_{\text{ROIC},t} (\text{ROIC}_0) \cdot f_{\text{ci},t} (\text{ci}_0) \cdot (t + f_{g,t}(g_0)) - f_{\text{ci},t} (\text{ci}_0) \cdot (1 + f_{g,t}(g_0)) - f_{\text{ci},t-1} (\text{ci}_0) \right] \cdot (1 + g_n) \cdot S_{t-1} \right]}{(1+r)^t} + \frac{V_T}{(1+r)^T} \tag{26}
\]

\[
\left( \begin{array}{c}
V_T \\
S_0
\end{array} \right) = \frac{[f_{\text{ROIC},0} (\text{ROIC}_0) \cdot f_{\text{ci},0} (\text{ci}_0) \cdot (1 + f_{g_0}(g_0)) - f_{\text{ci},0} (\text{ci}_0) \cdot (1 + f_{g_0}(g_0)) - f_{\text{ci},T} (\text{ci}_0)] \cdot \prod_{n=1}^{T} (1 + f_{g_0}(g_0))}{r \cdot f_{g_0}(g_0)} \tag{27}
\]

the value of the firm with respect to the value driver. The partial derivative of the value of the firm per dollar of sales with respect to the value driver for profitability (ROIC\(_{y_0}\)) is given by Equation (29) in Table 3. The partial derivative of the value of the firm per dollar of sales with respect to the value driver for growth (\(g_0\)) is given by Equation (30) in Table 3. The partial derivative of the value of the firm per dollar of sales with respect to the value driver for capital intensity (ci\(_{y_0}\)) is given by Equation (31) in Table 4.

**Dollar Changes in Value for Changes in Profitability, Growth, and Capital Intensity**

Another way to measure the sensitivities of the value of the firm to changes in profitability, growth, and capital intensity is the dollar change resulting from a change in the value drivers for profitability, growth, and capital intensity. The dollar change for a change in ROIC\(_0\), \(g_0\), and ci\(_0\) is equal to the partial derivative of the value of the firm per dollar of sales with respect to the respective value driver times the change in the value driver. Equations (32) and (33) in Table 4 give the changes in the value of the firm per dollar of sales and in the value of the firm for small changes in the measure for profitability, ROIC\(_{y_0}\). For small changes in the measure for growth, \(g_{y_0}\), the changes in the value of the firm per dollar of sales and in the value of the firm are given by equations (34) and (35) in Table 4. The changes in the value of the firm per dollar of sales and in the value of the firm for small changes in the measure for capital intensity, ci\(_{y_0}\), are given by equations (36) and (37) in Table 4.

**ESTIMATES FOR THE APPROXIMATION**

The third-degree Taylor series expansion, which approximates the theoretical relationships between the value of the firm per dollar of sales and the three value drivers, ROIC\(_0\), \(g_0\), and ci\(_0\), is used to estimate the value of the firm per dollar of sales and the sensitivities of the value of the firm per dollar of sales to profitability, growth, and capital intensity for actual companies for 1983-2002. The financial information used in this study is from the Compustat database. For each year, all companies with data for at least five previous years, with a stock price of at least three dollars per share, with annual sales of at least $10 million, and with a book value of equity of at least $10 million are included in the sample. The annual cross sections of companies are pooled for the entire 20-year period for form the data set used to produce the estimates for the approximation to the theoretical valuation model. There is a total of 32,582 observations for the variables employed in the model. Descriptive information for variables in the model employed in this study is provided in part A of Table 5. All of the tables are presented at the end of the paper. Linear multiple regression employing a robust-errors adjustment for heteroscedasticity and pooled cross-sectional times series were used to produce estimates for the coefficients in the model. Descriptive information for the multiple regression equation employed in this study is provided in part B of Table 5. Table 6 at the end of the paper contains estimates and statistics for all the coefficients retained in the model. Four of the coefficients in the third-degree Taylor series expansion for the valuation model were dropped from the final multiple regression equation because their estimates were not significantly different from zero. All, but two, of the remaining coefficients are significantly different from zero at the 0.01 level of significance. One of the remaining coefficients is significantly different from zero at the 0.01379 level of significance and the remaining coefficients is significantly different from zero at the 0.05747 level of significance. The coefficient with the 0.05747 level of significance was retained because it measures the interaction among all three of the value drivers.

**ESTIMATES OF THE SENSITIVITIES**

Empirical estimates of the value of the firm per dollar of sales for different fractiles of the distributions for profitability, growth, and capital intensity are presented in Table 8. Tables 5 through 11 are available from the authors. These estimates are based on estimates of the coefficients retained in the model shown in Table 6. The third-degree Taylor series expansion, which approximates the theoretical relationships between the value of the firm per dollar of sales and the three value drivers, ROIC\(_0\), \(g_0\), and ci\(_0\), is used to make these estimates. Empirical estimates of the sensitivities of the value of the firm per dollar of sales to profitability, growth, and capital intensity are presented in tables 5 through 7. These estimates are also based on the estimates of coefficients retained in the model shown in Table 6. The expressions for the partial derivatives of the value of the firm per dollar of sales with respect to the respective value driver.


<table>
<thead>
<tr>
<th>Equation</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \frac{V_{0,y,j}}{S_{0,y,j}} = \alpha_0 + \alpha_{ROIc} \cdot ROIc_{0,y,j} + \alpha_g \cdot g_{0,y,j} + \alpha_{ci} \cdot ci_{0,y,j} + )</td>
</tr>
<tr>
<td>( \beta_{ROIc} \cdot ROIc^2_{0,y,j} + \beta_g \cdot g^2_{0,y,j} + \beta_{ci} \cdot ci^2_{0,y,j} + \beta_{ROIc,g} \cdot ROIc_{0,y,j} \cdot g_{0,y,j} + )</td>
</tr>
<tr>
<td>( \beta_{ROIc,ci} \cdot ROIc_{0,y,j} \cdot ci_{0,y,j} + \beta_{g,ci} \cdot g_{0,y,j} \cdot ci_{0,y,j} + \gamma_{ROIc,ROIc} \cdot ROIc^3_{0,y,j} + )</td>
</tr>
<tr>
<td>( \gamma_g \cdot g^3_{0,y,j} + \gamma_{ci} \cdot ci^3_{0,y,j} + \gamma_{ROIc,ROIc,g} \cdot ROIc^2_{0,y,j} \cdot g_{0,y,j} + )</td>
</tr>
<tr>
<td>( \gamma_{ROIc,ci,ci} \cdot ROIc_{0,y,j} \cdot ci^2_{0,y,j} + \gamma_{g,g,ci} \cdot g^2_{0,y,j} \cdot ci_{0,y,j} + )</td>
</tr>
<tr>
<td>( \gamma_{g,ci,ci} \cdot ci^2_{0,y,j} + \gamma_{ROIc,ci,ci} \cdot ROIc^2_{0,y,j} \cdot ci_{0,y,j} + \gamma_{ROIc,ci,ci} \cdot ROIc^2_{0,y,j} \cdot ci_{0,y,j} + \epsilon_{0,y,j} + )</td>
</tr>
<tr>
<td>( \frac{\partial V_{0,y,j}}{\partial ROIc_{0,y,j}} = \alpha_{ROIc} + 2 \cdot \beta_{ROIc} \cdot ROIc^2_{0,y,j} + \beta_{ROIc,g} \cdot g_{0,y,j} + \beta_{ROIc,ci} \cdot ci_{0,y,j} + )</td>
</tr>
<tr>
<td>( 3 \cdot \gamma_{ROIc} \cdot ROIc^2_{0,y,j} + 2 \cdot \gamma_{ROIc,ROIc,g} \cdot ROIc^2_{0,y,j} \cdot g_{0,y,j} + \gamma_{ROIc,g,g} \cdot g^2_{0,y,j} + )</td>
</tr>
<tr>
<td>( 2 \cdot \gamma_{ROIc,ROIc,ci} \cdot ROIc^2_{0,y,j} \cdot ci_{0,y,j} + \gamma_{ROIc,ci,ci} \cdot ci^2_{0,y,j} + \gamma_{ROIc,ci,ci} \cdot g_{0,y,j} \cdot ci_{0,y,j} + )</td>
</tr>
<tr>
<td>( \frac{\partial V_{0,y,j}}{\partial g_{0,y,j}} = \alpha_g + 2 \cdot \beta_g \cdot g_{0,y,j} + \beta_{ROIc,g} \cdot ROIc^2_{0,y,j} + \beta_{g,ci} \cdot ci_{0,y,j} + )</td>
</tr>
<tr>
<td>( 3 \cdot \gamma_g \cdot g^2_{0,y,j} + \gamma_{ROIc,ROIc,g} \cdot ROIc^2_{0,y,j} + 2 \cdot \gamma_{ROIc,ROIc,g} \cdot ROIc^2_{0,y,j} \cdot g_{0,y,j} + )</td>
</tr>
<tr>
<td>( 2 \cdot \gamma_{g,g,ci} \cdot g^2_{0,y,j} + \gamma_{g,ci,ci} \cdot ci^2_{0,y,j} + \gamma_{ROIc,ci,ci} \cdot ROIc^2_{0,y,j} \cdot ci_{0,y,j} + )</td>
</tr>
</tbody>
</table>
### TABLE 4
Equations for Models Used in the Study

$$\frac{\partial V_{0,y,j}}{\partial c_{i_{0,y,j}}} = \alpha_{ci} + 2 \cdot \beta_{ci} \cdot c_{i_{0,y,j}} + \beta_{\text{ROIC}_{ci}} \cdot \text{ROIC}_{0,y,j} + \beta_{\text{g,ci}} \cdot g_{0,y,j} +$$

$$3 \cdot \gamma_{ci} \cdot c_{i_{0,y,j}}^2 + \gamma_{\text{ROIC,ROIC}_{ci}} \cdot \text{ROIC}_{0,y,j}^2 + 2 \cdot \gamma_{\text{ROIC,ci,ci}} \cdot \text{ROIC}_{0,y,j} \cdot c_{i_{0,y,j}} +$$

$$\gamma_{g,g,ci} \cdot g_{0,y,j}^2 + 2 \cdot \gamma_{g,ci,ci} \cdot g_{0,y,j} \cdot c_{i_{0,y,j}} + \gamma_{\text{ROIC,ci}} \cdot \text{ROIC}_{0,y,j} \cdot g_{0,y,j}$$

\[ (31) \]

$$\Delta \left( \begin{array}{c} V_{0,y,j} \\ S_{0,y,j} \end{array} \right) = \Delta \text{ROIC}_{0,y,j} \cdot \frac{\partial V_{0,y,j}}{\partial \text{ROIC}_{0,y,j}} \cdot \Delta S_{0,y,j}$$

\[ (32) \]

$$\Delta V_{0,y,j} = \Delta \text{ROIC}_{0,y,j} \cdot \frac{\partial V_{0,y,j}}{\partial \text{ROIC}_{0,y,j}} \cdot \Delta \text{ROIC}_{0,y,j} \cdot S_{0,y,j}$$

\[ (33) \]

$$\Delta V_{0,y,j} = \Delta \text{g}_{0,y,j} \cdot \frac{\partial V_{0,y,j}}{\partial \text{g}_{0,y,j}} \cdot \Delta \text{g}_{0,y,j} \cdot S_{0,y,j}$$

\[ (34) \]

$$\Delta V_{0,y,j} = \Delta \text{g}_{0,y,j} \cdot \frac{\partial V_{0,y,j}}{\partial \text{g}_{0,y,j}} \cdot \Delta \text{g}_{0,y,j} \cdot S_{0,y,j}$$

\[ (35) \]

$$\Delta V_{0,y,j} = \Delta \text{ci}_{0,y,j} \cdot \frac{\partial V_{0,y,j}}{\partial \text{ci}_{0,y,j}} \cdot \Delta \text{ci}_{0,y,j} \cdot S_{0,y,j}$$

\[ (36) \]

$$\Delta V_{0,y,j} = \Delta \text{ci}_{0,y,j} \cdot \frac{\partial V_{0,y,j}}{\partial \text{ci}_{0,y,j}} \cdot \Delta \text{ci}_{0,y,j} \cdot S_{0,y,j}$$

\[ (37) \]
sales with respect to profitability, growth, and capital intensity for the third-degree Taylor series expansion, which approximates the theoretical relationships between the value of the firm per dollar of sales and the three value drivers, is used to estimate the sensitivities shown in tables 5 through 7. Table 9 shows estimates of sensitivities of the value of the firm per dollar of sales with respect to the rate of return on invested capital. The sensitivities of the value of the firm per dollar of sales with respect to the growth rate is shown in Table 10. Table 11 shows estimates of sensitivities of the value of the firm per dollar of sales with respect to capital intensity. All of the four tables for the value of the firm per dollar of sales and the sensitivities have a common format. The general layout for tables 8 through 11 is shown in Table 7. Row 1 and column 1 of each section of each table are used for labels showing the numerical values of the three value drivers, ROIC\textsubscript{0}, g\textsubscript{0}, and c\textsubscript{0}, is used to produce the numerical values shown in the table. The value in the first row and first column of each section of these tables is the capital intensity for a fractile of the distribution of capital intensity for the 32,582 observations used to produce estimates for the model. Section A uses the 0.10 fractile for capital intensity to produce the numerical values shown in the cells located at the intersections of rows 2 through 6 and columns 2 through 6. The numerical value of capital intensity for the 0.10 fractile is shown in row 1 and column 1 of the section of the table. Section B uses the 0.25 fractile for capital intensity, Section C uses the 0.50 fractile for capital intensity, Section D uses the 0.75 fractile for capital intensity, and Section E uses the 0.90 fractile for capital intensity. Row 1 of columns 2 through 6 of each section of each table contains the numerical values of the rate of return on invested capital for the 0.10, 0.25, 0.50, 0.75, and 0.90 fractiles of the distribution for the 32,582 observations used to produce estimates for the model. Column 1 of rows 2 through 6 of each section of each table contains the numerical values of the growth rate for the 0.10, 0.25, 0.50, 0.75, and 0.90 fractiles of the distribution for the 32,582 observations used to produce estimates for the model shown in the cells located at the intersections of rows 2 through 6 and columns 2 through 6. Table 8 shows that the numerical values of the value of the firm per dollar of sales vary from 0.00618 when profitability, growth, and capital intensity are at the lowest levels shown to 5.17020 when profitability, growth, and capital intensity are at the highest levels shown. The value of the firm per dollar of sales for other specific combinations of profitability, growth, and capital intensity can be found in Table 8. For example, if ROIC\textsubscript{0} equals 0.12296, g\textsubscript{0} equals 0.06878, and c\textsubscript{0} equals 0.79771 (all three value drivers are at the 0.50 fractile level), the value of the firm per dollar of sales equals 1.48378. It should be noted that all of the numerical values for the value of the firm per dollar of sales are based on estimates obtained from 32,582 observations over 20 years. Table 9 shows that the numerical values partial derivative of the value of the firm per dollar of sales with respect to the rate of return on invested capital vary from 2.14689 when profitability, growth, and capital intensity are at the lowest levels shown to 6.99620 when profitability, growth, and capital intensity are at the highest levels shown. If all three value drivers are at the 0.50 fractile level, ROIC\textsubscript{0} equals 0.19095, g\textsubscript{0} equals 0.06878, and c\textsubscript{0} equals 0.79771, the partial derivative of the value of the firm per dollar of sales with respect to the rate of return on invested capital is 2.49063. This indicates that if ROIC\textsubscript{0} increases by 1 percent (0.01), the value of the firm per dollar of sales will increase by approximately 0.0249063 to approximately 1.48378 plus 0.02491. Numerical values of the partial derivative of the value of the firm per dollar of sales with respect to the growth rate are shown in Table 10. These values vary from 0.07107 when profitability, growth, and capital intensity are at its lowest levels shown to 3.65861 when profitability, growth, and capital intensity are at the highest levels shown. The partial derivative of the value of the firm per dollar of sales with respect to the growth rate is 1.86399 when all three value drivers are at the 0.50 fractile level, ROIC\textsubscript{0} equals 0.19095, g\textsubscript{0} equals 0.06878, and c\textsubscript{0} equals 0.79771. If g\textsubscript{0} increases by 1 percent (0.01), the value of the firm per dollar of sales will increase by approximately 0.0186399 to approximately 1.48378 plus 0.01864. Table 11 shows that the numerical values partial derivative of the value of the firm per dollar of sales with respect to capital intensity vary from 2.10125 when profitability, growth, and capital intensity are at the lowest levels shown to 1.10868 when profitability, growth, and capital intensity are at the highest levels shown. When all three value drivers are at the 0.50 fractile level with ROIC\textsubscript{0} equals 0.19095, g\textsubscript{0} equals 0.06878, and c\textsubscript{0} equals 0.79771, the partial derivative of the
value of the firm per dollar of sales with respect to
capital intensity is 1.75916. If all three value
drivers are at the 0.50 fractile level and $c_{i0}$
increases by 1 percent (0.01), the value of the firm
per dollar of sales will increase by approximately
0.0175916 to approximately 1.48378 plus 0.01759.

**SUMMARY AND CONCLUSIONS**

This research extends valuation models to be
used in value-based management so that they
include explicit treatment of profitability, growth,
and capital intensity. The extended valuation
models are developed so that they explicitly show
the relationships between these value drivers and
the value of the firm. Partial derivatives for the
extended valuation models are used to provide
expressions for the sensitivities of the value of the firm
per dollar of sales to profitability, growth, and
capital intensity. The sensitivities are used to
provide expressions for dollar changes in the
value of the firm per dollar of sales and the value
of the firm associated with changes in profitability,
growth, and capital intensity. The partial
derivatives and dollar changes can be used as
measures of the sensitivities of value of the firm
with respect to changes in these value drivers.
The empirical estimates for the coefficients of the
valuation model and the sensitivities provide
information about the relative importance of
changes in profitability, growth, and capital
intensity in terms of changes in the value of the
firm. The models developed in this paper and
empirical estimates are be used to generate
information about the value of the firm per dollar of
sales and the sensitivities of the value of the firm
per dollar of sales for different numerical values of
profitability, growth, and capital intensity. The
information presented in the tables in this paper is
based on 32,582 observations for actual firms over
a time period of 20 years. This information
provides insights about the actual impacts on the
value of the firm and the value of the firm per
dollar of sales of changes in these value drivers.

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ABSTRACT

Value-based management systems focus on wealth and the wealth creation process and promote the generation of value for the shareholders. In this paper, a valuation model for the firm is extended analytically to focus explicitly on profitability, growth, and capital intensity as drivers of the value of the firm. The extended model provides information about the sensitivities of the value of the firm to changes in the firm's profitability, growth, and capital intensity. These sensitivities are presented in terms of changes per dollar of sales and actual dollar changes. The changes per dollar of sales show the relative sensitivities of the changes in the value of the firm resulting from changes in the measures for profitability, growth, and capital intensity. Each dollar amount shows the total dollar changes in the value of the firm resulting from changes in the profitability, growth, and capital intensity measures. These sensitivities show the impact of changes in the profitability, growth, and capital intensity measures on the value of the firm. This information is valuable in helping managers determine a desired course of action to improve the wealth generating ability of the firm by managing these value drivers more effectively.

INTRODUCTION

Value-based management systems focus on wealth and the wealth creation process and promote the generation of value for the shareholders (Fisher 1995; Lieber 1996; Walbert 1994). In this paper, a valuation model for the firm is extended analytically to focus explicitly on profitability, growth, and capital intensity as drivers of the value of the firm. The extended model provides information about the sensitivities of the value of the firm to permanent changes in the firm's profitability, growth, and capital intensity. These sensitivities are presented in terms of partial derivatives and dollar changes. They show the impact of changes in the profitability, growth, and capital intensity measures on the value of the firm. This information is valuable in helping managers determine a desired course of action to improve the wealth generating ability of the firm by managing these value drivers more effectively (Lehn and Makhija 1996). In the next section, value-based management is viewed as a system that integrates valuation and action. A detailed analytical development of the extended valuation models used to produce the measures of sensitivities for profitability, growth, and capital intensity is presented in the third section of this paper. In this section, profitability, growth, and capital intensity are shown to be important drivers of free cash flow, the value of the firm, and the value of the firm per dollar of sales. The following section concentrates on permanent changes in profitability, growth, and capital intensity and relates them to free cash flow, the value of the firm, and the value of the firm per dollar of sales. Expressions are developed for the sensitivities of free cash flow, the value of the firm, and the value of the firm per dollar of sales with respect to changes in profitability, growth, and capital intensity.
intensity in the fifth section. The sixth section of
the paper develops expressions for dollar changes
in the value of the firm per dollar of sales and in
the value of the firm for permanent changes in
profitability, growth, and capital intensity. An
illustrative example employing the sensitivity
models is presented in the next to last section of
the paper. This section provides numerical values
of the partial derivatives and dollar changes for the
value of the firm and the value of the firm per
dollar of sales for permanent changes in
profitability, growth, and capital intensity. The final
section of the paper provides a summary and
concluding comments.

**DRIVING SHAREHOLDER VALUE**

Management systems that focus on driving
shareholder value incorporate valuation principles
and are designed and implemented in a way that
promotes and rewards decisions that add market
value to investor-supplied funds (Copeland, Koller,
and Murrin 1995; Stern, Stewart, and Chew 1991;
Ehrbar 1998; Rappaport 1998; Stewart 1991). Such management systems emphasizing value
creation need valuation models that are expanded
to include concepts from both the income
statement and balance sheet. The value of the firm
should be related to income statement and
balance sheet items and financial metrics. The
extended valuation models developed in this
paper incorporate items from the income
statement and balance sheet as value drivers.
The value drivers are designed so that
components of the employees’ work can be
identified and linked to the value drivers in the
extended valuation model. Performance targets
for the value drivers can be established and actual
performance can be measured, evaluated, and
rewarded in terms of the targets for value drivers.
When the value drivers are identified properly, the
measurement system is designed properly, and
actual performance is reinforced appropriately,
value-based management systems will produce
business decisions that increase the value of the
firm value (Stern Stewart 1992).

**EXTENDING VALUATION MODELS**

The cost of capital and measures of future cash
flows and are used by generally accepted
valuation frameworks to provide measures of the
value of the firm. The timing, magnitude, and
riskiness of future cash flows, and the cost of
capital determine the value of the business. The
two-phase valuation model for free cash flow
shown in Table 1 as equation (1) is employed in
this study. When constant growth with \( g < r \)
occurs after time \( T \) the two-phase valuation takes
the form shown by equations (2) and (3) in Table
1. The first \( T \) periods in this model, phase one,
represent an explicit forecast (transition) period
during which varying behavior is possible and the
remaining periods (phase two) are a continuing
value (steady-state) period during which growth is
constant and parameters have steady-state values
(Copeland, Koller, and Murrin 1995; Stewart 1991;
Stewart 1994). Free cash flow, \( FCF_t \), is defined as
equal to the net operating profit after taxes,
NOPAT\(_t\), less the required net investment, \( NINV_t \).
Equation (4) in Table 1 is the model for free cash
flow that is used in this study. Net operating
profit after taxes is equal to earnings before
interest and taxes, \( EBIT_t \), after taxes. In this
model, shown as Equation (5) in Table 1, \( t \) is the
cash income tax rate. The required net
investment is the required change in invested
capital, \( IC_t - IC_{t-1} \). The model for net investment
is given by Equation (6) in Table 1. The return on
invested capital, ROIC\(_t\), which relates net
operating profit after taxes and invested capital,
\( IC_t \), is the measure of profitability used in this
study. The definition employed for the return on
invested capital is shown as Equation (7) in Table
1. Capital intensity, \( ci_t \), relates invested capital
and sales revenue. The model used for capital
intensity is shown as Equation (8) in Table 1. These
relationships provide a model for net
operating profit after taxes in terms of the return
on invested capital, capital intensity, and sales
revenue. This model is presented in Table 1 as
Equation (9). The model for invested capital in
terms of capital intensity and sales revenue shown
as Equation (10) in Table 1 is provided by the
definition of capital intensity. Using the model for
invested capital gives the model for required net
investment in terms of capital intensity and sales
revenue given in Equation (11). The model for the
period-to-period growth rate for sales revenue, \( g \),
given in Equation (12) of Table 1 shows how sales
revenue evolves over time. Net investment also
depends on the period-to-period growth rate for
sales revenue as shown in Equation (13) of Table
1. Using the models for net operating profit after
taxes, required net investment, and sales revenue
growth, produces the models for free cash flow
shown in equations (14) and (15) of Table 1.
Substituting the expression for free cash flow into
TABLE 1
Equations Employed in the Study

\[ V_0 = \sum_{t=1}^{T} \frac{FCF_t}{(1+r)^t} + \frac{V_T}{(1+r)^T} \]  \hspace{1cm} (1)

\[ V_T = \frac{\sum_{t=T+1}^{H} \frac{FCF_t \cdot (1+g)^{t-T}}{(1+r)^{t-T}}}{(1+r)^{t-T}} = \frac{FCF_T}{(1+r)^{t-T}} \cdot \left( \frac{1+g}{1+r} \right)^{t-T} \text{ as } H \to \infty \]  \hspace{1cm} (2)

\[ V_T = \frac{FCF_T \cdot (1+g)}{r - g} = \frac{FCF_{T+1}}{r - g} \]  \hspace{1cm} (3)

\[ FCF_t = NOPAT_t - NINV_t \]  \hspace{1cm} (4)

\[ NOPAT_t = (1-t) \cdot EBIT_t \]  \hspace{1cm} (5)

\[ NINV_t = IC_t - IC_{t-1} \]  \hspace{1cm} (6)

\[ ROIC_t = \left( \frac{NOPAT_t}{IC_t} \right) \]  \hspace{1cm} (7)

\[ ci_t = \left( \frac{IC_t}{S_t} \right) \]  \hspace{1cm} (8)

\[ NOPAT_t = ROIC_t \cdot ci_t \cdot S_t \]  \hspace{1cm} (9)

\[ IC_t = ci_t \cdot S_t \]  \hspace{1cm} (10)

\[ NINV_t = ci_t \cdot S_t - ci_{t-1} \cdot S_{t-1} \]  \hspace{1cm} (11)

\[ S_t = (1 + g_t) \cdot S_{t-1} \]  \hspace{1cm} (12)

\[ NINV_t = ci_t \cdot (1 + g_t) \cdot S_{t-1} - ci_{t-1} \cdot S_{t-1} = [ci_t \cdot (1 + g_t) - ci_{t-1}] \cdot S_{t-1} \]  \hspace{1cm} (13)

\[ FCF_t = ROIC_t \cdot ci_t \cdot S_t - [ci_t \cdot (1 + g_t) - ci_{t-1}] \cdot S_{t-1} \]  \hspace{1cm} (14)

\[ FCF_T = (ROIC_T \cdot ci_T \cdot (1 + g_T) - [ci_T \cdot (1 + g_T) - ci_{T-1}]) \cdot S_{T-1} \]  \hspace{1cm} (15)
TABLE 2
Equations Employed in the Study

\[ V_0 = \sum_{t=1}^{T} \frac{\left( \text{ROIC}_t \cdot c_i \cdot (1+g_t) - [c_i \cdot (1+g_t) - c_{i-1}] \right) \cdot S_{t-1}}{(1+r)^t} + \frac{V_T}{(1+r)^T} \]  
\[ V_T = \frac{\left[ \text{ROIC} \cdot c_i \cdot (1+g) - c_{i+T} \cdot g \right] \cdot S_T}{r - g} \]  
\[ S_{t-1} = \prod_{n=1}^{t-1} (1+g_{n}) \cdot S_0 \]  
\[ S_T = \prod_{n=1}^{T} (1+g_{n}) \cdot S_0 \]  
\[ \prod_{n=1}^{0} (1+g_{n}) = 1 \]  
\[ \left( \begin{array}{c} V_0 \\ S_0 \end{array} \right) = \sum_{t=1}^{T} \frac{\left( \text{ROIC}_t \cdot c_i \cdot (1+g_t) - [c_i \cdot (1+g_t) - c_{i-1}] \right) \cdot \prod_{n=1}^{t-1} (1+g_{n}) \cdot \left( \begin{array}{c} V_T \\ S_0 \end{array} \right)}{(1+r)^t} + \frac{\left( \begin{array}{c} V_T \\ S_0 \end{array} \right)}{(1+r)^T} \]  
\[ \left( \begin{array}{c} V_T \\ S_0 \end{array} \right) = \frac{\left[ \text{ROIC} \cdot c_i \cdot (1+g) - c_{i+T} \cdot g \right] \cdot \prod_{n=1}^{T} (1+g_{n})}{r - g} \]  
\[ \text{ROIC}_t + \rho \]  
\[ g_t + \gamma \]  
\[ c_i + \delta \]  
\[ \text{ROIC} + \rho \]  
\[ g + \gamma \]  
\[ c_i + \delta \]  
\[ \text{FCF}_t = \left( (\text{ROIC}_t + \rho) \cdot (c_i + \delta) \cdot (1+g_t + \gamma) - [(c_i + \delta) \cdot (1+g_t + \gamma) - (c_{i-1} + \delta)] \right) \cdot \prod_{n=1}^{t-1} (1+g_{n} + \gamma) \cdot S_0 \]  
\[ \text{FCF}_{t+1} = \left( (\text{ROIC} + \rho) \cdot (c_i + \delta) \cdot (1+g + \gamma) - [(c_i + \delta) \cdot (1+g + \gamma) - (c_{i+1} + \delta)] \right) \cdot \prod_{n=1}^{T} (1+g_{n} + \gamma) \cdot S_0 \]
the two-phase valuation model shown in equations (1), (2), and (3) gives the valuation model shown in Table 2 as equations (16) and (17). The model for sales revenue can be expanded as shown in equations (18), (19), and (20) so that each year’s sales revenue depends on \( S_0 \) and the period-to-period growth rates from time 0 up to time \( t-1 \) and \( T \). Substituting the expanded model for sales into the model for the value of the firm gives the extended valuation model for the value of the firm per dollar of sales shown in Table 2 as equations (21) and (22). The time subscripts are removed from the symbols for return on invested capital, capital intensity, and sales revenue growth after time \( T \) to emphasize that steady-state values occur. This model shows how the return on invested capital, capital intensity, sales revenue growth, and cost of capital are drivers of the value of the firm per dollar of sales.

**THE IMPORTANCE OF PROFITABILITY, GROWTH, AND CAPITAL INTENSITY**

Profitability, growth, and capital intensity are important drivers of free cash flow and the value of the firm in the models presented so far. The importance of profitability, growth, and capital intensity in the value generation process can be examined more closely by looking at their effects on free cash flow and the value of the firm.

**Perturbation Terms for the Value Drivers**

The following notation that is used to examine sensitivities for the measures of profitability, growth, and capital intensity is presented in Table 2 in equations (23), (24), and (25) for the explicit forecast (transition) period and in equations (26), (27), and (28) for the for the continuing value (steady-state) period. In these models, \( \rho \), \( \gamma \), and \( \delta \) are perturbation terms which normally equal zero, but are set to positive and negative values to measure sensitivities of the value of the firm with respect to permanent changes in these measures of profitability, growth, and capital intensity.

**FCF in Terms of Profitability, Growth, and Capital Intensity Including Perturbation Terms**

When the perturbations terms are introduced into the expressions, the relationship between free cash flow and the measures of profitability, growth, and capital intensity are given in Table 2 by Equation (29) for the explicit forecast (transition) period and by Equation (30) for the continuing value (steady-state) period.

**Sensitivities of FCF with Respect to Profitability, Growth, and Capital Intensity**

The partial derivatives of free cash flow show their sensitivities with respect to profitability, growth, and capital intensity. The partial derivatives for free cash flow with respect to permanent changes in profitability, growth, and capital intensity are obtained from the models for free cash flow. For profitability, the partial derivatives for free cash flow with respect to a permanent change in the rate of return on invested capital are given in Table 3 by Equation (31) for the explicit forecast (transition) period and by Equation (32) for the continuing value (steady-state) period. The partial derivatives for free cash flow with respect to a permanent change in growth are given in Table 3 by Equation (33) for the explicit forecast (transition) period and by Equation (34) for the continuing value (steady-state) period. Equations (35) and (36) in Table 3 are the partial derivatives for free cash flow with respect to a permanent change in capital intensity for the explicit forecast (transition) period and for the continuing value (steady-state) period, respectively.

**Sensitivities of Value per Dollar of Sales with Respect to Profitability, Growth, and Capital Intensity**

The value of the firm per dollar of sales equals the present value of the future free cash flows divided by \( S_0 \) and is given by Equation (37) in Table 3. The partial derivative of the value of the firm per dollar of sales with respect to permanent changes in profitability is equal to the expression in Equation (38) in Table 3. The partial derivative of the value of the firm per dollar of sales with respect to a permanent change in growth is equal to the expression in Equation (39) in Table 3. The partial derivative of the value of the firm per dollar of sales with respect to a permanent change in capital intensity is equal to the expression in Equation (40) in Table 3.

**Dollar Changes for Profitability, Growth, and Capital Intensity**

Another way to measure the sensitivities of value and value added to changes in profitability,
### Table 3
Equations Employed in the Study

<table>
<thead>
<tr>
<th>Equation</th>
<th>Description</th>
</tr>
</thead>
</table>
| \[
\frac{\partial FCF_t}{\partial \rho} = (ci_t + \delta) \cdot (1 + g_t + \gamma) \cdot \prod_{n=1}^{t-1} (1 + g_n + \gamma) \cdot S_0
\] | (31) |
| \[
\frac{\partial FCF_{T+1}}{\partial \rho} = (ci_T + \delta) \cdot (1 + g_T + \gamma) \cdot \prod_{n=1}^{T} (1 + g_n + \gamma) \cdot S_0
\] | (32) |
| \[
\frac{\partial \gamma}{\partial \gamma} = \gamma + \sum \prod_{n=1}^{t-1} (1 + g_n + \gamma) \cdot S_0 +
\] | (33) |
| \[
\frac{\partial FCF_{T+1}}{\partial \gamma} = (ROIC + \rho) \cdot (ci_T + \delta) \cdot (1 + g_T + \gamma) \cdot \prod_{n=1}^{T} (1 + g_n + \gamma) \cdot S_0 +
\] | (34) |
| \[
\frac{\partial \gamma}{\partial \gamma} = \gamma + \sum \prod_{n=1}^{t-1} (1 + g_n + \gamma) \cdot S_0 +
\] | (35) |
| \[
\frac{\partial \gamma}{\partial \gamma} = \gamma + \sum \prod_{n=1}^{T} (1 + g_n + \gamma) \cdot S_0
\] | (36) |
| \[
\frac{\partial V_0}{\partial S_0} = \sum_{t=1}^{T} \frac{FCF_t}{S_0 \cdot (1 + \gamma)^t} + \frac{FCF_{T+1}}{S_0 \cdot [r \cdot (g + \gamma)] \cdot (1 + \gamma)^T}
\] | (37) |
| \[
\frac{\partial V_0}{\partial S_0} = \sum_{t=1}^{T} \left( \frac{\partial FCF_t}{\partial \rho} + \frac{\partial FCF_{T+1}}{\partial \rho} \right)
\] | (38) |
| \[
\frac{\partial V_0}{\partial \gamma} = \sum_{t=1}^{T} \left( \frac{\partial FCF_t}{\partial \gamma} + \frac{\partial FCF_{T+1}}{\partial \gamma} \right) \cdot (1 + g_T + \gamma) + S_0 \cdot \prod_{n=1}^{T} (1 + g_n + \gamma) \cdot S_0
\] | (39) |
| \[
\frac{\partial V_0}{\partial \gamma} = \sum_{t=1}^{T} \left( \frac{\partial FCF_t}{\partial \gamma} + \frac{\partial FCF_{T+1}}{\partial \gamma} \right) \cdot (1 + g_T + \gamma) + S_0 \cdot \prod_{n=1}^{T} (1 + g_n + \gamma) \cdot S_0
\] | (40) |
growth, and capital intensity is the dollar change resulting from a permanent change in profitability, growth, and capital intensity. The dollar change for a permanent change in the measures of profitability, growth, and capital intensity is equal to the partial derivative of the value of the firm with respect to the respective value driver times the change in the value driver. The changes in the value of the firm are given by equations (41), (42), and (43) in Table 4 for a permanent change in each of the value drivers, profitability, growth, and capital intensity.

**ILLUSTRATIVE EXAMPLE**

The models developed in this paper can be used to generate information about the value of the firm per dollar of sales, the value of the firm per dollar of sales, and the sensitivities of the value of the firm per dollar of sales to profitability, growth, and capital intensity. The models are used to generate the information presented in tables 1 through 4. In the tables, the explicit forecast (transition) period is five years and a continuing value (steady-state) period occurs after that. The different values of ROIC, g, and c are shown in the four tables are used to produce the different values of the partial derivatives of the value of the firm per dollar of sales with respect to the measures of profitability, growth, and capital intensity. Table 5 uses an initial ROIC of 25%, an initial growth rate of 20%, an initial capital intensity of 0.50, and a cost of capital of 15%. Table 6 uses an initial ROIC of 25%, an initial growth rate of 20%, a higher initial capital intensity of 1.00, and a cost of capital of 15%. Table 7 uses an initial ROIC of 25%, an initial growth rate of 20%, an even higher initial capital intensity of 1.50, and a cost of capital of 15%. Table 8 uses a lower initial ROIC of 20%, an initial growth rate of 20%, an initial capital intensity of 1.00, and a cost of capital of 15%. For the continuing value (steady-state) period, all four tables use an ROIC of 15%, a growth rate of 5%, and a cost of capital of 15%. The capital intensity for the continuing value (steady-state) period is 0.50, 1.00, 1.50, and 1.00 for the four tables. For the parameters shown in the tables, a permanent change in ROIC has the largest impact on the value of the firm per dollar of sales and a permanent change in capital intensity has the smallest impact on the value of the firm per dollar of sales. A permanent change in growth has an intermediate impact on the value of the firm per dollar of sales for the parameters shown. The sensitivities of the value of the firm per dollar of sales to profitability, growth, and capital intensity for other values of the parameters for the explicit forecast (transition) and continuing value (steady-state) periods can be generated using the models developed in this paper. The value of the partial
### TABLE 5

<table>
<thead>
<tr>
<th>Explicit Forecast (Transition) Period</th>
<th>Steady State</th>
<th>Partial Derivative</th>
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<tr>
<td>t</td>
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<td>1</td>
</tr>
<tr>
<td></td>
<td>0.25</td>
<td>0.25</td>
</tr>
<tr>
<td>g t</td>
<td>0.20</td>
<td>0.20</td>
</tr>
<tr>
<td>ci t</td>
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<td>0.50</td>
</tr>
<tr>
<td>r</td>
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<td>0.15</td>
</tr>
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</table>

### TABLE 6

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<th>Explicit Forecast (Transition) Period</th>
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<th>Partial Derivative</th>
</tr>
</thead>
<tbody>
<tr>
<td>t</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>0.25</td>
<td>0.25</td>
</tr>
<tr>
<td>g t</td>
<td>0.20</td>
<td>0.20</td>
</tr>
<tr>
<td>ci t</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>r</td>
<td>0.15</td>
<td>0.15</td>
</tr>
</tbody>
</table>

### TABLE 7

<table>
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<tr>
<th>Explicit Forecast (Transition) Period</th>
<th>Steady State</th>
<th>Partial Derivative</th>
</tr>
</thead>
<tbody>
<tr>
<td>t</td>
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<td>1</td>
</tr>
<tr>
<td></td>
<td>0.25</td>
<td>0.25</td>
</tr>
<tr>
<td>g t</td>
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<td>0.20</td>
</tr>
<tr>
<td>ci t</td>
<td>1.50</td>
<td>1.50</td>
</tr>
<tr>
<td>r</td>
<td>0.15</td>
<td>0.15</td>
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</tbody>
</table>

### TABLE 8

<table>
<thead>
<tr>
<th>Explicit Forecast (Transition) Period</th>
<th>Steady State</th>
<th>Partial Derivative</th>
</tr>
</thead>
<tbody>
<tr>
<td>t</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>0.20</td>
<td>0.20</td>
</tr>
<tr>
<td>g t</td>
<td>0.20</td>
<td>0.20</td>
</tr>
<tr>
<td>ci t</td>
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<td>1.00</td>
</tr>
<tr>
<td>r</td>
<td>0.15</td>
<td>0.15</td>
</tr>
</tbody>
</table>
derivative multiplied by the anticipated permanent changes in ROIC, g, or ci shows the magnitude of the anticipated change in the value of the firm per dollar of sales resulting from the change in the value driver. Suppose there is a permanent change in ROIC equal to 1% when the relevant values for the parameters are shown in Table 6. Then, the value of the firm per dollar of sales will increase by approximately $16.90277$ times $0.01$ equals $0.1690277$. In addition, assume that the firm's sales are $1$ billion. The value of the firm will increase by approximately $16.90277$ times $0.01$ times $1$ billion equals $0.1690277$ billion. The effects of permanent changes in the growth rate and capital intensity can also be analyzed using this approach. This example shows how the models provide quantitative measures of the effects of permanent changes in profitability, growth, and capital intensity on the value of the firm per dollar of sales and on the value of the firm. Other combinations of profitability, growth, capital intensity, and cost of capital for explicit forecast (transition) period and a continuing value (steady-state) period can be examined in similar fashion. Such results are interpreted as discussed in this example and can be used to develop a more complete understanding to the response surface for the value of the firm.

SUMMARY AND CONCLUSIONS

This research extends two-stage valuation models so that they include explicit treatment of profitability, growth, and capital intensity. Extended valuation models are presented which show the relationships between these three value drivers and the value of the firm and the value of the firm per dollar of sales. Partial derivatives for the extended valuation models are used to provide expressions for the sensitivities of the value of the firm per dollar of sales and the value of the firm with respect to profitability, growth, and capital intensity. The partial derivatives are used to produce expressions for dollar changes in the value of the firm associated with permanent changes in profitability, growth, and capital intensity. The partial derivatives and dollar changes are measures of the sensitivities of the value of the firm with respect to changes in these value drivers. An illustration example demonstrates the usefulness of the valuation models and sensitivities models developed. The sensitivity measures show the relative importance of permanent changes in profitability, growth, and capital intensity. This information can be used by value-based management systems in designing programs to enhance the value of the firm.

REFERENCES

ABSTRACT

Value-based management systems focus on wealth and the wealth creation process and promote the generation of value for the shareholders. In this paper, a valuation model for the firm is extended analytically to focus explicitly on profitability, growth, and capital intensity as drivers of the value of the firm. The extended model provides information about the sensitivities of the value of the firm to changes in the firm’s profitability, growth, and capital intensity. These sensitivities are presented in terms of changes per dollar of sales and actual dollar changes. The changes per dollar of sales show the relative sensitivities of the changes in the value of the firm resulting from changes in the measures for profitability, growth, and capital intensity. Each dollar amount shows the total dollar changes in the value of the firm resulting from changes in the profitability, growth, and capital intensity measures. These sensitivities show the impact of changes in the profitability, growth, and capital intensity measures on the value of the firm. This information is valuable in helping managers determine a desired course of action to improve the wealth generating ability of the firm by managing these value drivers more effectively (Lehn and Makhija 1996). In the next section, value-based management is viewed as a system that integrates valuation and action. A detailed analytical development of the extended valuation models used to produce the measures of sensitivities for profitability, growth, and capital intensity is presented in the third section of this paper. In this section, profitability, growth, and capital intensity are shown to be important drivers of free cash flow, the value of the firm, and the value of the firm per dollar of sales. The following section concentrates on permanent changes in profitability, growth, and capital intensity and relates them to free cash flow, the value of the firm, and the value of the firm per dollar of sales. Expressions are developed for the sensitivities of free cash flow, the value of the firm, and the value of the firm per dollar of sales with respect to changes in profitability, growth, and capital intensity.
intensity in the fifth section. The sixth section of the paper develops expressions for dollar changes in the value of the firm per dollar of sales and in the value of the firm for permanent changes in profitability, growth, and capital intensity. An illustrative example employing the sensitivity models is presented in the next to last section of the paper. This section provides numerical values of the partial derivatives and dollar changes for the value of the firm and the value of the firm per dollar of sales for permanent changes in profitability, growth, and capital intensity. The final section of the paper provides a summary and concluding comments.

**DRIVING SHAREHOLDER VALUE**

Management systems that focus on driving shareholder value incorporate valuation principles and are designed and implemented in a way that promotes and rewards decisions that add market value to investor-supplied funds (Copeland, Koller, and Murrin 1995; Stern, Stewart, and Chew 1991; Ehrbar 1998; Rappaport 1998; Stewart 1991). Such management systems emphasizing value creation need valuation models that are expanded to include concepts from both the income statement and balance sheet. The value of the firm should be related to income statement and balance sheet items and financial metrics. The extended valuation models developed in this paper incorporate items from the income statement and balance sheet as value drivers. The value drivers are designed so that components of the employees’ work can be identified and linked to the value drivers in the extended valuation model. Performance targets for the value drivers can be established and actual performance can be measured, evaluated, and rewarded in terms of the targets for value drivers. When the value drivers are identified properly, the measurement system is designed properly, and actual performance is reinforced appropriately, value-based management systems will produce business decisions that increase the value of the firm value (Stern Stewart 1992).

**EXTENDING VALUATION MODELS**

The cost of capital and measures of future cash flows and are used by generally accepted valuation frameworks to provide measures of the value of the firm. The timing, magnitude, and riskiness of future cash flows, and the cost of capital determine the value of the business. The two-phase valuation model for free cash flow shown in Table 1 as equation (1) is employed in this study. When constant growth with \( g < r \) occurs after time \( T \) the two-phase valuation takes the form shown by equations (2) and (3) in Table 1. The first \( T \) periods in this model, phase one, represent an explicit forecast (transition) period during which varying behavior is possible and the remaining periods (phase two) are a continuing value (steady-state) period during which growth is constant and parameters have steady-state values (Copeland, Koller, and Murrin 1995; Stewart 1991; Stewart 1994). Free cash flow, \( FCF_t \), is defined as equal to the net operating profit after taxes, \( NOPAT_t \), less the required net investment, \( NINV_t \). Equation (4) in Table 1 is the model for free cash flow is that is used in this study. Net operating profit after taxes is equal to earnings before interest and taxes, \( EBIT_t \), after taxes. In this model, shown as Equation (5) in Table 1, \( \tau \) is the cash income tax rate. The required net investment is the required change in invested capital, \( IC_t - IC_{t-1} \). The model for net investment is given by Equation (6) in Table 1. The return on invested capital, \( ROIC_t \), which relates net operating profit after taxes and invested capital, \( IC_t \), is the measure of profitability used in this study. The definition employed for the return on invested capital is shown as Equation (7) in Table 1. Capital intensity, \( ci_t \), relates invested capital and sales revenue. The model used for capital intensity is shown as Equation (8) in Table 1. These relationships provide a model for net operating profit after taxes in terms of the return on invested capital, capital intensity, and sales revenue. This model is presented in Table 1 as Equation (9). The model for invested capital in terms of capital intensity and sales revenue shown as Equation (10) in Table 1 is provided by the definition of capital intensity. Using the model for invested capital gives the model for required net investment in terms of capital intensity and sales revenue given in Equation (11). The model for the period-to-period growth rate for sales revenue, \( g_t \), given in Equation (12) of Table 1 shows how sales revenue evolves over time. Net investment also depends on the period-to-period growth rate for sales revenue as shown in Equation (13) of Table 1. Using the models for net operating profit after taxes, required net investment, and sales revenue growth, produces the models for free cash flow shown in equations (14) and (15) of Table 1. Substituting the expression for free cash flow into
### TABLE 1
Equations Employed in the Study

\[
V_0 = \sum_{t=1}^{T} \frac{FCF_t}{(1+r)^t} + \frac{V_T}{(1+r)^T} \quad (1)
\]

\[
V_T = \frac{H}{t=T+1} \frac{FCF_T \cdot (1+g)^{t-T}}{(1+r)^{t-T}} = FCF_T \cdot \frac{H}{t=T+1} \frac{(1+g)^{t-T}}{(1+r)} \text{ as } H \to \infty \quad (2)
\]

\[
V_T = \frac{FCF_T \cdot (1+g)}{r-g} = \frac{FCF_T + 1}{r-g} \quad (3)
\]

\[
FCF_t = NOPAT_t - NINV_t \quad (4)
\]

\[
NOPAT_t = (1-\tau) \cdot EBIT_t \quad (5)
\]

\[
NINV_t = IC_t - IC_{t-1} \quad (6)
\]

\[
ROIC_t = \left( \frac{NOPAT_t}{IC_t} \right) \quad (7)
\]

\[
c_i_t = \left( \frac{IC_t}{S_t} \right) \quad (8)
\]

\[
NOPAT_t = ROIC_t \cdot c_i_t \cdot S_t \quad (9)
\]

\[
IC_t = c_i_t \cdot S_t \quad (10)
\]

\[
NINV_t = c_{i_t} \cdot S_t - c_{i_{t-1}} \cdot S_{t-1} \quad (11)
\]

\[
S_t = (1+g_t) \cdot S_{t-1} \quad (12)
\]

\[
NINV_t = c_{i_t} \cdot (1+g_t) \cdot S_{t-1} - c_{i_{t-1}} \cdot S_{t-1} = [c_{i_t} \cdot (1+g_t) - c_{i_{t-1}}] \cdot S_{t-1} \quad (13)
\]

\[
FCF_t = ROIC_t \cdot c_i_t \cdot S_t - [c_{i_t} \cdot (1+g_t) - c_{i_{t-1}}] \cdot S_{t-1} \quad (14)
\]

\[
FCF_T = \{ROIC_T \cdot c_i_T \cdot (1+g_T) - [c_{i_T} \cdot (1+g_T) - c_{i_{T-1}}]\} \cdot S_{T-1} \quad (15)
\]
### TABLE 2
Equations Employed in the Study

\[
V_0 = \sum_{t=1}^{T} \frac{\{\text{ROIC}_t \cdot c_i(1+g_t)-[c_i(1+g_t)-c_i(t-1)]\} \cdot S_{t-1}}{(1+r)^t} + \frac{V_T}{(1+r)^T}
\]  
(16)

\[
V_T = \frac{[\text{ROIC} \cdot c_i(1+g)-c_i \cdot T \cdot g] \cdot S_T}{r \cdot g}
\]  
(17)

\[
S_{t-1} = \prod_{n=1}^{t-1} (1+g_n) \cdot S_0
\]  
(18)

\[
S_T = \prod_{n=1}^{T} (1+g_n) \cdot S_0
\]  
(19)

\[
0 \prod_{n=1}^{T} (1+g_n) = 1
\]  
(20)

\[
\left(\frac{V_0}{S_0}\right) = \sum_{t=1}^{T} \frac{\{\text{ROIC}_t \cdot c_i(1+g_t)-[c_i(1+g_t)-c_i(t-1)]\} \cdot \prod_{n=1}^{t-1} (1+g_n)}{(1+r)^t} + \frac{V_T}{(1+r)^T}
\]  
(21)

\[
\left(\frac{V_T}{S_0}\right) = \frac{[\text{ROIC} \cdot c_i \cdot (1+g) - c_{iT} \cdot g] \cdot \prod_{n=1}^{T} (1+g_n)}{r \cdot g}
\]  
(22)

\[
\text{ROIC}_t + \rho
\]  
(23)

\[
g_t + \gamma
\]  
(24)

\[
c_i + \delta
\]  
(25)

\[
\text{ROIC} + \rho
\]  
(26)

\[
g + \gamma
\]  
(27)

\[
c_i + \delta
\]  
(28)

\[
\text{FCF}_t = \{(\text{ROIC}_t + \rho) \cdot (c_i + \delta) \cdot (1+g_t + \gamma) - [(c_i + \delta) \cdot (1+g_t + \gamma) - (c_{i(t-1)} + \delta)] \cdot \prod_{n=1}^{t-1} (1+g_n + \gamma) \cdot S_0
\]  
(29)

\[
\text{FCF}_T+1 = \{(\text{ROIC} + \rho) \cdot (c_i + \delta) \cdot (1+g + \gamma) - [(c_i + \delta) \cdot (1+g + \gamma) - (c_{i(T-1)} + \delta)] \cdot \prod_{n=1}^{T} (1+g_n + \gamma) \cdot S_0
\]  
(30)
the two-phase valuation model shown in equations (1), (2), and (3) gives the valuation model shown in Table 2 as equations (16) and (17). The model for sales revenue can be expanded as shown in equations (18), (19), and (20) so that each year’s sales revenue depends on \( S_0 \) and the period-to-period growth rates from time 0 up to time \( t-1 \) and \( T \). Substituting the expanded model for sales into the model for the value of the firm gives the extended valuation model for the value of the firm per dollar of sales shown in Table 2 as equations (21) and (22). The time subscripts are removed from the symbols for return on invested capital, capital intensity, and sales revenue growth after time \( T \) to emphasize that steady-state values occur. This model shows how the return on invested capital, capital intensity, sales revenue growth, and cost of capital are drivers of the value of the firm per dollar of sales.

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Profitability, growth, and capital intensity are important drivers of free cash flow and the value of the firm in the models presented so far. The importance of profitability, growth, and capital intensity in the value generation process can be examined more closely by looking at their effects on free cash flow and the value of the firm.

**Perturbation Terms for the Value Drivers**

The following notation that is used to examine sensitivities for the measures of profitability, growth, and capital intensity is presented in Table 2 in equations (23), (24), and (25) for the explicit forecast (transition) period and in equations (26), (27), and (28) for the for the continuing value (steady-state) period. In these models, \( \rho \), \( \gamma \), and \( \delta \) are perturbation terms which normally equal zero, but are set to positive and negative values to measure sensitivities of the value of the firm with respect to permanent changes in these measures of profitability, growth, and capital intensity.

**FCF in Terms of Profitability, Growth, and Capital Intensity Including Perturbation Terms**

When the perturbations terms are introduced into the expressions, the relationship between free cash flow and the measures of profitability, growth, and capital intensity are given in Table 2 by Equation (29) for the explicit forecast (transition) period and by Equation (30) for the continuing value (steady-state) period.

**Sensitivities of FCF with Respect to Profitability, Growth, and Capital Intensity**

The partial derivatives of free cash flow show their sensitivities with respect to profitability, growth, and capital intensity. The partial derivatives for free cash flow with respect to permanent changes in profitability, growth, and capital intensity are obtained from the models for free cash flow. For profitability, the partial derivatives for free cash flow with respect to a permanent change in the rate of return on invested capital are given in Table 3 by Equation (31) for the explicit forecast (transition) period and by Equation (32) for the continuing value (steady-state) period. The partial derivatives for free cash flow with respect to a permanent change in growth are given in Table 3 by Equation (33) for the explicit forecast (transition) period and by Equation (34) for the continuing value (steady-state) period. Equations (35) and (36) in Table 3 are the partial derivatives for free cash flow with respect to a permanent change in capital intensity for the explicit forecast (transition) period and for the continuing value (steady-state) period, respectively.

**Sensitivities of Value per Dollar of Sales with Respect to Profitability, Growth, and Capital Intensity**

The value of the firm per dollar of sales equals the present value of the future free cash flows divided by \( S_0 \) and is given by Equation (37) in Table 3. The partial derivative of the value of the firm per dollar of sales with respect to permanent changes in profitability is equal to the expression in Equation (38) in Table 3. The partial derivative of the value of the firm per dollar of sales with respect to a permanent change in growth is equal to the expression in Equation (39) in Table 3. The partial derivative of the value of the firm per dollar of sales with respect to a permanent change in capital intensity is equal to the expression in Equation (40) in Table 3.

**Dollar Changes for Profitability, Growth, and Capital Intensity**

Another way to measure the sensitivities of value and value added to changes in profitability,
### TABLE 3
Equations Employed in the Study

<table>
<thead>
<tr>
<th>Equation</th>
<th>Description</th>
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<tbody>
<tr>
<td>( \frac{\partial \text{FCF}_t}{\partial \rho} )</td>
<td>( (c_i_t + \delta) \cdot (1 + g_t + \gamma) \cdot \prod_{n=1}^{t-1} (1 + g_n + \gamma) \cdot S_0 ) (31)</td>
</tr>
<tr>
<td>( \frac{\partial \text{FCF}_{T+1}}{\partial \rho} )</td>
<td>( (c_i_t + \delta) \cdot (1 + g + \gamma) \cdot \prod_{n=1}^{T} (1 + g_n + \gamma) \cdot S_0 ) (32)</td>
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<tr>
<td>( \frac{\partial \text{FCF}_t}{\partial \gamma} )</td>
<td>( [\text{ROIC}<em>t + \rho] \cdot (c_i_t + \delta) - (c_i_t + \delta) \cdot \prod</em>{n=1}^{t-1} (1 + g_n + \gamma) \cdot S_0 + ) (33)</td>
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<tr>
<td>( \frac{\partial \text{FCF}_{T+1}}{\partial \gamma} )</td>
<td>( [\text{ROIC} + \rho] \cdot (c_i_t + \delta) - (c_i_t + \delta) \cdot \prod_{n=1}^{T} (1 + g_n + \gamma) \cdot S_0 + )</td>
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<tr>
<td>( \frac{\partial \text{FCF}_t}{\partial \delta} )</td>
<td>( [\text{ROIC}<em>t + \rho] \cdot (c_i_t + \delta) - (c_i_t + \delta) \cdot \prod</em>{n=1}^{t-1} (1 + g_n + \gamma) \cdot S_0 ) (35)</td>
</tr>
<tr>
<td>( \frac{\partial \text{FCF}_{T+1}}{\partial \delta} )</td>
<td>( [\text{ROIC} + \rho] \cdot (1 + g + \gamma) - (g + \gamma) \cdot \prod_{n=1}^{T} (1 + g_n + \gamma) \cdot S_0 ) (36)</td>
</tr>
<tr>
<td>( \frac{V_0}{S_0} )</td>
<td>( \frac{\sum_{t=1}^{T} \text{FCF}<em>t}{S_0 \cdot (1 + r)^t} + \frac{\text{FCF}</em>{T+1}}{S_0 \cdot [r - (g + \gamma)] \cdot (1 + r)^T} ) (37)</td>
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<td>( \frac{\partial V_0}{\partial \rho} )</td>
<td>( \frac{\sum_{t=1}^{T} \left( \frac{\partial \text{FCF}<em>t}{\partial \rho} \right)}{S_0 \cdot (1 + r)^t} + \frac{\left( \frac{\partial \text{FCF}</em>{T+1}}{\partial \rho} \right)}{S_0 \cdot [r - (g + \gamma)] \cdot (1 + r)^T} ) (38)</td>
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<tr>
<td>( \frac{\partial V_0}{\partial \gamma} )</td>
<td>( \frac{\sum_{t=1}^{T} \left( \frac{\partial \text{FCF}<em>t}{\partial \gamma} \right)}{S_0 \cdot (1 + r)^t} + \frac{\left( \frac{\partial \text{FCF}</em>{T+1}}{\partial \gamma} \right) \cdot [r - (g + \gamma)] + \text{FCF}_{T+1}}{S_0 \cdot [r - (g + \gamma)]^2 \cdot (1 + r)^T} ) (39)</td>
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<tr>
<td>( \frac{\partial V_0}{\partial \delta} )</td>
<td>( \frac{\sum_{t=1}^{T} \left( \frac{\partial \text{FCF}<em>t}{\partial \delta} \right)}{S_0 \cdot (1 + r)^t} + \frac{\left( \frac{\partial \text{FCF}</em>{T+1}}{\partial \delta} \right)}{S_0 \cdot [r - (g + \gamma)] \cdot (1 + r)^T} ) (40)</td>
</tr>
</tbody>
</table>
growth, and capital intensity is the dollar change resulting from a permanent change in profitability, growth, and capital intensity. The dollar change for a permanent change in the measures of profitability, growth, and capital intensity is equal to the partial derivative of the value of the firm with respect to the respective value driver times the change in the value driver. The changes in the value of the firm are given by equations (41), (42), and (43) in Table 4 for a permanent change in each of the value drivers, profitability, growth, and capital intensity.

**ILLUSTRATIVE EXAMPLE**

The models developed in this paper can be used to generate information about the value of the firm per dollar of sales, the value of the firm per dollar of sales, and the sensitivities of the value of the firm per dollar of sales to profitability, growth, and capital intensity. The models are used to generate the information presented in tables 1 through 4. In the tables, the explicit forecast (transition) period is five years and a continuing value (steady-state) period occurs after that. The different values of ROIC, g, and c shown in the four tables are used to produce the different values of the partial derivatives of the value of the firm per dollar of sales with respect to the measures of profitability, growth, and capital intensity. Table 5 uses an initial ROIC of 25%, an initial growth rate of 20%, an initial capital intensity of 0.50, and a cost of capital of 15%. Table 6 uses an initial ROIC of 25%, an initial growth rate of 20%, a higher initial capital intensity of 1.00, and a cost of capital of 15%. Table 7 uses an initial ROIC of 25%, an initial growth rate of 20%, an even higher initial capital intensity of 1.50, and a cost of capital of 15%. Table 8 uses a lower initial ROIC of 20%, an initial growth rate of 20%, an initial capital intensity of 1.00, and a cost of capital of 15%. For the continuing value (steady-state) period, all four tables use an ROIC of 15%, a growth rate of 5%, and a cost of capital of 15%. For the parameters shown in the tables, a permanent change in ROIC has the largest impact on the value of the firm per dollar of sales and a permanent change in capital intensity has the smallest impact on the value of the firm per dollar of sales. A permanent change in growth has an intermediate impact on the value of the firm per dollar of sales for the parameters shown. The sensitivities of the value of the firm per dollar of sales to profitability, growth, and capital intensity for other values of the parameters for the explicit forecast (transition) and continuing value (steady-state) periods can be generated using the models developed in this paper. The value of the partial
**TABLE 5**

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derivative multiplied by the anticipated permanent changes in ROIC, g, or ci shows the magnitude of the anticipated change in the value of the firm per dollar of sales resulting from the change in the value driver. Suppose there is a permanent change in ROIC equal to 1% when the relevant values for the parameters are shown in Table 6. Then, the value of the firm per dollar of sales will increase by approximately $1 billion equals 0.1690277 billion. In addition, assume that the firm’s sales are $1 billion. The value of the firm will increase by approximately $1 billion equals $0.1690277 billion. The effects of permanent changes in the growth rate and capital intensity can also be analyzed using this approach. This example shows how the models provide quantitative measures of the effects of permanent changes in profitability, growth, and capital intensity on the value of the firm per dollar of sales and on the value of the firm. Other combinations of profitability, growth, capital intensity, and cost of capital for explicit forecast (transition) period and a continuing value (steady-state) period can be examined in similar fashion. Such results are interpreted as discussed in this example and can be used to develop a more complete understanding to the response surface for the value of the firm.

SUMMARY AND CONCLUSIONS

This research extends two-stage valuation models so that they include explicit treatment of profitability, growth, and capital intensity. Extended valuation models are presented which show the relationships between these three value drivers and the value of the firm and the value of the firm per dollar of sales. Partial derivatives for the extended valuation models are used to provide expressions for the sensitivities of the value of the firm per dollar of sales and the value of the firm with respect to profitability, growth, and capital intensity. The partial derivatives are used to produce expressions for dollar changes in the value of the firm associated with permanent changes in profitability, growth, and capital intensity. The partial derivatives and dollar changes are measures of the sensitivities of the value of the firm with respect to changes in these value drivers. An illustration example demonstrates the usefulness of the valuation models and sensitivities models developed. The sensitivity measures show the relative importance of permanent changes in profitability, growth, and capital intensity. This information can be used by value-based management systems in designing programs to enhance the value of the firm.

REFERENCES


ASSESSMENT OF STATISTICAL POWER IN CONTEMPORARY ACCOUNTING INFORMATION SYSTEMS RESEARCH

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ABSTRACT

The purpose of this study is to provide a current, representative assessment of statistical power in accounting information systems (AIS) research. This study empirically investigates whether the statistical power of extant AIS research has been strong enough to detect important relationships that may exist. A power analysis of 45 articles from the most recent, complete five years (1996–2000) of Journal of Information Systems and Journal of Management Information Systems shows that, on the average, 56 percent of empirical studies do not have high power levels. This suggests that, on average across all effect sizes, more than half the time AIS researchers risk not being able to detect significant effects when, in fact, they exist. This risk increases greatly as the effect size decreases. Current findings suggest the need for more statistical power planning in AIS research designs. Statistical power is important to AIS research because it increases the probability of making correct decisions about empirical studies. Without adequate statistical power, AIS research may fail to identify statistically significant results and viable research streams might be abandoned prematurely. Statistical power will also become increasingly important as empirical studies in AIS study relatively smaller effects.

INTRODUCTION

Of the challenges and opportunities facing researchers, perhaps the most pressing is the need to conduct and publish quality research. Similar to research in other social sciences, the quest to conduct and publish quality research in accounting has placed a major emphasis on statistical significance when testing hypotheses (Lindsay 1993). One unintended consequence of this focus on statistical significance has been a lack of acknowledgment by researchers of statistical power and effect size (Mazen et al. 1987a, 1987b; Cohen 1977, 1988; Baroudi and Orlikowski 1989; Lindsay 1993; Mone et al. 1996). Although the formal concept of statistical power has been around since 1933 (Cohen 1988), its usage has not been prominent in extant accounting research (Lindsay 1993).

There have been many studies of the use of statistical power in other research fields (Mazen et al. 1987a, 1987b; Baroudi and Orlikowski 1989; Lindsay 1993; Mone et al. 1996); however, only...
recently has the investigation into the impact of statistical power on accounting research begun (Lindsay 1993). Understanding statistical power is important to accounting researchers because studies with low levels of statistical power often result in inconclusive findings, even if the study is well designed (Semon 1990). Researchers invest time, effort, and money into studies and want to detect significant findings, if they exist (Baroudi and Orlikowski 1989). Without adequate statistical power, accounting research may fail to identify statistically significant results. Thus, sufficient statistical power may help prevent the premature abandonment of viable research streams (Ferguson and Ketchen 1999).

The purpose of this study is to provide a current, representative assessment of statistical power in accounting information systems (AIS) research. This study will empirically investigate whether the statistical power of extant AIS research has been strong enough to detect important relationships that may exist.

This paper is organized as follows. The first section describes the components of statistical power and the relationships among these components. In the next section, an assessment of current statistical power levels in leading AIS journals is described. The third section presents the results of this investigation. The implications of these results are discussed in the fourth section. This paper concludes with a summary of the findings, the limitations of this study, and the possibilities for future research.

COMPONENTS OF STATISTICAL POWER

By definition, the probability of committing a Type I error is alpha (α) (Larsen and Marx 1986). Type I errors occur when researchers mistakenly reject the null hypothesis (Mone et al. 1996). But what about a Type II error (β)? What are the chances that the observed sample will take on values that will “deceive” the researcher into failing to reject the null hypothesis when it should be rejected (Larsen and Marx 1986)? This question is addressed by the concept of power.

Vogt (1999) defines statistical power as a gauge of the sensitivity of a statistical test to detect significant effects. In other words, statistical power is the probability that an empirical test will detect a relationship when a relationship, in fact, exists (Vogt 1999). Statistical power is determined by three interacting components: effect size (d), significance level (α), and sample size (n) (Cohen 1977, 1988). Effect size is the magnitude of findings (e.g., a correlation between two variables, the difference between two means), alpha is the level of risk of rejecting a true null hypothesis, and sample size is the number of observations used in a test (Lindsay 1993). The power of a statistical test is calculated by subtracting the probability of a Type II error from 1 (1 – β). Power can range from a minimum of 0 to a maximum of 1, with 80 percent often considered an acceptable level (Vogt 1999). Thus, a common acceptable probability of correctly rejecting the null hypothesis when it should be rejected is 80 percent.

The relationships among effect size, alpha, sample size, and power are quite complicated, and a number of sources of guidance are available (Hair et al. 1998). However, power and its three components are so closely related that when any of the three are known, the fourth can be calculated easily (Cohen 1988). A brief introduction of each component follows.

Effect Size (δ). According to Cohen (1977, p 9), effect size is “the degree to which a phenomenon is present in the population,” or “the degree to which the null hypothesis is false.” Ceteris paribus (α and n), power increases as effect size increases. Thus, the larger the effect size of the phenomenon being studied, the greater the probability the researcher has for rejecting the null (Lindsay 1993).

Of the three power components, effect size is probably the most important determinant of statistical power and the least understood (Baroudi and Orlikowski 1989). Additionally, effect size is also the most difficult parameter to estimate (Mazen et al. 1987b). According to Pedhazur and Schmelkin (1991), the ambiguity surrounding the meaning of effect size contributes to the problem of determining effect size, because the term is often used interchangeably to refer to magnitude, importance, or meaningfulness. Difficulties in defining magnitude, importance, and meaningfulness further confound the problem of effect size determination (Pedhazur and Schmelkin 1991). Pedhazur and Schmelkin (1991) postulate
that knowledge of the subject matter, the properties of the measures used, and hard thinking are the most important ingredients for making informed decisions about effect size.

Cohen (1977) posits conventional, operational definitions for small, medium, and large effect sizes for different statistical tests. Although Cohen (1977) himself admits that these conventional definitions of effect size are somewhat arbitrary, they do provide a standard index and sufficient guidance for researchers to use in determining effect size. According to Lindsay (1993), Cohen defines small, medium, and large effect sizes as being approximately equal to an r of .10, .30, and .50, respectively.

Alpha (α). Cohen (1977) posits that statistical power is an increasing function of alpha, holding other things equal (n and δ). A small alpha level results in a relatively small power value (Cohen 1977). As α decreases, it becomes less probable that the null hypothesis will be rejected because it requires an increasingly larger δ (Lindsay 1993). Because there is also an inverse relationship between α and β, an increase in α decreases β and therefore increases power (Mazen et al. 1987a). Power not only increases with larger α, but also with directional hypothesis tests (Baroudi and Orlikowski 1989). However, Cohen (1977, 1988) has expressed serious reservations about using directional testing in behavioral science research in all but relatively limited circumstances. The reason for Cohen’s (1977, 1988) reservations is that most behavioral science studies are concerned with proof that some phenomenon exists or does not exist. In this case, the researcher is normally comparing some parameter (e.g., mean, proportion, correlation) for two populations and no direction of the difference is specified, because either direction from the null hypothesis constitutes evidence against the null (Cohen 1977, 1988).

Sample Size (n). Generally, the larger the sample size, the smaller the error and the more accurate the measure of the phenomenon under investigation (Mazen et al. 1987a). In other words, the precision of sample estimates increases as n increases (Cohen 1977). The larger the n, ceteris paribus (α and δ), the greater the probability of rejecting a false null hypothesis (Baroudi and Orlikowski 1989). Although increasing sample size is a simple concept, factors beyond the control of researchers often limit the size of samples included in their studies. For example, the following are all possibilities for constrained sample sizes: a limited amount of money, a limited amount of time, or a limited number of qualified participants (participants possessing or not possessing some characteristic).

Power (1 – β). Statistical power can be increased by increasing any one of its components (Cohen 1988). The larger the effect size, ceteris paribus, the more likely it is that a statistical test will detect the effect. Because an inverse relationship exists between α and β, statistical power can be increased by increasing α. Increasing sample size can also increase power, because statistical power increases monotonically with increases in sample size (Lindsay 1993).

Although Cohen (1977, 1988) recommends statistical power be assessed a priori, Baroudi and Orlikowski (1989) suggests power analysis is useful before, during, and after the research process. In each case, power analysis allows researchers to take appropriate action and get the most out of their study (Baroudi and Orlikowski 1989). When statistical power is inadequate, researchers may not be able to detect meaningful differences or effects (Lindsay 1993). Thus, time and effort may be wasted or a research stream may be abandoned prematurely. On the other hand, when statistical power is excessive (usually the result of large sample sizes), the test may be oversensitive and small effects may appear significant. Although such findings are statistically significant, they may not have practical significance (Hair et al. 1998).

**METHOD**

Although there are only two leading journals devoted to AIS research (Journal of Information Systems and International Journal of Accounting Information Systems), there are several leading management information systems journals that also publish AIS research, including MIS Quarterly, Information Systems Research, and Journal of Management Information Systems. To assess the current level of statistical power in AIS research, this study examined empirical articles in two of the leading journals, Journal of Information Systems...
(JIS) and Journal of Management Information Systems (JMIS).

The unit of analysis was the journal article. For the most recent complete five years (1996–2000), all articles from JIS were selected and ten articles per volume from JMIS were selected randomly. This resulted in an initial sample of 89 articles.
TABLE 1

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and represents 100% and 26% of all articles published over these five years for *JIS* and *JMIS*, respectively. The initial sample was screened for articles containing ANOVA/ANCOVA, t test, multiple regression, correlation, and chi-square statistical tests. According to Cohen (1977, 1988), these statistical tests lend themselves to power analyses. This resulted in a usable sample of 45 articles, as shown in Table 1.

As discussed above, the power of a statistical test is a function of three parameters: alpha, effect size, and sample size. Because the sample size is given in each particular article, only the first two parameters need to be identified for the purposes of the current study. Following past power research (Mazen et al. 1987a, 1987b; Cohen 1977, 1988; Baroudi and Orlikowski 1989; Lindsay 1993; Mone et al. 1996), this study assumed non-directional (two-tailed) tests with an alpha level of 0.05. Cohen’s (1977) operational definitions of small, medium, and large effect sizes were used for each type of statistic analyzed in this study. These three parameters were used to determine power from Cohen’s (1977) power analysis tables for each full-model ANOVA/ANCOVA, t test, multiple regression, correlation, and chi-square statistical test reported in the articles. As recommended by Cohen (1977, 1988), linear interpolation was used to determine power values for parameters that fell between table values.

Only tests of the major hypotheses are included in the analyses. Power calculations were not made for reliability tests, tests of statistical assumptions, or manipulation checks. An average power figure was calculated for each article, and each article carried equal weight in the analysis. Power was calculated for a total of 175 tests.

RESULTS

The frequency and ascending cumulative percentage distributions of the average power of AIS studies to detect small, medium, and large effects and the related descriptive statistics are presented in Table 2. Average power across type of statistical test was 0.22 for small, 0.74 for medium, and 0.92 for large effect sizes. More importantly, none of the studies reviewed in the current study met the conventional power level of 0.80 for detecting small effect sizes, and only 49 percent of these studies met that standard for detecting medium effect sizes. Although 84 percent of the studies exhibited sufficient power for detecting large effect sizes, large effect sizes are inherently much easier to detect (Cohen 1988). This fact, coupled with the weak power levels for detecting small and medium effects, may imply that this outcome is generally not preplanned.

Across all effect sizes, the recommended power level was achieved in less than half of the articles (44%). Put differently, 56 percent of these studies had low power levels. This suggests that, on average across all effect sizes, more than half the time AIS researchers risk not being able to detect significant effects when, in fact, they exist. This risk increases greatly as the effect size decreases.

Table 3 contains descriptive information concerning power levels for each type of statistic and effect size. To determine which type of statistics had significantly different power levels at $\alpha = 0.05$, Tukey’s studentized range (HSD) tests (an ANOVA procedure) were conducted. The purpose of this analysis is to assess whether there are significant differences in the actual
### TABLE 2
**Frequency and Ascending Cumulative Percentage Distribution of Statistical Power***

<table>
<thead>
<tr>
<th>Power</th>
<th>Small Effect Size</th>
<th></th>
<th>Medium Effect Size</th>
<th></th>
<th>Large Effect Size</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cumulative Frequency</td>
<td>Percent</td>
<td>Cumulative Frequency</td>
<td>Percent</td>
<td>Cumulative Frequency</td>
<td>Percent</td>
</tr>
<tr>
<td>.99+</td>
<td>0</td>
<td>0</td>
<td>9</td>
<td>20</td>
<td>26</td>
<td>58</td>
</tr>
<tr>
<td>.95—.98</td>
<td>0</td>
<td>0</td>
<td>7</td>
<td>36</td>
<td>6</td>
<td>71</td>
</tr>
<tr>
<td><strong>.90—.94</strong></td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>45</td>
<td>4</td>
<td>80</td>
</tr>
<tr>
<td>.80—.89</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>49</td>
<td>2</td>
<td>84</td>
</tr>
<tr>
<td>.70—.79</td>
<td>0</td>
<td>0</td>
<td>8</td>
<td><strong>67</strong></td>
<td>4</td>
<td>93</td>
</tr>
<tr>
<td>.60—.69</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>71</td>
<td>0</td>
<td>93</td>
</tr>
<tr>
<td>.50—.59</td>
<td>3</td>
<td>9</td>
<td>3</td>
<td>78</td>
<td>1</td>
<td>96</td>
</tr>
<tr>
<td>.40—.49</td>
<td>2</td>
<td>13</td>
<td>4</td>
<td>87</td>
<td>1</td>
<td>98</td>
</tr>
<tr>
<td>.30—.39</td>
<td>7</td>
<td>29</td>
<td>3</td>
<td>94</td>
<td>1</td>
<td>100</td>
</tr>
<tr>
<td><strong>.20—.29</strong></td>
<td>7</td>
<td><strong>45</strong></td>
<td>2</td>
<td>98</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>.10—.19</td>
<td>16</td>
<td>80</td>
<td>1</td>
<td>100</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>.01—.09</td>
<td>9</td>
<td>100</td>
<td>0</td>
<td>100</td>
<td>0</td>
<td>100</td>
</tr>
</tbody>
</table>

| n         | 45 | 45 | 45 |

**Mean** | 0.22 | 0.74 | 0.92 |
**sd** | 0.14 | 0.25 | 0.15 |

*Note*: Power assessments assumed .05 alpha and two-tailed tests.

The corresponding power level range for each mean effect size is shown in bold.

*Frequencies above the dotted line achieved the conventional power of .80.

---

### TABLE 3
**Means and Standard Deviations of Statistical Power for Small, Medium, and Large Effect Sizes by Type of Statistic**

<table>
<thead>
<tr>
<th>Type of Statistic</th>
<th>N of Analyses</th>
<th>Percent of Tests</th>
<th>Small Effect Size</th>
<th>Medium Effect Size</th>
<th>Large Effect Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANOVA/ANCOVA</td>
<td>64</td>
<td>37%</td>
<td>.23</td>
<td>.74</td>
<td>.95</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(.18)</td>
<td>(.22)</td>
<td>(.08)</td>
</tr>
<tr>
<td>t Test</td>
<td>26</td>
<td>15%</td>
<td>.17</td>
<td>.60</td>
<td>.85</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(.09)</td>
<td>(.27)</td>
<td>(.16)</td>
</tr>
<tr>
<td>Multiple Regression</td>
<td>26</td>
<td>15%</td>
<td>.26</td>
<td>.89</td>
<td>.96</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(.13)</td>
<td>(.20)</td>
<td>(.11)</td>
</tr>
<tr>
<td>Correlation</td>
<td>29</td>
<td>16%</td>
<td>.28</td>
<td>.89</td>
<td>.98</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(.13)</td>
<td>(.18)</td>
<td>(.11)</td>
</tr>
<tr>
<td>Chi-Square</td>
<td>30</td>
<td>17%</td>
<td>.17</td>
<td>.66</td>
<td>.92</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(.13)</td>
<td>(.29)</td>
<td>(.17)</td>
</tr>
<tr>
<td>Total</td>
<td>175</td>
<td>100%</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note*: Standard deviations are in parentheses. Power assessments assumed .05 alpha and two-tailed tests.
### TABLE 4
Means and Standard Deviations of Statistical Power for Small, Medium, and Large Effect Sizes by Journal

<table>
<thead>
<tr>
<th>Journal</th>
<th>N of Analyses</th>
<th>Percent of Tests</th>
<th>Effect Size</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Small</td>
<td>Medium</td>
</tr>
<tr>
<td>Journal of Information Systems</td>
<td>80</td>
<td>46%</td>
<td>.23</td>
<td>.79</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(.16)</td>
<td>(.21)</td>
</tr>
<tr>
<td>Journal of Management Information Systems</td>
<td>95</td>
<td>54%</td>
<td>.21</td>
<td>.72</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(.14)</td>
<td>(.28)</td>
</tr>
<tr>
<td>Total</td>
<td>175</td>
<td>100%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note: Standard deviations are in parentheses. Power assessments assumed .05 alpha and two-tailed tests.*

### TABLE 5
Means and Standard Deviations of Statistical Power for Small, Medium, and Large Effect Sizes by Year of Publication

<table>
<thead>
<tr>
<th>Year of Publication</th>
<th>N of Analyses</th>
<th>Percent of Tests</th>
<th>Effect Size</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Small</td>
<td>Medium</td>
</tr>
<tr>
<td>1996</td>
<td>41</td>
<td>24%</td>
<td>.26</td>
<td>.80</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(.16)</td>
<td>(.25)</td>
</tr>
<tr>
<td>1997</td>
<td>23</td>
<td>13%</td>
<td>.20</td>
<td>.69</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(.15)</td>
<td>(.27)</td>
</tr>
<tr>
<td>1998</td>
<td>25</td>
<td>14%</td>
<td>.14</td>
<td>.61</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(.07)</td>
<td>(.24)</td>
</tr>
<tr>
<td>1999</td>
<td>33</td>
<td>19%</td>
<td>.18</td>
<td>.70</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(.12)</td>
<td>(.25)</td>
</tr>
<tr>
<td>2000</td>
<td>53</td>
<td>30%</td>
<td>.27</td>
<td>.85</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(.17)</td>
<td>(.21)</td>
</tr>
<tr>
<td>Total</td>
<td>175</td>
<td>100%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note: Standard deviations are in parentheses. Power assessments assumed .05 alpha and two-tailed tests.*
power levels of various types of statistical tests commonly used in leading AIS journals.

Analyses of variance (ANOVAs) of power level by type of statistic used in each of the 175 analyses revealed significant main effect differences for small (df = 4, 170; \(F = 3.45; p < .0097\)), medium (df = 4, 170; \(F = 9.13; p < .0001\)), and large (df = 4, 170; \(F = 4.84; p < .0010\)) effect sizes. For small effects, only the difference between the power of correlation and chi-square is significantly different, with the power level of correlation being greater. For medium effects, both the power of correlation and multiple regression are significantly greater than the power of ANOVA/ANCOVA, chi-square, and t test. Also for medium effects, the power of ANOVA/ANCOVA is significantly greater than chi-square and t test. For large effects, the power of correlation, multiple regression, and ANOVA/ANCOVA are significantly greater than the power of t test.

Table 4 contains descriptive information concerning power levels for each journal and effect size. Tukey’s studentized range (HSD) tests were conducted to determine which journal had significantly different power levels at \(\alpha = 0.05\).

ANOVAs of power level by journal only revealed significant main effect differences for large (df = 1, 173; \(F = 8.53; p < .0040\)) effect sizes. Small (df = 1, 173; \(F = .75; p < .3866\)) and medium (df = 1, 173; \(F = 3.69; p < .0565\)) effect sizes did not reveal a significant difference of power by journal. For both small and medium effects, the power levels are not significantly different. For large effects, the power level of JIS is significantly greater than that found in JMIS.

Descriptive information concerning power levels for each year (1996–2000) of publication and effect size is presented in Table 5. Tukey’s studentized range (HSD) tests were conducted to determine which years had significantly different power levels at \(\alpha = 0.05\).

ANOVAs of power level by year of publication revealed significant main effect differences for small (df = 4, 170; \(F = 4.65; p < .0014\)), medium (df = 4, 170; \(F = 5.32; p < .0005\)), and large (df = 4, 170; \(F = 2.63; p < .0361\)) effect sizes. For both small and medium effects, the power levels of 2000 and 1996 are significantly greater than the power of 1998 tests. Also for medium effects, the power of 2000 statistics is significantly greater than 1999. For large effects, only the difference between the power of 2000 and 1998 is significantly different, with the power of 2000 being greater.

**DISCUSSION**

Statistical power should be a topic of interest to any researcher using statistical inference testing (Baroudi and Orlikowski 1989). According to Lindsay (1993), the formal inclusion of statistical power permits scientific significance to be attached to failures to reject the null, allows researchers to remedy designs that have too little power, and helps prevent trivial results from being declared significant.

However, current findings suggest that AIS researchers do not always conduct research studies with enough power to detect small and medium effect sizes. Overall, the average power of ANOVA/ANCOVA, t test, multiple regression, correlation, and chi-square statistics reported in JIS and JMIS to detect small, medium, and large effect sizes was 0.22, 0.74, and 0.92, respectively (from Table 2). Low power levels for tests with medium and small effect sizes are a reason for concern.

Across all effect sizes, the recommended power level was achieved in less than half of the articles (44%). This means that a researcher who investigated unknown differences between means had, on the average, more than a 50-50 chance to erroneously sustain the null hypothesis. It would seem foolish to conduct studies in which the probability of failure is greater than half at the outset. Clearly, current findings suggest the need for more statistical power planning in AIS research designs.

This study also examined differences in power levels by type of statistic, journal, and year. Regarding type of statistic, t test was found to have significantly smaller power levels than other types of statistics. This suggests that AIS researchers who use t test may want to use larger sample sizes to avoid a greater risk of overlooking significant effects. For small and medium effects, there was no significant difference between JIS and
JMISS power levels. JIS had a significantly higher power level for large effects. Although articles published in 2000 contained the highest power levels for all effect sizes, this difference may not be practically significant because of the relatively larger number of analyses in the year 2000. On the other hand, this result could be indicative of an increase in power awareness by JIS researchers, editors, and reviewers, but there was no consistent trend.

Verma and Goodale (1995) posit that young disciplines typically start by studying large effects, and, as these disciplines mature, more and more research is undertaken that explores smaller effects. Pedhazur and Schmelkin (1991) point out, however, that large effect sizes are not generally encountered in sociobehavioral research fields. This lack of large effect size could be a problem for AIS research, because current findings indicate that AIS research is not very powerful. Recall that statistical power generally suffered in current AIS studies as effect size decreased. Hence, the researcher believes that power levels will become increasingly important in future empirical AIS research.

Although the statistical power of a test can be improved by increasing one of its three components (a, d, and n), effect size can be considered to be more-or-less fixed and acceptable a levels are set by norms of the field of study (Verma and Goodale 1995). Thus, researchers are left with sample size as the controlling factor for generating acceptable power levels (Verma and Goodale 1995). This information and a priori assumptions allow researchers to design more sensitive, powerful, and economical studies.

CONCLUSION

The conclusion of this paper is that AIS researchers need to consider conducting more statistical power planning. Generally, the average study in this analysis did not achieve the recommended 0.80 level of statistical power when the effect size was small or medium. Only AIS research for large effect size was powerful enough to detect the phenomena under analysis. Thus, one can conclude that AIS research is, on the average, statistically powerful only if the effect size is large. Statistical power is important to AIS research because it increases the probability of making correct decisions about empirical studies.

This study is not without limitation. First, this analysis dealt entirely with published research. This method ignores unpublished effect sizes, which may or may not be smaller than that of published studies. Second, this analysis gave the same weight to each article, and, in general, it would seem that good studies are more powerful than bad ones. Finally, this study examined only two leading AIS journals. This limits the generalizability of the current findings.

Future research in this area should consider including more AIS journals. Future research could also compare the power level of AIS research to that of different areas of the social sciences. Finally, a more accurate comparison may be made by holding time constant, to account for the advancement of methodological rigor over time.
REFERENCES


ETS Influence on Curriculum and Teaching Methods

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Abstract
Grade inflation and retention pressure have made traditional assessment methods questionable at best. At one time faculty evaluated a student’s performance and assigned a grade that reflected their assessment of that student’s performance. Today the integrity of grades has declined to a point that the public does not trust what they see on the transcript. To restore accountability, every oversight board and accrediting agency is looking for an organized assessment plan that includes some type of benchmarking. The Educational Testing Service (ETS) Major Field exam is one method of addressing this need to benchmark. This study examines the results of a survey that asked schools both what methods of assessment they were using and what they thought of the ETS exam as a benchmarking tool. The survey indicated that most schools use multiple assessment tools and that ETS is commonly a part of the mix. Additionally it was reported that most schools felt that the exam coverage paralleled their course coverage appropriately enough that they did not need to change either their courses or their curriculum for it to be a fair assessment tool.

What: Higher education is highly concerned with assessment. All of the accrediting bodies have made it a top priority. It is no longer sufficient to have instructors assign grades in required classes and declare that your measure of the quality of the education your institution offers. In order to provide a benchmark against other institutions many schools have turned to the Educational Testing Service Major Field Exam. National norms exist that allow you to see how your school stacks up against everyone else. Everyone wants to be in the top 5%. That can’t happen. So what becomes of the rest? Possible outcomes can be “cookie cutter” degrees as people teach to the test. Review/Prep classes may find their way into programs by crowding out other courses. Rewards (bonus points in a class) or punishments (minimum score to graduate) can be implemented to influence student performance. Part-time students and students with significant gaps in attendance who are at a significant disadvantage may be discouraged from attending. This session is intended to look at how the schools that are using this exam are approaching it and the results they are getting.

How: Prior to the conference, the author will be running a nationwide survey on this issue. The first 10 minutes will be used to summarize the results of that survey. The next 10 minutes will be used to gather information from the participants about what their respective schools are doing in the area of benchmarking and see how that compares to the survey results. The balance of the time will be used for an open discussion of the issue of what effects benchmarking is having on programs, faculty, and students. Issues such as course sequencing requirements, limitations on academic freedom, the value of prep courses, and student incentives will be on the table.

Why: As indicated above, benchmarking is becoming nearly mandatory with many accrediting bodies as a part of assessment. It is going to have a significant impact on how schools address curriculum issues and course content. This may mean that faculty are going to be restricted in what and how they teach. How a school performs on benchmarks such as this may ultimately effect funding and program continuation.
PROMOTING CHARACTER WITHIN PUBLIC HIGHER EDUCATION

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ABSTRACT

Character promotion in higher education has generally been viewed as the province of the nation’s military academies, private institutions, or faith-affiliated colleges and universities. Only a few public institutions of higher learning devote resources or energy to promote positive character traits among their students. However, conversations between public higher education professionals often center on inappropriate student behavior, underachievement, and issues concerning academic integrity. Poor student attitudes and the lack of concern for consequences of what could be characterized as unrestrained selfishness or self-absorbed behavior are believed to be two drivers that exacerbate these conditions.

How might educators at public institutions of higher education combat undesirable student attributes without resorting to lists of “thou shall not …?” One way to develop positive campus attitudes is by developing and promoting the tenants of an institutional creed. Students learn from what they hear, see, and what is practiced. A creed or statement of values is a condensed positively written document concerning institutional belief, principles, and expectations. It is meant to inspire students, encourage commitment to high standards of performance and ideals, and to publicly reveal these institutional aspirations. Most students can be significantly influenced when they are in an environment that promotes high standards of honesty, perseverance, and achievement.

Our paper presents two versions of an institutional creed that promotes positive character traits. A student may be neutral to or reject such traits due to long-established routines, traditions, or patterns of thinking and behavior. Or a student may choose to embrace such virtues and we believe obtain advantages in personal and professional endeavors. At some point in a person’s development, the practice of inclusion of positive or negative character traits will serve as norms in decision making and behavior which will influence how one approaches life’s decisions.
Using the Huang and Stoll (1997) bid-ask spread decomposition model, we investigate the time varying costs that affect all traders. Generally, the quoted bid-ask spread and the adverse selection component both follow a reverse-J pattern. However, in contrast to earlier research that did not perform a complete bid-ask spread decomposition, we find that the inventory holding cost component decreases significantly throughout the day, with a marginal increase at the close of trading. This decline is more gradual for higher liquidity stocks, suggesting that inventory management plays a greater role for these stocks.
estimation procedure is not compromised even if
the error terms are serially correlated or show
signs of heteroscedasticity. Adoption of the model
and estimation procedure has not been
widespread since implementing the model is very
data intensive.

Intraday variation in the bid-ask spread as a whole
has been examined by McInish and Wood (1992)
and others. They find that the bid-ask spread on
the New York Stock Exchange is widest at the
open, drops sharply during the first hour of trading,
and increases slightly before the market closes.
Chung and Zhao (2003) find a similar pattern on
NASDAQ after market reform. A number of studies
have examined the intraday properties of the
adverse selection component. Foster and
Viswanathan (1993) observe that lower liquidity
stocks tend to show more variation in this
component. Lin, Sanger and Booth (1995) divide
the day into three periods and find that this
component declines throughout the trading day.
Using a five-period day, Madhavan, Richardson,
and Roomans (1997) observe that the adverse
selection component declines throughout the day
until the last half-hour of trading. McInish and Van
Ness (2001) examine 30 stocks over 13 half-hour
periods and find that the intraday variation in
adverse selection and the other two aggregated
components is similar to the variation in the total
bid-ask spread.

We extend prior research by adapting Huang and
Stoll’s (1997) comprehensive general model to
decompose the aggregate bid-ask spread into all
three components for use with intraday periods.
There are three main areas where this paper
differs from prior papers and contributes to the
literature. First, we estimate all three components
simultaneously in an intraday model with multiple
periods, where most intraday papers have
examined only one component. Second, we
employ a method that results in an unbiased
sample that only excludes stocks when the
estimation procedure fails to converge or provides
implausible estimates. This procedure results in a
sample size that is comparable to that of some
other models but avoids the sample selection bias
inherent in the earlier papers. Third, we explicitly
examine the impact of liquidity on intraday
estimates of all three bid-ask spread components.
The paper is organized as follows. Section 2
provides a brief review of the relevant literature.
Section 3 presents our methodology. Section 4
describes the results of our intraday analyses on
the entire sample. Section 5 describes our
liquidity partitioned results and section 6
concludes.

ESTIMATING COMPONENTS OF THE BID-ASK
SPREAD

Huang and Stoll (1997) construct a basic trade
indicator model within which all previous models of
the bid-ask spread’s components are reconciled.
Huang and Stoll (1997) break up the spread into
its three separate components and estimate these
components for a sample of 20 large NYSE listed
stocks for all trading days in 1992. They find that
some of their estimates for the adverse
information and inventory carrying cost
components are negative but this result is
theoretically implausible if market makers are risk
averse and private information exists. They argue
that this apparent anomaly occurs because large
trades are broken down into several smaller sized
trades to make execution cheaper. For this
reason, they bunch trades under certain
circumstances such that sequential trades actually
become one for the purposes of estimation. Their
results after the bunching procedure are far more
consistent with theoretical predictions.

Huang and Stoll (1997) report an adverse
information component of the spread of 9.6%,
which is also consistent with the results in George,
(1997) find that the inventory carrying cost
component of the spread is 28.7% with the
remaining 61.7% attributed to order processing
costs. These results are different than those
reported by Madhavan, Richardson, and Roomans
(1997) who use a model that groups the inventory
holding and order processing costs together. They
report that the adverse information component for
their sample is in the 35-50% range, depending on
the time of day. Even if we assume that the
smaller average firm size used in Madhavan,
Richardson, and Roomans (1997) causes a larger
adverse information component, such a large
disparity is disturbing.

The first papers to analyze the spread’s
components on an intraday basis are Hasbrouck
(1991) and Foster and Viswanathan (1993). Both
papers employ the GMM technique to estimate
parameters of their model (the majority of previous
papers used Maximum Likelihood or OLS) and
both use information asymmetry models that
divide the spread into adverse selection costs and
transitory costs (representing both inventory holding and order processing costs). Hasbrouck (1991) finds that the price impact of trades on subsequent quotes tends to increase with trade size. He concludes that this increase reflects an adverse selection cost to the market maker as informed investors wish to maximize their gain by trading a large volume of shares. His results are especially significant for less liquid stocks that have a lower trading volume.

Foster and Viswanathan (1993) use the model developed by Hasbrouck (1991) to examine the components of the spread on an intraday and intraweek basis. Foster and Viswanathan (1993) not only test all firms for systematic changes in the spread components, but also divide their sample into deciles based on liquidity and analyze the components of the spread across these liquidity deciles. Although these deciles are supposed to represent a true cross section of the market, Foster and Viswanathan (1993), by their own admission, do not estimate the most liquid stocks due to computational difficulty. This problem notwithstanding, the paper still finds that liquidity does affect the components of the spread during the day. They show that the spread components for lower liquidity firms reveal more intraday variation than the same components for higher liquidity firms.

Lin, Sanger, and Booth (1995) examine the components of the spread by partitioning the day into three periods. While they also use a trade indicator model with a GMM estimation technique, they focus on trade size and how it affects both the components of the spread during the day and the order flow immediately following a trade. They choose 150 stocks that have at least 2,500 trades during 1988. This selection technique excludes low liquidity stocks so the results of the paper represent inferences only for medium and high liquidity stocks. They find that the adverse selection component of the spread increases monotonically for all trade sizes except the largest 1% of trades. Their finding is consistent with the stealth trading hypothesis which argues that block trades should convey very little information to the market. They also find that order persistence (the probability that a buy follows a buy or a sell follows a sell) decreases with trade size, implying that market makers revise their quotes by a larger amount after larger trades in order to induce a trade reversal. They also infer that larger trades have a larger inventory cost component compared to smaller trades. This conclusion is intuitively appealing given that a market maker’s inventory level is affected more after a large trade than it is after a small one. Hence even if the trade contains very little information, the incentive to induce a trade reversal is stronger subsequent to larger trades.

The other principal intraday paper by Madhavan, Richardson, and Roomans (1997) uses a five-period day to examine the bid-ask spread components. Their sample of 274 NYSE-listed stocks represents the largest sample to date for a trade indicator study of the bid-ask spread’s components. Their sample, however, consists of stocks that are larger and more liquid than the average NYSE-listed firm and thus suffers the same data bias as Lin, Sanger, and Booth (1995). Such a bias is difficult to avoid given that the GMM estimation procedure requires a large number of observations to arrive at meaningful estimates. Since many stocks don’t trade often enough to be able to use this procedure, more liquid stocks will dominate the sample. Madhavan, Richardson, and Roomans (1997) report similar results to Lin, Sanger, and Booth (1995) for intraday changes in the spread’s components. They show that the adverse selection component of the spread decreases monotonically until the last half-hour of trading when it increases marginally. In addition, Madhavan, Richardson, and Roomans (1997) also show that the autocorrelation coefficient of the order flow follows a U-shape over the course of the day. This implies that \( \pi \), the probability of a trade reversal, will follow an inverted U-shape.

In sum, intraday analysis of the bid-ask spread has identified several patterns related to the spread as a whole and its individual components. Specifically, the adverse selection component decreases throughout the day as the market maker learns from the order flow while the inventory holding component rises during the day as the risk of holding inventory overnight increases. However, these earlier empirical studies use models that have since been improved and data sets that are not fully representative of the market. This study addresses these issues by using an improved model that estimates all components and including all NYSE stocks.

**METHODOLOGY**

Huang and Stoll’s (1997) model of the spread relies on \( M_t \), the quote midpoint and \( P_t \), the
transaction price. The quote midpoint is the bid quote plus the ask quote, divided by two, and is calculated just before a transaction occurs. Huang and Stoll (1997) use a trade indicator model to estimate the spread’s components, hence each trade must be signed as either buyer or seller initiated. \( Q \) is a dummy variable that equals -1 if the trade occurs above the midpoint, 1 if it occurs below the midpoint, and 0 if the transaction occurs at the midpoint.

If the current transactions are related to prior transactions due to the adjustment of quotes by the market maker, then Huang and Stoll (1997) show that the following relationship can be obtained:

\[
E(Q_{t-1}|Q_{t-2}) = (1-2\pi)Q_{t-2}
\]

where \( \pi \) represents the probability that \( Q_{t-1} \) is opposite in sign to \( Q_{t-2} \), that is, \( \pi \) represents the probability of a reversal in trades. Huang and Stoll (1997) model the midpoint change by relying on the quoted spreads to arrive at a model which is able to estimate the three components of the spread individually:

\[
\Delta M = (\alpha + \beta) \frac{S_{t-1}}{2} Q_{t-1} - \alpha \frac{S_{t-2}}{2} (1-2\pi) Q_{t-2} + \epsilon
\]

where \( \alpha \) represents the adverse selection component, \( \beta \) represents the inventory holding cost component, and \( S_{t-1} \) and \( S_{t-2} \) represent posted spreads. By estimating equations (1) and (2) simultaneously, the spread can be decomposed into its three individual components.

The general model estimates the spread’s components for the entire day. Hence, for an intraday analysis, the day must be broken up into various periods with each period being estimated separately. Since other studies have already attempted an intraday analysis with other models, intraday periods are chosen to facilitate comparison with the studies by Lin, Sanger and Booth (1995) and Madhavan, Richardson, and Roomans (1997).

We perform a bunching procedure that is more narrowly defined than the Huang and Stoll (1997) procedure. They define a sequence of trades as one large trade when they are all “at the same price on the same side of the market without any change in bid or ask quotes” (Huang and Stoll 1997, 1019). Although this method of bunching trade sequences will capture a majority of large broken-up trades, it may also bunch trades that are completely independent of each other since there is no time constraint. This is likely to produce results that are spurious, given that the model for determining the components of the spread relies heavily on the order flow and hence on the value of \( \pi \), which is directly affected when trades are bunched. Large trades that are broken up will generally be executed reasonably quickly to avoid movements in the price, hence, the trade sequences are only bunched when they are observed within a short period of time. Trades at the same price, same side of the market, and same quotes are grouped together, as in Huang and Stoll (1997), however, a two minute time constraint is also employed. Although this method may not always catch large broken-up trades, it reduces the likelihood of bunching independent transactions, thereby producing a more meaningful estimate of \( \pi \). A further advantage of this methodology is that it will highlight the impact of Huang and Stoll’s (1997) bunching procedure on both \( \pi \) and the bid-ask spread component estimates. Similar to Huang and Stoll (1997), we employ a Generalized Method of Moments (GMM) estimation procedure since it offers the most flexibility in estimation and provides consistent standard errors even when the error terms in the moment equations show signs of heteroskedasticity or serial correlation. The procedure also does not require the joint distribution of variables to be normally distributed.

We use the Trades and Quotes (TAQ) database from the NYSE for all trading days in the 1996. Since different market structures may affect the results, the analysis is limited to stocks traded on the NYSE. Data from 1996 has been chosen because it represents a period of high growth in the US economy at a time without a stock market ‘correction’. Such a period is ideal for this type of study because it demonstrates a time of normal trading behavior, hence, the results and conclusions are likely to be useful to both market participants and regulatory bodies under normal circumstances. Periods of high volatility, such as that observed in October 1997, have been purposely avoided because the paper’s primary goal is to provide an analysis of the spread’s components during the trading day, not a review of the components’ reaction to a market crisis.
Consistent with prior literature, the analysis is confined to those transactions recorded as regular trades that occur in a continuous auction subsequent to the open. Therefore, the opening trade that is conducted in a call auction based on accumulated overnight orders is excluded from the analysis because it is performed under a different market structure than regular trades on the NYSE. Similarly, trades reported in TAQ as block transactions are removed since such trades are usually prearranged and convey very little information and are, therefore, inconsistent with the remainder of the order flow. In addition, any quote with a percentage spread greater than 15% and any quotes or transactions more than 50% away from the previous quote or transaction are excluded.

In order to assign each trade as buyer or seller initiated, a set of prevailing quotes is matched with each transaction. Lee and Ready (1991) recognize that prevailing quotes are often recorded ahead of trades, creating an artificial lag between transaction time and the underlying quotes at that time. In order to eliminate this problem, the prevailing quotes identified for each transaction are those quotes that were in effect at least five seconds prior to the transaction being recorded. This set of quotes is then matched to the trade, and the quote midpoint is calculated as the average of these prevailing bid and ask offers.

### Table 1

<table>
<thead>
<tr>
<th>Statistics</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market Cap. ($bn.)</td>
<td>2.22</td>
<td>2.47</td>
<td>0.0090</td>
<td>176.21</td>
</tr>
<tr>
<td>Trade Price ($)</td>
<td>31.88</td>
<td>77.10</td>
<td>0.23</td>
<td>3,397.67</td>
</tr>
<tr>
<td>Transactions/Day</td>
<td>46</td>
<td>88</td>
<td>1</td>
<td>1,367</td>
</tr>
<tr>
<td>Volume/Transaction</td>
<td>1,719</td>
<td>1,464</td>
<td>16</td>
<td>44,501</td>
</tr>
<tr>
<td>Quoted Bid-Ask Spread ($)</td>
<td>0.50</td>
<td>3.88</td>
<td>0.12</td>
<td>203.40</td>
</tr>
<tr>
<td>Percentage Bid-Ask Spread (%)</td>
<td>1.43</td>
<td>1.54</td>
<td>0.12</td>
<td>13.39</td>
</tr>
<tr>
<td>Effective Bid-Ask Spread ($)</td>
<td>0.30</td>
<td>2.71</td>
<td>0</td>
<td>140.93</td>
</tr>
</tbody>
</table>

### INTRADAY BID-ASK SPREAD COMPONENT ESTIMATES

Descriptive statistics for the entire data set are provided for all NYSE-listed firms. Table 1 reports details on the market capitalization of NYSE-listed firms in 1996, trade prices across all firms, volume per trade, number/frequency of trades per day as well as several measures of the bid-ask spread. Except for market capitalization which is calculated at the beginning of each month, these measures are estimated by averaging across the 254 trading days in 1996 for each firm, and then averaging the results across all firms.

The full sample consists of all NYSE-listed stocks in 1996, which eliminates many of the data biases that have plagued recent studies of the spread. Madhavan, Richardson and Roomans (1997) for example, eliminate all stocks that do not have at least 250 observations for each intraday period being tested while Lin, Sanger, and Booth (1995) require a total of no less than 2,500 observations for the entire year. This filtering method results in the selection of more actively traded firms that, in general, will also be the larger firms listed on the NYSE.

The estimates reported in Table 1 reveal that the median market capitalization of NYSE stocks in 1996 was $1.51 billion, with a median transaction price across these stocks of $24.35. The median number of transactions per day during 1996 was 17 with a maximum of 1,367 and a minimum of just 1, while the average volume of shares traded per transaction ranged from 16 to 44,501 with a median of 1,505. It can be seen in Table 1 that the stocks exhibit a wide range in terms of size and activity, with all variables being skewed to the right.

Three bid-ask spread statistics are estimated and reported in Table 1. The median quoted spread for all stocks in 1996 was $0.19, which represents a significant difference to the average quoted spread of $0.50. This discrepancy is due to the fact that a huge proportion of the spreads on the NYSE at this time are $0.125. Once the spread becomes greater than this it tends to increase quite rapidly, with several stocks trading with spreads in excess of $100. Furthermore, the standard deviation of the quoted spread is very large which represents the high variability of spreads when they are not equal to $0.125.

The effective spread, defined as \(2P_t - M_t\) where \(P_t\) and \(M_t\) are the price and midpoints, respectively, also has a mode of $0.125, but the median estimate for this spread is much smaller than that for the quoted spread due to the possibility of trades occurring inside the quotes. The variability of this spread estimate is high and
its distribution is skewed to the right. The median percentage spread for NYSE stocks in 1996 is 0.97% and less variation is observed for this spread characteristic compared to the quoted and effective spread.

There are some constraints to the estimates for each bid-ask spread component. If at least one individual has more information than the market maker, adverse selection costs must be greater than zero. Likewise, given that a market maker is risk averse and, therefore, loses utility when holding a sub-optimal level of inventory (Amihud and Mendelson 1980), he also faces a positive inventory holding cost. Furthermore, since a market maker faces other costs, such as wages to employees, annual expenses payable to the exchange, and costs associated with the actual processing of an order, an additional positive order processing cost is included in the spread. The decomposition of the spread, therefore, must provide a positive estimate for all three of these parameters.

Unfortunately, the GMM model employed for estimation, due to its problems with estimating small samples, provides invalid estimates for the parameters of many firms. An estimate is considered invalid when either (a) the adverse selection or inventory holding component of the spread exceeds one or is less than zero, or (b) the sum of these two components exceeds one (thereby making the order processing cost negative). We remove these invalid estimates from our sample so that the final sample used for analysis contains only those estimates of the spread’s components that are consistent with theory.

The number of valid estimates is 292 for the five-period sample. We require that a valid estimate be observable in each period for that stock to be included in the sample. This selection technique significantly reduces the sample size because a stock is eliminated even if it contains only one invalid estimate during the day. Unlike other studies, this elimination is done based on the parameter estimates and not on any variable such as liquidity.

The five-period final sample is similar in size to 274 NYSE-listed stocks used by Madhavan, Richardson, and Roomans (1997), but is far larger than the 60 NYSE-listed stocks employed by Foster and Viswanathan (1993). As reported in Table 2, the median market capitalization of the final sample is $1.53 billion and for the excluded firms it is $1.51 billion. This difference is negligible ($p = 0.85) and, as with the one and three-period models, the market capitalization of the final sample is close to the median for all NYSE-listed firms.

Trading activity of our sample is representative of the market average. Table 2 reports that the median number of transactions per day for the final sample (excluded firms) is 18 (17). Similarly, the median percentage spread for the final sample is not statistically different from that for the excluded firms. The final sample, therefore, is a good representation of the average NYSE-listed firms with respect to size, costs of trading, and market activity.

| TABLE 2 |
| Statistics for Five -Period Final Sample |

**Panel A: Final sample of 292 stocks**

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Std.Dev.</th>
<th>Min</th>
<th>Max</th>
<th>Median</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market Cap. ($bn.)</td>
<td>2.01</td>
<td>1.69</td>
<td>0.026</td>
<td>35.96</td>
<td>1.53</td>
</tr>
<tr>
<td>Trade Price</td>
<td>23.58**</td>
<td>13.24***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transactions/Day</td>
<td>24</td>
<td>22</td>
<td>3</td>
<td>177</td>
<td>18</td>
</tr>
<tr>
<td>Volume/Transaction</td>
<td>1,592**</td>
<td>1,270***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quoted Bid-ask Spread ($)</td>
<td>0.21**</td>
<td>0.08***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percentage Bid-ask Spread (%)</td>
<td>0.16**</td>
<td>0.06***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Effective Bid-ask Spread ($)</td>
<td>0.16**</td>
<td>0.06***</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Panel B: All other NYSE-traded stocks**

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Std.Dev.</th>
<th>Min</th>
<th>Max</th>
<th>Median</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market Cap. ($bn.)</td>
<td>2.24</td>
<td>2.52</td>
<td>0.009</td>
<td>176.21</td>
<td>1.51</td>
</tr>
<tr>
<td>Trade Price</td>
<td>32.56</td>
<td>80.11</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transactions/Day</td>
<td>48</td>
<td>91</td>
<td>1</td>
<td>1,367</td>
<td>17</td>
</tr>
<tr>
<td>Volume/Transaction</td>
<td>1,836</td>
<td>1,691</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quoted Bid-Ask Spread ($)</td>
<td>0.52</td>
<td>5.08</td>
<td>0.12</td>
<td>203.40</td>
<td>0.19</td>
</tr>
<tr>
<td>Percentage Bid-Ask Spread (%)</td>
<td>1.45</td>
<td>1.58</td>
<td>0.12</td>
<td>13.39</td>
<td>0.97</td>
</tr>
<tr>
<td>Effective Bid-Ask Spread ($)</td>
<td>0.35</td>
<td>3.19</td>
<td>0</td>
<td>140.93</td>
<td>0.14</td>
</tr>
</tbody>
</table>

Wilcoxon rank-sum tests: * significant at 5% ** significant at 1%  
Med. two-sample tests: * significant at 10% *** significant at 1%

Panel A of Table 3 reports the unbunched estimates for each of the three components, while Panel B reports the bunched estimates. Since the
The objective of this paper is to examine what proportion of the spread each of the components represents and how these vary throughout the day. We present results as a percentage of the spread. This is also consistent with and facilitates comparisons to Huang and Stoll (1997). The bunching procedure appears to have little effect on the estimate of $\alpha$. This implies that either the number of informed traders breaking up their transactions may be small, or that these informed traders may be executing the broken-up orders slowly.

Consistent with the argument that the specialist learns from the order flow throughout the day and the risk of trading with a more informed investor therefore decreases, the adverse selection component of the spread is far greater in the first period of the day than for any period later in the day. Indeed, the median estimate of $\alpha$ decreases by 20% after the first period and then remaining periods appear to have a U-shape. For the entire day, the pattern of $\alpha$ appears to have a reverse-J shape.

### TABLE 3
Bid-Ask Spread Component Estimates Across Five Intraday Periods

<table>
<thead>
<tr>
<th>Period</th>
<th>Panel A: Unbunched</th>
<th>Panel B: Bunched</th>
<th>$\chi^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$\alpha$ Mean</td>
<td>$\beta$ Mean</td>
<td>$\pi$ Mean</td>
</tr>
<tr>
<td></td>
<td>(Mean Std. Err.)</td>
<td>(Mean Std. Err.)</td>
<td>(Mean Std. Err.)</td>
</tr>
<tr>
<td>9:30 – 10:00</td>
<td>0.1958 (0.0082)</td>
<td>0.3092 (0.0099)</td>
<td>0.2760 (0.0032)</td>
</tr>
<tr>
<td>10:00 – 11:30</td>
<td>0.1481 (0.0067)</td>
<td>0.2890 (0.0079)</td>
<td>0.2825 (0.0050)</td>
</tr>
<tr>
<td>11:30 – 14:00</td>
<td>0.1337 (0.0053)</td>
<td>0.2646 (0.0070)</td>
<td>0.2745 (0.0049)</td>
</tr>
<tr>
<td>14:00 – 15:30</td>
<td>0.1331 (0.0059)</td>
<td>0.2503 (0.0070)</td>
<td>0.2688 (0.0050)</td>
</tr>
<tr>
<td>15:30 – 16:00</td>
<td>0.1414 (0.0056)</td>
<td>0.2403 (0.0069)</td>
<td>0.2719 (0.0057)</td>
</tr>
<tr>
<td></td>
<td>(p&lt;0.001)</td>
<td>(p&lt;0.001)</td>
<td>(p&lt;0.001)</td>
</tr>
<tr>
<td></td>
<td>0.3092 (0.0082)</td>
<td>0.2890 (0.0079)</td>
<td>0.2825 (0.0050)</td>
</tr>
<tr>
<td></td>
<td>(Mean Std. Err.)</td>
<td>(Mean Std. Err.)</td>
<td>(Mean Std. Err.)</td>
</tr>
<tr>
<td>Std. Dev.</td>
<td>0.1398 (0.0053)</td>
<td>0.1400 (0.0070)</td>
<td>0.1353 (0.0049)</td>
</tr>
<tr>
<td>Median</td>
<td>0.1588 (0.0116)</td>
<td>0.1167 (0.1001)</td>
<td>0.1201 (0.1201)</td>
</tr>
<tr>
<td></td>
<td>0.1414 (0.0056)</td>
<td>0.0953 (0.0069)</td>
<td>0.1094 (0.0069)</td>
</tr>
<tr>
<td></td>
<td>(p&lt;0.001)</td>
<td>(p&lt;0.001)</td>
<td>(p&lt;0.001)</td>
</tr>
<tr>
<td></td>
<td>0.3092 (0.0082)</td>
<td>0.2890 (0.0079)</td>
<td>0.2825 (0.0050)</td>
</tr>
<tr>
<td></td>
<td>(Mean Std. Err.)</td>
<td>(Mean Std. Err.)</td>
<td>(Mean Std. Err.)</td>
</tr>
<tr>
<td>Std. Dev.</td>
<td>0.1300 (0.0053)</td>
<td>0.1199 (0.0064)</td>
<td>0.1201 (0.0050)</td>
</tr>
<tr>
<td>Median</td>
<td>0.1588 (0.0116)</td>
<td>0.1167 (0.1001)</td>
<td>0.1201 (0.1201)</td>
</tr>
<tr>
<td></td>
<td>0.1414 (0.0056)</td>
<td>0.0953 (0.0069)</td>
<td>0.1094 (0.0069)</td>
</tr>
<tr>
<td></td>
<td>(p&lt;0.001)</td>
<td>(p&lt;0.001)</td>
<td>(p&lt;0.001)</td>
</tr>
<tr>
<td></td>
<td>0.2102 (0.0098)</td>
<td>0.3684***</td>
<td>0.2860***</td>
</tr>
<tr>
<td></td>
<td>(Mean Std. Err.)</td>
<td>(Mean Std. Err.)</td>
<td>(Mean Std. Err.)</td>
</tr>
<tr>
<td>Std. Dev.</td>
<td>0.1668 (0.0076)</td>
<td>0.3454***</td>
<td>0.2825***</td>
</tr>
<tr>
<td>Median</td>
<td>0.1599 (0.0079)</td>
<td>0.3105***</td>
<td>0.2785***</td>
</tr>
<tr>
<td></td>
<td>0.1416 (0.0059)</td>
<td>0.0934***</td>
<td>0.2938***</td>
</tr>
<tr>
<td></td>
<td>(p&lt;0.001)</td>
<td>(p&lt;0.001)</td>
<td>(p&lt;0.001)</td>
</tr>
<tr>
<td></td>
<td>0.1413 (0.0064)</td>
<td>0.2938***</td>
<td>0.2775***</td>
</tr>
<tr>
<td></td>
<td>(p&lt;0.001)</td>
<td>(p&lt;0.001)</td>
<td>(p&lt;0.001)</td>
</tr>
<tr>
<td></td>
<td>0.1413 (0.0064)</td>
<td>0.2938***</td>
<td>0.2775***</td>
</tr>
<tr>
<td></td>
<td>(p&lt;0.001)</td>
<td>(p&lt;0.001)</td>
<td>(p&lt;0.001)</td>
</tr>
<tr>
<td></td>
<td>0.1413 (0.0064)</td>
<td>0.2938***</td>
<td>0.2775***</td>
</tr>
<tr>
<td></td>
<td>(p&lt;0.001)</td>
<td>(p&lt;0.001)</td>
<td>(p&lt;0.001)</td>
</tr>
<tr>
<td></td>
<td>0.1525 (0.0063)</td>
<td>0.2938***</td>
<td>0.2775***</td>
</tr>
<tr>
<td></td>
<td>(p&lt;0.001)</td>
<td>(p&lt;0.001)</td>
<td>(p&lt;0.001)</td>
</tr>
<tr>
<td></td>
<td>0.1525 (0.0063)</td>
<td>0.2938***</td>
<td>0.2775***</td>
</tr>
<tr>
<td></td>
<td>(p&lt;0.001)</td>
<td>(p&lt;0.001)</td>
<td>(p&lt;0.001)</td>
</tr>
<tr>
<td></td>
<td>27.36</td>
<td>54.39</td>
<td>10.82</td>
</tr>
</tbody>
</table>

Parametric tests: **significant at 10%**  " significant at 5%  *** significant at 1%
Wilcoxon Rank-Sum tests: +++ significant at 5%  +++ significant at 1%
Inventory holding costs decline during the day for the five-period model. This decline is shown to be highly significant for both bunched and unbunched trades. Such a finding implies that market makers face the largest inventory risks in the morning, with these risks diminishing throughout the day. This can be attributed to the learning process of market makers that may face higher risks in the morning because they are unsure of how the order flow will progress during the day. As market makers learn from the order flow, the inventory risk decreases since they are able to more accurately predict the future arrival of trades. This view is supported by the observed decrease in $\pi$, implying that because market makers are less worried about their inventory positions as the day progresses, they are less inclined to induce trade reversals.

THE EFFECT OF LIQUIDITY ON ESTIMATION OF INTRADAY BID-ASK SPREAD COMPONENTS

The earlier intraday bid-ask spread component estimation papers were influenced by the levels of liquidity of stocks included in the analysis. In the Madhavan, Richardson, and Roomans (1997) paper, their sample was much larger than the mean NYSE firm. Similarly, in Lin, Sanger, and Booth (1995) their sample was restricted to stocks that had at least 2,500 transactions. We assess the impact of liquidity by breaking our sample into three groups: high, medium, and low liquidity. The high liquidity group has an average number of transactions during 1996 of 1,728 per day, the medium liquidity group has an average of 607 and the low liquidity group has an average of 212.

In Table 4, we report the pattern of coefficient estimates across the five periods during the day for each of the liquidity groups. We report only the unbunched estimates since the pattern is qualitatively similar for the bunched group. The estimates for $\alpha$ are in Panel A while the estimates for $\beta$ are in Panel B.

For the adverse selection component ($\alpha$) there are no statistical differences across the five intraday time periods in the low liquidity stocks. The low liquidity stocks exhibit the highest adverse selection component level of any of the liquidity groups with an adverse selection component of approximately 20%. This is not surprising since these firms typically would have less analyst coverage and therefore greater informational asymmetries. This rationale and findings are consistent with those of Brennan and Subrahmanyam (1995). For the medium liquidity stocks, the adverse selection component declines steadily throughout the day from 18% to 14%. The high liquidity stocks have a lower level of the adverse selection component and this level is relatively constant throughout most of the day at about 11%. These stocks do exhibit a decline at the end of the day in the last half-hour period to 8%.

There are statistically significant differences across the liquidity groups within each of the five periods throughout the day, with the higher the level of liquidity, the lower the level of adverse selection. The difference in adverse selection across the liquidity groups is the least significant during the first half-hour of trading at a p-value = 0.012. This can be explained as being the most risky time of day to trade since information is being impounded in prices after the overnight closure. The differences across the liquidity groupings are not surprising, but it does indicate that forming a sample on the basis of liquidity could lead to a potential bias.

The differences in the inventory holding cost component ($\beta$) across the liquidity groupings is less pronounced than the adverse selection component. There are some statistical differences in the second and third periods of the day (10:00-11:30 and 11:30-14:00), but no differences at the beginning or end of the day. This suggests that inventory management may be different for stocks with different liquidity but only during the trading day. Within each of the liquidity groups, there are statistical differences across the five periods, with the low liquidity stocks having the more rapid decline in the inventory holding cost component. The high liquidity stocks (and to a lesser degree the medium liquidity stocks) exhibit a slower decline in the component. This phenomenon may be explained as being a result of the potential risks of inventory being greater for the higher liquidity stocks. Since there are a larger number of shares traded, inventory management may be more of a concern.

CONCLUSION

Our adaptation of the Huang and Stoll (1997) bid-ask spread decomposition model to an intraday analysis reveals that order flow properties may impact on the estimation. The bunching procedure, which was necessary in the Huang and
<table>
<thead>
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<th></th>
<th>9:30 – 10:00</th>
<th>10:00 – 11:30</th>
<th>11:30 – 14:00</th>
<th>14:00 – 15:30</th>
<th>15:30 – 16:00</th>
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<tr>
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<td>(0.0196)</td>
<td>(0.0196)</td>
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<td>(0.0089)</td>
<td>(p&lt;0.274)</td>
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<td>Std. Dev.</td>
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<td>0.1416</td>
<td>0.1193</td>
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<td>Median</td>
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<td>0.1832</td>
<td>0.1878</td>
<td>0.1738</td>
<td>0.1621</td>
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</tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
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<td>0.1463</td>
<td>0.1209</td>
<td>0.1295</td>
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<td></td>
<td></td>
<td></td>
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<td>Mean</td>
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<td></td>
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<td>Mean</td>
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<td>( \chi^2 )</td>
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<td>(p&lt;0.617)</td>
<td>(p&lt;0.013)</td>
<td>(p&lt;0.023)</td>
<td>(p&lt;0.508)</td>
<td>(p&lt;0.591)</td>
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Stoll (1997) sample, is found to influence the inventory holding cost component of the bid-ask spread. In contrast to earlier papers that suggested that inventory management only matters at the end of the day, our finding that this component decreases significantly during the day implies that order flow and the assumptions inherent in these decomposition models are extremely important and can bias estimates and conclusions. While these intraday patterns may appear, when partially aggregated, to be similar to the overall bid-ask spread intraday pattern, individual examination is crucial to understanding each component especially when examining stocks with different levels of liquidity.

We verify that the intraday variation of the quoted bid-ask spread and the adverse selection component both follow a reverse-J pattern, similar to that found by McInish and Wood (1992) for the spread as a whole. These patterns are not consistent across stocks with different levels of liquidity since we observe that low liquidity stocks have no difference in adverse selection throughout the day. Higher liquidity stocks, however, have much lower levels of adverse selection and this is consistent with the notion that large stocks have more of a financial analysts following.

Differences in the inventory holding cost component are present across stocks with different levels of liquidity. High liquidity stocks tend to have their levels of the inventory holding cost component decline during the day much more slowly than low liquidity stocks. This may be explained as due to the larger risks of inventory imbalances inherent in higher liquidity stocks. This also has implications for bid-ask spread component estimation since due to the nature of GMM estimation, liquidity is often a variable used in sample selection.

Our procedures imposed tight data requirements to facilitate clear comparisons across the intraday time periods. While we have verified that the firms that were successful in being included in the sample are representative of the entire universe of NYSE-listed common stocks, there is a clear need to expand the sample with new estimation techniques. Determining the reasons why estimates fail to converge and finding new methods of estimation are subjects of future research.

REFERENCES


A REEXAMINATION OF INFORMATION FLOW IN FINANCIAL MARKETS: THE IMPACT OF REGULATION FD AND DECIMALIZATION

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ABSTRACT
We investigate the impact of Regulation FD on the information flow in the equities market. Our analysis indicates that information flow around earnings announcements, proxied by the abnormal return volatility around those announcements, of U.S. stocks increased in the first effective quarter of Regulation FD (the fourth quarter of 2000). The information flow of ADRs, which are exempt from Regulation FD, does not change, and this supports the inference that Regulation FD, not general market conditions, caused the increase in volatility. However, the data do not suggest that Regulation FD has a persistent impact on information flow, as measured by abnormal return volatility. Our results are robust to controls that include decimalization, which was implemented concurrently with Regulation FD and has reduced return volatility. Our comparison of return volatilities between firms of various sizes indicates that Regulation FD only temporarily had a differential impact on the information environment of small firms.

INTRODUCTION AND MOTIVATION
Corporate disclosure has long been a controversial and complicated issue. As the violations of insider trading laws over the years have shown, individuals occasionally profit from material corporate information that has not been disclosed publicly. In addition, many corporations (such as Enron and WorldCom) have not gone far enough in providing transparent data about their operations. Other corporations regularly release annual reports that are hundreds of pages in length and difficult for individual investors to assimilate. In light of this continuing controversy, it is appropriate to explore the impact of a recent change in how corporations release information to the investing community. In October 2000, the Securities and Exchange Commission (SEC) started requiring companies to comply with Regulation Fair Disclosure (FD). This rule prohibits corporations from selectively disclosing material, non-public information to investment analysts or institutional investors. Regulation FD, in theory,
should increase fairness in information access by requiring issuers to publicly release material information.

Analysts, however, argue that a level playing field may have resulted at the expense of lowering the quality and quantity of information provided to investors. Since the SEC does not provide specific guidelines on materiality, companies that are unable to classify information may tend to avoid releasing it at all rather than risk the legal liability associated with disclosing it informally or selectively. Although the SEC has incorporated certain safeguards against inappropriate liability, this could still be a concern to companies, especially before legal precedents exist.

On the other hand, the quality of company announcements may be reduced if companies react to Regulation FD by releasing all information, whether material or not. Under this scenario, individual investors may be left to decipher the information before analysts can evaluate it and quantify its relevance. Prohibiting selective disclosure may cause corporate information to arrive less frequently and result in large changes in stock prices around earnings announcements. Releasing corporate data simultaneously to all parties may cause increased volatility as investors try to determine the true value of new data.

In this paper we examine the impact of Regulation FD on information flow, as proxied by abnormal stock return volatility, and investigate its differential effect on firms of different sizes. Other researchers (Heflin, Subramanyam and Zhang, 2001b) analyze Regulation FD and return volatility. However, we offer a more methodologically sound approach to test the impact of Regulation FD on stock returns. Since Regulation FD does not apply to foreign companies, our design examines the relation between the return volatility of foreign issues, specifically American Depositary Receipts (ADRs) listed on the NYSE and NASDAQ, and U.S. issues around earnings announcements.

Our results indicate that the abnormal return volatility of firms increased in the first effective quarter of Regulation FD. However, the data are consistent with this impact being only temporary. We find that decimalization, which occurred contemporaneously for many firms with the first effective date of Regulation FD, reduced stock return volatility and mitigated the temporary increase in return volatility associated with Regulation FD. The evidence indicates that the information flow from small firms was temporarily more sensitive to the new disclosure rules. This may be a result of these firms reducing information quantity or quality until they were able to copy the disclosure practices of larger companies.

**REGULATION FD**

Regulation FD requires that public companies release material, non-public information through a news release or open conference call before it is discussed in a restricted-access forum with analysts or professional investors. If such information is selectively released in an unintentional manner, the company is required to disseminate the information within 24 hours by either issuing a press release or filing Form 8-K with the SEC. If the inadvertent disclosure occurs during a holiday or weekend, the official release must be made before the start of the next trading day.

Anecdotal evidence prior to the implementation of Regulation FD suggests that it may increase stock volatility. To investigate how corporations plan to react to the new regulation, the National Investor Relations Institute (NIRI) (2000) conducted a survey of 462 investor relations professionals from a broad cross section of companies. This survey showed that 42% of those professionals will probably limit communication practices and another 12% said they would limit their practices "significantly" should the SEC approve Regulation FD.

However, an NIRI survey (2001) conducted after the effective date of Regulation FD suggests that companies were not quite as apprehensive about information releases following implementation. According to that survey, 27% of the 577 respondents indicated that they are providing more information to investors as a result of Regulation FD. Nearly one-half of analysts (48%) are issuing about the same amount of information, while 24% are disseminating less information than before the new rule went into effect.

Heflin et al. (2001b) explore the impact of Regulation FD and conclude that there is no deterioration of information flow into the market since Regulation FD took effect. Information
quality is measured by return volatility around earnings announcements and by analyst forecast accuracy and dispersion. Heflin et al. (2001b) use a method of matching sample firms with a control firm both one quarter prior to Regulation FD implementation and the quarter one year prior to implementation. By looking at these two quarters, the matched-pair sample design attempts to minimize effects that may otherwise be attributable to changes in the economic environment or comparison of unlike quarters. However, Heflin et al. admit to possible empirical design limitations: “… we have attempted to control for changes in economic factors that could affect our inferences, [however] we can never completely rule out the possibility that our results are driven by some other contemporaneous economic event unrelated to Regulation FD.”

We believe that the Heflin et al. (2001b) methodology does not accurately isolate the effect of Regulation FD. One confounding factor that is not controlled for by this method is the gradual switch to decimalization by the AMEX, NASDAQ and NYSE. Decimalization refers to quoting stock prices in decimals instead of fractions, and this pricing system allows a smaller bid-ask spread and a smaller minimum price change. As decimalization was implemented across securities and exchanges between August 2000 and April 2001, volatility measures during the final quarter of 2000 would reflect the effects of both decimalization and Regulation FD for some securities.

Research on the impact of decimalization indicates that it reduces price and return volatility. Bessembinder (2002) reaches the following conclusion: “For the full sample of NYSE stocks median return volatility declined from 2.04% in the pre-decimalization sample to 1.56% post decimalization. For the full Nasdaq sample the decrease in median volatility is from 3.66% to 2.98%.”

HYPOTHESES AND METHODOLOGY

Impact of Regulation FD on U.S. Issues

In our preliminary analysis, we examine the impact of Regulation FD on abnormal return volatility focusing specifically on U.S. common stocks. Although Regulation FD applies to most securities listed on U.S. exchanges, it does not apply to all securities. Specifically, foreign issues are currently exempt from Regulation FD. However, these issues are still required to comply with decimalization, thus they provide a unique control sample to test the impact of Regulation FD.

Since our sample extends to the third quarter of 2001, we are able to measure the effect of the regulation over a longer period than Heflin et al. (2001a). If information flow has deteriorated post-FD, either in quality or quantity, we would expect to find greater abnormal return volatility around earnings announcements of U.S. issues subsequent to the implementation of the regulation. Our first hypothesis is as follows:

Hypothesis 1: Abnormal return volatility around earnings announcements by U.S. firms is insignificantly different in the pre-FD and post-FD periods.

Rejection of this hypothesis would imply that factors such as Regulation FD, decimalization, and general changes in market conditions are contributing factors to the change in abnormal return volatility from the pre-FD period to the post-FD period.
To test this hypothesis we calculate abnormal return volatility (ARV) around quarterly earnings announcements for U.S. common stocks in each of the quarters subsequent to the implementation of Regulation FD for which data is available to us. These are the fourth quarter of 2000 to the third quarter of 2001 and represent our U.S. event samples. We only include securities listed on NYSE, NASDAQ and AMEX to construct our control samples. Our control samples are abnormal return volatility around earnings announcements by our U.S. sample firms in (a) the third quarter of 2000 which provides us with the most recent control available, (b) the fourth quarter of 1999 which will control for comparison of unlike quarters, and (c) the fourth quarter of 1998. There has been anecdotal evidence that firms, in an attempt to prepare for the implementation of Regulation FD, began reducing selective disclosure practices prior to October of 2000. By using the fourth quarter of 1998 as an additional control period, our results will be robust to these claims.

Abnormal return volatility around earnings announcements is measured as

\[ ARV_{i,q} = \sum_{t=-m}^{+m} (R_{i,q,t} - \bar{E}[R_{i,q,t}])^2 \]  

where \( ARV_{i,q} \) is the abnormal return volatility for firm \( i \) in quarter \( q \), over event windows of 5 days, -2 to +2, around the announcement. \( R_{i,q,t} \) is defined as the return for firm \( i \) in quarter \( q \) on day \( t \), and the expectation \( \bar{E}[R_{i,q,t}] \) is calculated using the market model over a period of 100 trading days prior to the event window. Since our results may be sensitive to differences in the normal return volatility of each stock, we deflate the abnormal return volatility, which is defined in equation (1), by dividing by each firm’s average daily market model residual volatility during the market model estimation period.

We test our hypothesis by performing a multivariate regression similar to that employed by Heflin et al. (2001b).

\[ ARV_{i,q}^{U.S.} = b_0 + b_1 PostFD_{i,q} + b_2 Loss_{i,q} + b_3 Mag_{i,q} + b_4 Trend_{i,q} + b_5 VAR_{i,q} + e_{i,q} \]  

where \( PostFD_{i,q} \) is a dummy variable taking on the value of unity if the observation is from the post-FD period and the value of zero otherwise. Related literature (Hayn 1995; Freeman and Tse 1992; Barth, Elliot and Finn 1999) has suggested that the sign of earnings, magnitude of unexpected earnings, and the earnings trend are significant determinants of the relationship between earnings and return. Thus, \( Loss_{i,q} \), which is a dummy variable with value of unity if the earnings are negative and zero otherwise, \( Mag_{i,q} \), the size of the unexpected component of earnings measured by the difference between actual earnings and mean expected earnings, and \( Trend_{i,q} \), a dummy variable with the value of unity if quarter \( q \)’s earnings are greater than that of quarter \( q \)’s earning in the previous year and zero otherwise, are included. Any cross-sectional differences in return volatility are controlled for by including \( VAR_{i,q} \) in the regression model. This variable represents the average daily variance of the market model prediction errors. We perform additional testing of H1 concurrently with our testing of H4 below where we control for decimalization.

**Impact of Regulation FD on ADRs**

As ADRs are not subject to Regulation FD, we would expect these firms to exhibit similar return volatility patterns during the pre-FD and post-FD periods. However, to ensure that our findings for the U.S. firms are robust, and not generated by market-wide changes, we examine return volatility for ADRs across the same quarters used in our analysis of U.S. issues. Our second null hypothesis, therefore, is:

**Hypothesis 2** Abnormal return volatility around earnings announcements by ADRs is insignificantly different in the pre-FD and post-FD periods.

Rejection of the hypothesis would imply that factors such as decimalization and general changes in market conditions are contributing factors.

In a similar manner to that described for equation 2, the abnormal return volatility is deflated by dividing by each ADR’s average market model residual volatility to control for differences in the normal return volatility of each security. We run a
similar multivariate regression on our ADR sample.

\[ ARV_{i,q}^{ADR} = b_0 + b_1 PostFD_{i,q} + b_2 Loss_{i,q} + b_3 Mag_{i,q} + b_4 Trend_{i,q} + b_5 VAR_{i,q} + e_{i,q} \] [3]

where the independent variables are defined previously.

**Differential Impact of Regulation FD on U.S. Issues and ADRs**

In their multivariate regression model, Heflin et al. (2001a) find that the coefficient for \( PostFD_{i,q} \) is significant and negative, and they conclude that there is no deterioration in the information quality based on this measure. However, they do not provide an adequate control for changes in the securities markets. If Regulation FD significantly altered the information environment, we would expect a significant difference in post-FD abnormal return volatility between U.S. issues and ADRs, which are not subject to Regulation FD. This provides the basis for our next hypothesis.

**Hypothesis 3:** The abnormal return volatility around earnings announcements by U.S. firms is not significantly different from that of ADRs.

We test the hypothesis using our post-FD sample of firms (both U.S. issues and ADRs) and the following multivariate regression model:

\[ ARV_{i,q}^{all} = b_0 + b_1 Loss_{i,q} + b_2 Mag_{i,q} + b_3 Trend_{i,q} + b_4 VAR_{i,q} + b_5 ADR_{i,q} + e_{i,q} \] [4]

where \( ADR_{i,q} \) takes a value of unity if firm \( i \) is an ADR and zero otherwise and all other variables are as defined previously. Significance of the \( ADR_{i,q} \) variable would indicate that abnormal return volatility differs between U.S. firms and ADRs, and thus would lead us to reject hypothesis 3.

**Impact of Decimalization on Return Volatility**

Decimalization was implemented in stages on the NYSE, NASDAQ and AMEX. The first stage was implemented in the fourth quarter of 2000 for a limited group of stocks and the final group of firms was switched over by the end of April 2001. To determine whether introduction of decimalization played a significant role in abnormal return volatility around earnings announcements, we propose the following hypothesis.

**Hypothesis 4:** Decimalization has an insignificant effect on abnormal return volatility around earnings announcements.

To test our hypothesis, initially we employ the following multivariate regression model:

\[ ARV_{i,q}^{NYSE} = b_0 + b_1 PostFD_{i,q} + b_2 Loss_{i,q} + b_3 Mag_{i,q} + b_4 Trend_{i,q} + b_5 VAR_{i,q} + b_6 DEC_{i,q} + e_{i,q} \] [5]

where \( DEC_{i,q} \) is unity if the earnings announcement for firm \( i \) occurs subsequent to decimalization for that security and zero otherwise. Significance of the decimalization dummy variable would lead to rejection of hypothesis 4 and indicate that the concurrent implementation of decimalization was a confounding event in the measurement of ARV.

We also test hypothesis 4 by comparing the deflated ARVs of three subsamples of firms. Firms are placed in the above groups by comparing the earnings announcement dates to the dates of decimalization. The first subsample consists of firms that do not have decimalized trading in either the pre- or post-FD period. This group is used to isolate the effect of Regulation FD before decimalization. The second subsample contains firms that are not decimalized in the pre-FD period but are decimalized in the post-FD period. This group combines the effects of Regulation FD and decimalization, but allows for isolation of the effect of Regulation FD when comparing two post-FD quarters. The final subsample is composed of firms that are decimalized in both the pre- and post-FD periods; the ARVs of this class reflect the effect of Regulation FD after decimalization.

**Differential Impact of Regulation FD on Small, Medium and Large Firms**

The results of the PriceWaterhouseCoopers (2001) survey indicate that large firms better understand the requirements of Regulation FD than small firms. Furthermore, we expect that firm size is an indicator of the amount of resources that a firm can allocate toward ensuring that
information released is compliant with Regulation FD. Therefore smaller firms may opt to release less information and create greater abnormal return volatility around earnings announcements.

Furthermore, small firms may have provided analysts with selective disclosure in the pre-FD period to attract their coverage. If Regulation FD reduced analysts’ incentives to cover small firms, we expect to see greater return volatility for smaller companies. Consistent with the argument that analyst coverage affects returns, Hong, Lim, and Stein (2000) document that trading strategies based on momentum are more profitable for firms with lower analyst coverage. This leads to the following null hypothesis:

**Hypothesis 5:** Abnormal return volatility does not differ among various size firms.

To test this hypothesis we place firms in one of three categories based upon their total market capitalizations. We use the same size categories as the PriceWaterhouseCoopers (2001) survey (large firms have market capitalization above $5 billion; medium firms have market capitalizations from $1.0 billion to less than $5 billion; small firms have market capitalizations less than $1.0 billion) to classify firms by size and compare the deflated abnormal return volatility across various periods for each of the three size categories.

### TABLE 1

<table>
<thead>
<tr>
<th>Sample</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
<th>Model 5</th>
<th>Model 6</th>
<th>Model 7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Period</td>
<td>U.S. Pre &amp; Post</td>
<td>Pre &amp; Post</td>
<td>Pre &amp; Post</td>
<td>Pre &amp; Post</td>
<td>Post</td>
<td>Pre &amp; Post</td>
<td>Pre &amp; Post</td>
</tr>
<tr>
<td>Post-FD</td>
<td>-0.00372 ***</td>
<td>0.00343 **</td>
<td>-0.00178</td>
<td>0.00303 *</td>
<td>0.00382 *</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(1.58)</td>
<td>(2.30)</td>
<td>(-0.41)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loss</td>
<td>0.00242 **</td>
<td>-0.00430 *</td>
<td>-0.01595 ***</td>
<td>-0.00336</td>
<td>0.00014</td>
<td>-0.00104</td>
<td>-0.00142</td>
</tr>
<tr>
<td>(2.01)</td>
<td>(-1.76)</td>
<td>(-3.05)</td>
<td>(-1.40)</td>
<td>(0.9)</td>
<td>(-0.81)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trend</td>
<td>-0.0012</td>
<td>-0.00320 **</td>
<td>-0.00084 *</td>
<td>0.000273</td>
<td>-0.00104</td>
<td>-0.00255 ***</td>
<td>-0.00390 **</td>
</tr>
<tr>
<td>(1.40)</td>
<td>(-1.96)</td>
<td>(-0.70)</td>
<td>(-1.46)</td>
<td>(0.79)</td>
<td>(-0.79)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mag</td>
<td>0.00035</td>
<td>0.00056</td>
<td>0.00058</td>
<td>0.00031</td>
<td>0.00042</td>
<td>0.00048</td>
<td>0.00053</td>
</tr>
<tr>
<td>(0.59)</td>
<td>(0.81)</td>
<td>(1.30)</td>
<td>(0.35)</td>
<td>(0.28)</td>
<td>(0.76)</td>
<td>(0.96)</td>
<td></td>
</tr>
<tr>
<td>Mktvar</td>
<td>0.4485 ***</td>
<td>0.51601 ***</td>
<td>1.14779 ***</td>
<td>0.82550 ***</td>
<td>0.51604 ***</td>
<td>0.51577 ***</td>
<td>0.57182 ***</td>
</tr>
<tr>
<td>(22.02)</td>
<td>(13.67)</td>
<td>(11.10)</td>
<td>(16.09)</td>
<td>(15.89)</td>
<td>(23.96)</td>
<td>(14.87)</td>
<td></td>
</tr>
<tr>
<td>ADR</td>
<td>0.00290</td>
<td>0.00128</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(1.09)</td>
<td>(0.48)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dec</td>
<td>-0.00799 ***</td>
<td>-0.00957 **</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(-4.30)</td>
<td>(-2.25)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adj. R^2</td>
<td>0.3099</td>
<td>0.3498</td>
<td>0.3389</td>
<td>0.2321</td>
<td>0.1117</td>
<td>0.3046</td>
<td>0.3285</td>
</tr>
<tr>
<td>3180</td>
<td>1074</td>
<td>239</td>
<td>996</td>
<td>2384</td>
<td>3216</td>
<td>1147</td>
<td></td>
</tr>
</tbody>
</table>

*Significant at the 10% level.

**Significant at the 5% level.

***Significant at the 1% level.

### Regression Analysis

Table 1 presents the results of our regression analysis. This analysis is similar to that used by Heflin et al. (2001b), but it is extended to include additional time periods and dichotomous variables for ADRs and decimalization. The models are defined as follows. Model 1 uses only U.S. common stocks and all pre-FD and post-FD quarters. Model 2 uses only U.S. common stocks and all pre-FD quarters and Q4 2000. Model 3 uses only ADRs and all pre-FD and post-FD quarters. Model 4 uses all pre-FD quarters and the entire sample and includes an ADR dummy variable. Model 5, which is estimated using all post-FD quarters and the entire sample, includes an ADR dummy variable. Model 6 uses all NYSE and NASDAQ stocks in our sample and includes a decimalization dummy variable. Model 7 is identical to Model 6 but compares the pre-FD quarters only to Q4 2000.

The results from Model 1 for the post-FD variable indicate that ARV decreases following the effective date of Regulation FD, but the opposite sign is
found in Model 2 (all pre-FD quarters versus Q4 2000). In Model 4 (U.S. firms and ADRs during all pre-FD quarters) the ADR dummy variable is insignificant, as is the case for all post-FD quarters in Model 5. This leads us to accept hypothesis 3, and conclude that whether a firm is subject to Regulation FD (U.S. firms) or not (ADRs) does not affect the firm’s ARV. This suggests that any effect of Regulation FD on return volatility is not permanent.

Models 6 and 7 include the decimalization dummy variable. The significance and negative sign of this variable leads us to reject hypothesis 4. When using all post-FD quarters and a decimalization dummy in our analysis (model 6), the post-FD dummy is insignificant. This suggests that the post-FD coefficient in model 1 is capturing the effect of decimalization. Additionally, the post-FD variable is significant when only the first effective quarter subsequent to the regulation is included (model 7). In conjunction with our finding of a lack of significance in the ADR variable, in Model 5 and the post-FD variable in Model 6, which provides support for hypothesis 2, these results indicate that the volatility increasing effects of FD are not permanent.

### TABLE 2
Deflated Abnormal Return Volatility Differences for Decimalized and non-Decimalized Firms

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Column A</td>
<td>Column B</td>
<td>Column C</td>
</tr>
<tr>
<td></td>
<td>(Regulation FD</td>
<td>(Decimalization</td>
<td>(Combined Dec. and</td>
</tr>
<tr>
<td></td>
<td>Effect Only)</td>
<td>Effect Only)</td>
<td>Regulation FD</td>
</tr>
<tr>
<td></td>
<td>Difference</td>
<td>Difference</td>
<td>Difference</td>
</tr>
<tr>
<td></td>
<td>(a – b)</td>
<td>(a – b)</td>
<td>(a – b)</td>
</tr>
<tr>
<td></td>
<td>Obs</td>
<td>Obs</td>
<td>Obs</td>
</tr>
<tr>
<td>0 / -1</td>
<td>4.877**</td>
<td>2.081</td>
<td>-0.477**</td>
</tr>
<tr>
<td></td>
<td>(1.97)</td>
<td>(0.47)</td>
<td>(-0.41)</td>
</tr>
<tr>
<td>0 / -4</td>
<td>-0.1355</td>
<td>-15.049</td>
<td>-1.607</td>
</tr>
<tr>
<td></td>
<td>(-0.88)</td>
<td>(-1.01)</td>
<td>(-0.50)</td>
</tr>
<tr>
<td>0 / -8</td>
<td>4.262***</td>
<td>-4.516</td>
<td>4.1757</td>
</tr>
<tr>
<td></td>
<td>(2.86)</td>
<td>(-0.61)</td>
<td>(0.98)</td>
</tr>
<tr>
<td>1 / 0</td>
<td>-5.257</td>
<td>-2.938*</td>
<td>-1.494</td>
</tr>
<tr>
<td></td>
<td>(-0.83)</td>
<td>(-1.93)</td>
<td>(-0.88)</td>
</tr>
<tr>
<td>2 / 0</td>
<td>-5.183**</td>
<td>-4.682***</td>
<td>-1.655</td>
</tr>
<tr>
<td></td>
<td>(-1.74)</td>
<td>(-2.42)</td>
<td>(-1.55)</td>
</tr>
<tr>
<td>3 / 0</td>
<td>-4.682***</td>
<td>-1.414</td>
<td>-1.414</td>
</tr>
<tr>
<td></td>
<td>(-2.42)</td>
<td>(-1.22)</td>
<td>(-1.22)</td>
</tr>
<tr>
<td>1 / -1</td>
<td>-3.319</td>
<td>-0.377</td>
<td>-0.377</td>
</tr>
<tr>
<td></td>
<td>(-1.24)</td>
<td>(-0.35)</td>
<td>(-0.35)</td>
</tr>
<tr>
<td>2 / -1</td>
<td>1.652</td>
<td>1.251</td>
<td>1.251</td>
</tr>
<tr>
<td></td>
<td>(1.26)</td>
<td>(1.13)</td>
<td></td>
</tr>
<tr>
<td>3 / -8</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Significant at the 10% level.
**Significant at the 5% level.
***Significant at the 1% level.

We run additional tests comparing ARVs of our U.S. firms and ADRs for each quarter in our sample. Results not reported are consistent with our regression analysis findings. We also perform robustness checks to determine whether the economic downturn is driving our ARV results.

We find that this is not the case. Also, to control for the possibility that our panel regression was influenced by country-level or firm-level differences, we perform a fixed-effects regression. We find that our results are robust to these factors.
Decimalized and Non-decimalized Subsamples
In Table 2 we present results for the three subsamples based upon decimalization. We compare pre-FD periods with post-FD periods and also compare the effective quarter of Regulation FD with the three following quarters. Column D indicates that firms decimalized in the pre- and post-FD periods have higher ARV in the quarter after Regulation FD compared to the quarter before Regulation FD, although all other quarter comparisons were insignificant. This appears to be a function of the small sample of firms trading in decimals in both periods. Fortunately there is sufficient sample size in the non-decimalized subsample to reach significant conclusions about the effect of Regulation FD by itself. Column A of Table 2 indicates that non-decimalized firms have higher ARV in the effective (0) quarter of Regulation FD when compared to one quarter before and eight quarters before Regulation FD, although the comparison to the period four quarters prior to Regulation FD is insignificant. These results indicate that Regulation FD increases ARV, leading us to reject hypothesis 1.

The results in Column B separate the Regulation FD effect from the decimalization effect (something lacking in prior research), and the analysis indicates that firms that began to trade in decimals after their announcement date (and thus after the effective date of Regulation FD in this instance) experienced ARV declines, leading us to reject hypothesis 4 in favor of its alternative. This is consistent with prior research (Bessembinder, 2002) indicating that decimalization lowered return volatility, and is consistent with our a priori belief that decimalization was a confounding event that possibly influenced the Heflin et al. (2001b) results. In fact, in Column C the comparison of quarters 1 and -1 shows that the combined effect of decimalization and FD produced a significant decline in ARV; thus it appears that the volatility-reducing decimalization effect is stronger than the competing Regulation FD effect.

### TABLE 3
Deflated Abnormal Return Volatility Differences for U.S. Common Stocks Across Firm Size Categories

<table>
<thead>
<tr>
<th>Panel A: Small vs. Large firms</th>
<th>Period</th>
<th>DefARV_S</th>
<th>Obs</th>
<th>DefARV_L</th>
<th>Obs</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q4 '98</td>
<td>7.456</td>
<td>131</td>
<td>6.127</td>
<td>78</td>
<td>1.329</td>
<td>(1.10)</td>
</tr>
<tr>
<td>Q4 '99</td>
<td>12.946</td>
<td>136</td>
<td>11.112</td>
<td>67</td>
<td>1.835</td>
<td>(0.50)</td>
</tr>
<tr>
<td>Q3 ’00</td>
<td>9.850</td>
<td>296</td>
<td>9.932</td>
<td>153</td>
<td>-0.082</td>
<td>(-0.06)</td>
</tr>
<tr>
<td>Q4 ’00</td>
<td>13.547</td>
<td>151</td>
<td>12.054</td>
<td>80</td>
<td>1.493</td>
<td>(0.53)</td>
</tr>
<tr>
<td>Q1 ’01</td>
<td>7.469</td>
<td>490</td>
<td>5.814</td>
<td>215</td>
<td>1.655**</td>
<td>(2.26)</td>
</tr>
<tr>
<td>Q2 ’01</td>
<td>8.079</td>
<td>393</td>
<td>9.299</td>
<td>184</td>
<td>-1.220</td>
<td>(-0.94)</td>
</tr>
<tr>
<td>Q3 ’01</td>
<td>8.919</td>
<td>698</td>
<td>9.944</td>
<td>250</td>
<td>-1.025</td>
<td>(-0.60)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Panel B: Small vs. Medium-sized firms</th>
<th>Period</th>
<th>DefARV_S</th>
<th>Obs</th>
<th>DefARV_M</th>
<th>Obs</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q4 ’98</td>
<td>6.127</td>
<td>78</td>
<td>7.679</td>
<td>51</td>
<td>-1.552</td>
<td>(-0.93)</td>
</tr>
<tr>
<td>Q4 ’99</td>
<td>11.112</td>
<td>67</td>
<td>9.568</td>
<td>57</td>
<td>1.544</td>
<td>(0.44)</td>
</tr>
<tr>
<td>Q3 ’00</td>
<td>9.932</td>
<td>153</td>
<td>9.273</td>
<td>92</td>
<td>0.659</td>
<td>(0.41)</td>
</tr>
<tr>
<td>Q4 ’00</td>
<td>12.054</td>
<td>80</td>
<td>9.999</td>
<td>58</td>
<td>2.056</td>
<td>(0.94)</td>
</tr>
<tr>
<td>Q1 ’01</td>
<td>5.814</td>
<td>215</td>
<td>5.689</td>
<td>106</td>
<td>0.125</td>
<td>(0.16)</td>
</tr>
<tr>
<td>Q2 ’01</td>
<td>9.299</td>
<td>184</td>
<td>8.772</td>
<td>101</td>
<td>0.527</td>
<td>(0.39)</td>
</tr>
<tr>
<td>Q3 ’01</td>
<td>9.944</td>
<td>250</td>
<td>9.849</td>
<td>113</td>
<td>0.095</td>
<td>(0.05)</td>
</tr>
</tbody>
</table>

**Significant at the 5% level.

Results by Firm Size
Table 3 provides tests for volatility differences across the three size categories, which are defined earlier in the paper. As shown in Panels A and B, the return volatility of small firms is statistically greater than the return volatility of medium and large firms in the first quarter of 2001 (the second effective quarter for Regulation FD). In contrast, Panel C shows that medium and large firms do not have differing volatilities for any quarter. Our analysis leads us to reject hypothesis...
5 that ARV does not differ among various size firms.

CONCLUSIONS
This paper provides a superior methodology for examining the effect of Regulation FD on information flow, as measured by abnormal return volatility around earnings announcements. Our analysis extends the work of Heflin et al. (2001b) in four ways. First, we compare the return volatility of U.S. firms to ADRs. ADRs serve as a valuable control; these securities are exempt from Regulation FD but are still affected by changing market conditions in the U.S. While disclosure practices do differ across countries, our analysis indicates that abnormal return volatilities around earnings announcements for ADRs do not differ from U.S. firms from the fourth quarter of 1998 to the third quarter of 2000. However, this may be an issue worthy of further examination in another paper. Second, our analysis includes the fourth quarter of 2000 to the third quarter of 2001, and this allows us to test the persistence of Regulation FD’s impact. Heflin et al. (2001b) only examine the fourth quarter of 2000 in their study. Third, our analysis adjusts for the effect of decimalization on return volatility. Research has shown that the switch to decimal pricing, which was concurrent with the implementation of Regulation FD, significantly lowered return volatility. Fourth, our study investigates the impact of Regulation FD on different size companies. We incorporate several robustness checks of our results.

Our analysis indicates that the abnormal return volatility around earnings announcements increased in the first effective quarter of Regulation FD (the fourth quarter of 2000). However, the data do not suggest that Regulation FD has a persistent impact on return volatility. Our multivariate regression analysis shows that our results are robust to controls that include decimalization, and to using like quarter comparisons used by Heflin et al. (2001b). Our study indicates that stock return volatility is reduced by decimalization, and this makes it difficult to discern the true impact of Regulation FD. Our comparison of return volatilities between firms of different sizes indicates that small firms had larger return volatility increases, but the difference was only temporary.

One possible explanation for our results is the limited enforcement by the SEC. Firms may have initially reduced the quantity or quality of information provided to investors, but after learning the extent of enforcement they returned to their old practices. At a SEC conference in April 2001, a SEC commissioner indicated that Regulation FD was not currently being aggressively enforced (Glasner 2001). Furthermore, the SEC also indicated that it would publish additional clarifications of what constitutes material information. Companies may be interpreting this as an indication that the regulation will not be enforced until further guidelines are made public. Additionally, Arthur Levitt, the SEC Chairman who backed the implementation of Regulation FD, left his position on February 9, 2001. He was replaced by Laura Unger, a Republican who opposed the regulation.

There is another possible reason why Regulation FD did not result in persistently higher return volatility around earnings announcements. Corporations may have made their disclosure practices less selective prior to the implementation of the regulation. A survey of senior investor relations officers that was conducted in February 2000 is consistent with this assertion (NIRI, 2000). A substantial portion of the companies were conducting conference calls, and 82% of those that did allowed access to individual investors. This was up substantially from the 29% of firms that indicated they were providing these services in a survey conducted in 1998. The survey found that 48% of companies were providing real-time access to their conference calls via webcasting while virtually none of the companies were doing this one year earlier. In addition, approximately half of the companies using webcasting for conference calls were also either broadcasting or considering broadcasting other types of meetings of investor interest.

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National Investor Relations Institute. February 29, 2000. Most conference calls are now open to individual investors and the media.

National Investor Relations Institute. August 8, 2000. NIRI survey finds adoption of Regulation Fair Disclosure likely to limit amount of information disclosed to market participants.


READABILITY OF AWARD WINNING POPULAR ANNUAL FINANCIAL REPORTS

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ABSTRACT

As a result of the Governmental Accounting Standards Board Statement 34, citizens are considered users of governmental financial statements for the first time. The Government Finance Officers Association (GFOA) permits entities that are awarded the Certificate of Achievement for their Comprehensive Annual Financial Reports (CAFRs) to participate in the Popular Annual Financial Report (PAFR) Program. The PAFR is a condensed version of the CAFR aimed at providing financial information to average citizens who do not have a background in accounting. This study discusses various readability measures and uses them to evaluate the readability of PAFRs. The readability of the award winning PAFRs for year ended 2001 was tested using Grammatik and Readability Plus for Windows. The results of the current study may influence local governments to write the PAFR at a lower reading level and use a more understandable writing style.
EVALUATING THE EFFECTIVENESS OF TAX CREDITS FOR RESEARCH AND DEVELOPMENT: INTERNATIONAL EVIDENCE

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ABSTRACT

Research and development (R&D) spending within a country has been positively linked to national economic growth. A substantial portion of this total R&D investment in a country is the R&D performed by private corporations. This study examines the effectiveness of R&D tax credits to stimulate higher levels of private R&D investment across the major industrialized nations (G7), some of which offer R&D tax credits. A regression analysis is used in which the level of R&D expense is regressed on an indicator variable representing the availability of R&D tax credits and other control variables affecting R&D investment. The analysis is performed using both pooled estimates of the regression coefficients and coefficient estimates that vary by country. The results support the effectiveness of the tax credits to stimulate R&D investment. Firms in countries that offer R&D tax credits do spend relatively more on R&D than those in countries without tax incentives for R&D. These findings have implications for policymakers in countries either evaluating their current R&D tax credits or considering the adoption of R&D tax credits.
THE CURRENT STATUS OF FINANCIAL MODELING IN ACADEMIC FINANCE

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ABSTRACT

Financial modeling has burst into the lexicon of modern finance along with related terms like financial engineering and computational finance. The increased mathematical sophistication of modern finance, cheap and accessible computing power and databases, together with the interplay of academic finance and Wall Street have converged to create a demand for courses that emphasize practical computational skills. This paper discusses the evolution and taxonomy of this type of discipline and the pedagogical reasons why stand-alone graduate and undergraduate courses, even entire graduate programs, are proliferating in these areas. A detailed analysis of the software commonly employed in the classroom with separate discussions of spreadsheets, basic programming languages and mathematically sophisticated packages is provided. The emerging marketplace for financial modeling textbooks is delineated and the prevalent texts listed. The paper presents an author-created and annotated website that catalogs financial modeling software, textbooks, and service provider sites. The website contains a survey of financial modeling type classes at AACSB schools that shows the class syllabi and required textbooks for a variety of modeling classes.
A DECISION THEORETIC EXPLANATION FOR “IRRATIONAL” OPPOSITION TO UNITIZATION AGREEMENTS IN THE OIL AND GAS INDUSTRY

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ABSTRACT

During the production of an oil and gas reservoir numerous operators have the right to withdraw from a common source of supply. This is a classic example of the common pool problem. Numerous prior researchers have noted the inefficiencies that are attendant with common pool resources. These problems include unnecessary capital expenditures, over-drilling of wells, and a higher than optimal rate of extraction.

Unitization is a private contractual solution to the common pool resource problem noted above. Under this type of agreement, the various different operators pool their interests in the oil and gas reservoir and one company operates the reservoir as an integrated whole. Operating the shared resource as an integrated whole enables sophisticated enhanced oil recovery programs, thereby dramatically increasing ultimate recovery from the reservoir. This leads to many benefits for both society and the companies.

Traditionally, very large oil companies (majors) have been viewed as supporters of unitization agreements while smaller oil companies (independents) have been viewed as opponents to these agreements. An examination of the historical record bears this assertion out. This has been attributed to an intense dislike of the majors by the independents.

But this explanation is equivalent to saying that the decision makers for the independents are not rational. This paper models the decision of the independent using traditional decision theory under uncertainty. We show that when the type of risk aversion of the decision makers is taken into account, the independents are in fact behaving rationally.
APPLICATION OF MANAGEMENT AND FINANCIAL ACCOUNTING
PRINCIPLES TO NUCLEAR MATERIAL CONTROL AND ACCOUNTABILITY

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ABSTRACT

This paper considers the application of financial and management accounting principles to the control and accountability of weapons grade nuclear materials. The similarities and differences between traditional financial and management accounting as applied to commercial enterprises and as applied to nuclear materials are described and discussed. The paper concludes that significant differences between these two types of accounting are created both by the nature of the assets being accounted for and the types of reports that are required by the external users of the accounting information.

This paper discusses the application of standard financial and management accounting to nuclear materials control and accountability (NMC&A). In some ways the accounting systems employed in NMC&A are very consistent with the financial and management accounting processes used in manufacturing industries. In other ways though, the unique issues associated with accounting for weapons grade nuclear materials call for the implementation of very different accounting concepts.

BACKGROUND

The Atomic Energy (AE) Act assigns the primary responsibility for the design, development and production of nuclear weapons to the United States Department of Energy (DOE). The AE Act further mandates that the Department of Defense (DOD) be responsible for the operation of the strategic nuclear arsenal, and that nuclear weapons be returned to the DOE for storage or disposition when retired from active service.

Whether in the custody of DOE or DOD, nuclear weapons are certainly well protected. Those weapons maintained by DOD in active service are either deployed in a delivery system or held in reserve, but in either case they are under a vigorous protection regime featuring a high degree of physical security. Civilian paramilitary security forces that are also well armed and highly trained protect the weapons that have been retired from the active arsenal and returned to DOE. In either case
though, accounting for these weapons is a rather simple process based on a chain of custody regime and item accountability.

Unlike DOD though, active weapons are not the only type if nuclear materials in the DOE Inventory. This inventory also includes test devices, weapons components and weapons grade materials (i.e.-plutonium and uranium) in various forms such as oxides, solutions or scrap and waste. Accounting for these type materials draws on numerous disciplines including financial accounting, standard cost accounting, statistical analysis, analytical chemistry and non-destructive materials analysis.

In many ways nuclear material accounting is similar to financial and managerial accounting as practiced in any industrial organization. A chart of accounts has been developed and generally traditional accounting practices are followed (Ureel). The basic concepts of nuclear material accounting were noted by Bowen and Bennett as being consistent with the universal practice of recording and assigning values to possessions. As would any organization large enough to undertake a formal inventory/cost accounting process, a nuclear facility records acquisitions of materials into inventory records and subtracts all authorized removals, process losses, or discards to waste from the totals included in these records, maintains current book inventory totals for each account by reconciling the account as each recorded transaction occurs, and uses standard cost accounting techniques to assign economic values to the items in these accounts.

In these ways then nuclear material accounting is consistent with the general applications of financial and managerial accounting to any commercial enterprise. This process is complicated by the fact that assets exist in various forms and may be difficult to identify, characterize or measure. However, these problems are similar to those faced by manufacturing or extractive enterprises such as petroleum refining, metal processing or the pharmaceuticals industry.

There are significant differences though between accounting in general and nuclear materials accounting. One area of significant difference is that of internal control and the consequence of an inadequate internal control program. Every organization utilizes internal controls to safeguard assets. Unlike the facilities in the DOE Weapons Complex though, most firms don't depend upon a highly trained and well paramilitary security force to enforce asset control. There are other differences in the structure of the accounting databases and recording of transactions as well.

Another consideration is the consequence of breakdowns in internal control. In the commercial world generally the worst thing that could happen to a business firm as a result of loss of control of assets might be that the firm loses money or competitive advantage. However, in the case of nuclear material accounting the loss of control of assets (i.e.-significant quantity of weapons grade material) could result in catastrophic consequences to the entire nation.

NUCLEAR MATERIALS ACCOUNTING

Markin (1994) describes the principal objectives of nuclear material accounting as: (1) To provide assurance that all nuclear materials are present in the correct amounts, (2) To provide timely detection of loss of material, and (3) To estimate the amount of a loss and to determine the location where the loss occurred. These objectives are attained by acquiring materials measurements, by reviewing the analytical measurement data and by distributing this data in reports describing the status of these materials.
As to how assets are recorded, in some cases discreet units such as reactor fuel elements or items stored in shipping drums secured with tamper indicating seals, nuclear material can be accounted for as specific units. For chemical processing lines though, the accounting must be based on measuring both the quantities in the process tanks and the amounts transferred through the various process steps in the line. These analytical measurements introduce additional issues such as measurement accuracy, repeatability and precision. Regardless of how the entries going into the book inventory are created, good accounting practice demands that periodically a complete check of all materials on hand must be conducted to verify the accuracy of the accounting records and to make any necessary corrections. This reconciliation of book to physical inventory is the core of nuclear material accounting (Bowen and Bennett) and any variance is identified as the facility Inventory Difference or ID. This overall process of tracking and identifying inventory differences is known as Material Balance Accounting.

MATERIAL BALANCE ACCOUNTING

Korstad (1980) studied nuclear material accounting from the perspective of the scientific principle of conservation of mass and observed that verification that recorded values of material amounts within a facility are correct could be based on the recognition that process flows must conserve mass. The principal tool used to accomplish Material Balance Accounting is the Material Balance Equation (MBE). For a defined area and a defined accounting period, the law of conservation of mass would require that

\[
\text{Ending Inventory} - \text{Beginning Inventory} = \text{Input Transfers} - \text{Output Transfers} \tag{1}
\]

where the terms on the left are the actual amounts of material present in the area at the beginning and end of the accounting period and the terms on the right are the actual amounts of material that have moved into or out of the area during the accounting period. While this might seem obvious the difficulty is that the equation assumes that the amounts of these inventories and transfers can be known exactly when in reality they must measured and can be known only approximately. In some cases the materials are not accessible for measurements at all and the values must be estimated based on the analysis of samples. Thus since the values can not be known exactly the MBE must be modified somewhat. Korstad suggested that the modified equation should read

\[
\text{Inventory Difference (ID)} = \text{“Beginning Inventory”} - \text{“Ending Inventory”} + \text{“Input Transfers”} - \text{“Output Transfers”} \tag{2}
\]

where the quotation marks indicate that the values on the right side of the equation are estimated. The left side of the equation (the ID) will generally be a non-zero value since estimation errors or other errors generated by sampling, measurement uncertainties and other process variables can cause an apparent deviation from conservation of mass.

It is significant that the MBE includes all of the movement across the boundary of the process area during successive inventory determinations. This accounting period is known as the Material Balance Period and the ID for the period \( n \) has been defined by Goldman, Picard and Shipley (1982) as
\[ ID_n = I_n - I_{n+1} + T_n \]

where \( I_n \) is the estimated inventory at the beginning of period \( n \), \( I_{n+1} \) is the estimated inventory at the beginning of period \( n+1 \) and \( T_n \) is the estimated net transfer (estimated input transfers minus estimated output transfers for period \( n \)).

The accuracy of the measurements used to determine these values are based on engineering estimates. These estimates are evaluated by comparison to capability indices and these comparisons permit identification of the weakest or most variable areas. Identification of these troublesome areas then guides the facility to make the changes needed to reduce losses and improve the quality of the information in the accounting system (Prasad and Calis).

COMPARISON BETWEEN FINANCIAL AND NUCLEAR MATERIAL ACCOUNTING

The reconciliation of inventory differences identified by application of the Material Balance Equation during physical inventories is one of the major differences between nuclear material accounting and conventional financial accounting. Simons (1974) noted that standard financial accounting requires that inventory differences detected during the conduct of a physical inventory be reconciled by adjusting the books to the observed value and recording the discrepancy as an operating expense, an adjustment to cost of goods sold, or an extraordinary item on the income statement.

However, when the IDs consist of amounts of weapons grade nuclear material, the primary concern then becomes the serious consequences of the potential loss of control of the material rather than the financial consequences of an inventory adjustment. Nuclear material accounting then takes on a dimension not normally considered either in conventional financial accounting, industrial process control or resource management. Should a difference between book and physical inventory be detected during an inventory an ID is recognized and the inventory records are adjusted, but the difference does not affect the financial statements. The DOE has continued the policy established by its predecessor agency the Atomic Energy Commission of handling IDs by establishing an ID account for each operating facility and posting the period ID to this cumulative account. The current regulatory authority mandating the continuation of this long-standing policy is found in DOE Manual 470.4, Control and Accountability of Nuclear Materials”.

Per this directive, the ID for the most recent period and the cumulative ID for each facility are published two times each year by the DOE in a report to the Congress and the ID does not enter into the preparation of financial statements in any way.

A second major difference between nuclear material accounting and financial accounting has to do with the level of detail reported in inventory records. One of the fundamental aspects of financial accounting is materiality. Wolk and Teamey (1997) state that materiality is defined in terms of whether or not the item is important to the operation of the organization or large enough in value to influence user's decisions regarding operations or reporting. It should follow then that small items of little value that are not important to the operation of the organization might not be captured in the inventory records. However, the DOE has taken this decision out of the financial arena and into regulatory space by specifying reporting requirements for type and isotope of nuclear material without regard to the financial
concept of materiality. In some cases the reportable levels are as low as micrograms.

DOE Order 5633.3 establishes reporting levels as low as micrograms for some materials (i.e.-californium and berkelium) and further mandates that in addition to maintaining records at a high level of detail at the local level, these inventory quantities must also be reported into a national data base. So not only are inventory records maintained at a higher level of detail than would normally occur in financial accounting, the inventory values are reported into a national data base at this high degree of detail and some of the reports generated by the data base are even reported to international agencies.

The national data base mentioned above is known as the Nuclear Material Management and Safeguards System and is referred to by the acronym NMMS (Smith, Kuzmycz and Heaton 1994). NMMS also generates reports that serve several reporting obligations mandated by international treaty commitments. Principle among these treaty commitments is the U.S. obligation as a signatory to the Nuclear Weapons Non-Proliferation Treaty (NPT) to report nuclear materials information to the International Atomic Energy Agency (IAEA), the organization tasked by the United Nations to oversee NPT compliance.

A third major difference between financial accounting and nuclear material accounting has to do with how the economic values of finished goods held in inventory are reported in financial statements. Generally an industrial enterprise would use the standard cost accounting process (Horngren 1994) to calculate the direct and indirect costs attributed to particular items in inventory. These historical costs would then serve as the baseline for inventory valuation. In some cases though the values are adjusted to a Lower of Cost or Market figure when the value declines due to technical obsolescence of the product or changes in the market caused by shifts in customer preferences.

However, the DOE uses the process mandated by Federal Accounting Standards Advisory Board (FASAB) Statement #3 reporting inventory values. This process differs significantly from standard cost accounting in that the cost figures used in valuing inventories are developed at the national or agency level rather than at the local facility level. The primary difference between the DOE/NRC process and standard costing is that cost figures for each nuclear facility in the DOE Weapons Complex (i.e.-Oak Ridge, Savannah River, Hanford, Lawrence Livermore and Los Alamos) are rolled up into an overall average figure. The national average then is applied to inventory quantities to determine economic values as financial statements are prepared for each facility. An additional difference between FASAB #3 and standard financial accounting is that FASAB #3 does not permit any adjustments to the historical cost values for strategic nuclear materials once they have been established at the national level. Unlike standard GAAP based financial accounting then, there would never be than any inventory adjustment to lower of cost or market or any other type valuation adjustment unless the Secretary of Energy had directed the adjustment based on a cost revision calculated at the national level.

CONCLUSION
Nuclear material accounting is in many ways consistent with the management and financial accounting principles applied to other commercial or government enterprises. Significant differences exist though that are primarily the result of the nature of the nuclear assets and the risk to the national welfare that could result from a potential loss. An additional difference is created by the reporting requirements which are extensive and include high degrees of detail.

BIBLIOGRAPHY


Federal Accounting Standards Advisory Board Statement Number 3, "Accounting for Inventory and Related Property", Executive Office of the President/Office of Management and Budget, 10/27/93.


This paper describes a game used to illustrate incentives for earnings management. The rules of the game are modified to demonstrate how manipulation can be constrained by environment factors. After being dealt cards, students complete a public report that need not reflect the cards received. A die is rolled to see if the cards must be shown. If the roll indicates the cards can remain undisclosed then the student receives payment based on the public report. If the die indicates the cards must be shown then penalties are incurred if the public report does not reflect the actual cards received. Several rounds are played which vary the probability of observing the true state and the penalties for deception. The rounds proxy for the environmental issues discussed in the Positive Theory of Accounting. This exercise helps students understand the effect various restrictions have on the ability to misrepresent earnings.
Recent high-profiled earnings management cases (e.g., WorldCom) and the collapse of Enron have put the role and quality of external audit in ensuring the quality of corporate earnings under considerable scrutiny. Much research has been conducted on the determinants of earnings management, such as a firm’s financial characteristics and audit quality. Since earnings management is inherently unobservable, most studies used measures of accruals as proxies for earnings management. The purpose of this study is to examine the relationship between audit quality and a more direct measure of earnings quality – earnings restatements. Contrary to the concerns of many in accounting practice or research, and the results in prior research, this study finds no statistically significant relationship between earnings restatements and non-audit fees. This does not support the claim that non-audit fees paid to the auditor are the primary reason for auditor independence impairment that results in lower audit and earnings quality. On the other hand, this study provides evidence that total fees and audit fees are positively associated with earnings restatements.

**INTRODUCTION**

The role of auditing in ensuring the quality of corporate earnings has come under considerable scrutiny due to some high-profiled earnings management cases (e.g., WorldCom) and the collapse of Enron. Since values of the firms are linked to reported earnings figures, it creates economic incentives for management to engage in earnings management. Former Securities and Exchange Commission (SEC) Chairman Arthur Levitt (1998) expressed his serious concerns over earnings management in his famous “the Numbers Game” speech. He called for a fundamental cultural
change for the firm management and the accounting profession.

Various definitions exist for earnings management. Schipper appears to have captured the essence of earnings management by defining it as “...purposeful intervention in the external financial reporting process with the intent of obtaining private gain...” (1989). Likewise, Healy and Wahlen (1999) state that “earnings management occurs when managers use judgment in financial reporting and in structuring transactions to alter financial reports to either mislead some stakeholders about the underlying economic performance of the company or to influence contractual outcomes that depend on reported accounting numbers”.

Many studies have examined the SEC’s proposition that non-audit services to audit clients by the auditor may impair auditor independence, resulting in lower audit quality. The concern is that large fees from nonaudit services create too close a financial relationship between the auditor and the client, which makes the auditor more reluctant in challenging questionable accounting practices by the client management. To address the concern, SEC requires firms to disclose the amounts of all audit fees and non-audit fees in proxy statements filed on or after February 5, 2001. Such disclosures are expected to provide the investors with information about quality of independent audit of financial statements.

Much research has been conducted on the determinants of earnings management, such as a firm’s financial characteristics and audit quality. Since earnings management is inherently unobservable, most studies use various measures of discretionary (abnormal) accruals as proxies for earnings management. Discretionary accruals require assumptions and estimates of non-discretionary portion of the total accruals. Therefore, reliability of estimated discretionary accruals and earnings quality decreases in the magnitude of estimation errors (Dechow and Dichev 2002). Similarly, Guay et al. (1996) contend that accruals derived from alternative models involve considerable imprecision. Bernard and Skinner (1996) present similar argument that abnormal accruals derived using Jones-type models reflect measurement errors partly because of the misclassification of normal as abnormal accruals. Using data collected from proxy statements, this study examines the relationship between audit quality and a more direct measure of earnings management—earnings restatements.

**PRIOR RESEARCH & HYPOTHESES**

Studies have been conducted on the determinants and consequences of earnings restatements. Higher market expectations for future earnings growth and higher levels of outstanding debt appear to be the characteristics of firms that restate earnings (Richardson et. al 2002). In addition, restatements of core accounts (mainly revenue accounts) are associated with higher frequencies for fraud and subsequent bankruptcy (Palmrose and Scholz 2002). Overall, the more material the restatements are, the more negatively security price responds to the restatement (e.g. Owers et. al 2002, Palmrose and Scholz 2002). Investors seem to be more concerned with restatements that are associated with management integrity than those related to technical accounting issues (Palmrose et al. 2002). However, Owers et. al find that of the categories of restatements, accounting issues (errors/irregularities/method-changes) have the most negative investor reactions. This is especially true when there is a contemporaneous change in the firm’s CEO.

Given the consequences and increasing occurrences of earnings restatements, some critics of the accounting profession have argued that non-audit services provided by independent auditors to their audit clients have contributed to poor quality of reported earnings that subsequently have to be restated. Some recent studies have addressed this issue of auditor independence and earning quality with mixed results. For example, Frankel et al. (2002) propose that a greater economic bond between the audit firm and client will impair auditor independence. Impaired auditor independence makes the auditor less willing to resist client’s biases in reported earnings. As a result, earnings quality is lower. Measuring the economic bond as the relative importance of non-audit fees as disclosed in the proxy statements, Frankel et al. (2002) report that the ratio of non-audit fees to total fees is positively associated with small earnings surprises and with the magnitude of discretionary accruals (proxies for earnings quality or earnings management). One criticism directed towards the study is that Frankel et al. do not consider whether higher audit fees and total fees may increase the economic bond and the resulting effects on auditor independence and, in turn, earnings quality (Kinney and Libby 2002). In other words, higher fees from either non-audit or audit services would presumably increase the economic bond to client and lower earnings quality.

While Frankel et al. provide evidence of impaired auditor independence from higher non-audit fees, Chung and Kalapur (2002) find no significant relationship between discretionary accruals and audit fees and non-audit fees. Similarly, Raghunandan et al. (2003) find no evidence supporting the claim that non-audit fees or total fees appropriately influence the audit of financial statements that are subsequently restated. The authors report no significant differences between the restatement and control firms in unexpected or actual (as disclosed in proxy statements) non-audit fees, total fees, or ratio of non-audit to total fees.
However, like Frankel at al, the authors also fail to consider the association between audit fees and earning quality. Likewise, focusing on audit opinions (instead of discretionary accruals), Defond et al. (2002) report no significant association between auditors’ going concern opinions and non-audit fees, audit fees, total auditor’s fees and fee ratio.

One reason for the mixed results in prior studies is that some focus on non-audit services and fail to consider that higher auditor fees, regardless for audit or non-audit services, will strengthen economic bond of the auditor to the client, resulting in auditor independence impairment and, thus, poor quality of reported earnings. Indeed, in the recent legal action against KPMG in audit of Xerox Corporation in 2003, the SEC contends that total fees are a material inducement for the auditor to permit the client to manipulate earnings to meet the performance expectations of Wall Street. To further examine the relationship between auditors’ fees and earnings quality, this study tests the following hypotheses (stated in null form):

H1: There is no significant association between audit fees and earnings quality.

H2: There is no significant association between non-audit fees and earnings quality.

H3: There is no significant association between total fees and earnings quality.

RESEARCH METHODOLOGY

Sample Selection

The initial sample firms consist of 267 publicly-held corporations that restated their reported earnings for the fiscal year 2000 and are identified by using keyword searches of Lexis-Nexis on the words “income or earnings restatement” and their variations. These firms are then screened for availability of requisite financial data on Research Insight (personal-computer version of Compustat) and data on fees paid to external auditors in proxy statements. The restatement sample includes 117 firms, after deleting 106 firms due to incomplete financial data and 44 firms due to missing auditor fee data. We match each restatement sample firm with two non-restatement firms based on four-digit SIC code and firm size. All control sample firms are screened for earnings restatement (or a lack of). This results in a final sample of 351 firms. The one-to-two match approach better reflects the proportion of restatement firms relative to non-restatement firms in practice. A one-to-one match is also applied with similar results as discussed later. Fiscal year 2000 is the focus of this study because it is the first year that publicly-held companies are required by the SEC to disclose annual fees paid to external auditors for audit and non-audit services. This presents a first opportunity that allows the examination of the association between non-audit fees (and audit fees) and quality of reported earnings. Restatements of earnings for fiscal year 2001 and thereafter are not included because there is a considerable time lag between original reporting and subsequent restatement of earnings for the same fiscal year. This sample screening criterion provides reasonable assurance that any control firm will not restate its earnings for fiscal year 2000.

Model Specification

Auditor Fee Variables. Prior studies contend that higher fees paid to auditors increase economic bond and thus impair auditor independence. The impaired independence results in poor audit quality and allows for greater earnings management (resulting in lower earnings quality). This study uses auditor fees disclosed in proxy statements to develop three measures of the auditor fees. The first measure (and of primary interest in this study) is a log transformation of total fees paid to auditors (LNTLFEE). This is consistent with the argument that the economic bond to a client is the total fees paid to the auditor (Kinney and Libby 2002). This is also consistent with the SEC’s position in recent enforcement actions against independent auditors (e.g. SEC vs KPMG in SEC Civil Action No. 03-CV-0671(DLC) in 2003).

The second and third measures of audit fees are log transformations of fees for audit (LNAUFEE) and non-audit services (LNNONAU), respectively. These two measures are consistent with the argument that higher fees from either kind of services would presumably increase the economic bond (Kinney and Libby 2002). These measures allow us to examine the respective relationships between earning management and audit and non-audit fees simultaneously.

The fourth measure is the ratio of non-audit fees to total fees (FEERATIO). This measure is the focus of many recent studies on auditor independence and earnings management. This measure is included to obtain empirical results for comparison with prior studies.

Control Variables. In addition to the four auditor fee measures, this study includes two variables as proxies for audit quality. Prior studies suggest that Big-5 auditors (BIG5) are less likely to allow earnings management than non-Big-5 auditors (e.g., Becker et al. 1998; Francis et al. 1999). Another variable is auditor tenure (AUDTEN) measured in the number of years the same auditor has au-
Edited the client’s financial statements. Prior research suggests that auditor independence decreases as the length of auditor tenure increases (Beck et al. 1988b; Lys and Watts 1994). On the other hand, others claim that as auditor tenure increases, the auditor is better at assessing risk of material misstatements by gaining insights into the client’s operations and business strategies (e.g., Arens et al. 2003).

This study also includes several variables that are frequently used in prior research to control for other factors influencing management’s incentives to manage or manipulate reported earnings. Several measures of firm performance are reported to be correlated with earnings management (or earnings quality) in prior studies (e.g., Dechow et al. 1995; Frankel et al. 2002; McNichols 2000): cash flows from operations deflated by average total assets (CFO), the absolute value of cash flows from operations deflated by average total assets (ABSCFO), total accruals deflated by average total assets (ACC), the absolute value of total accruals deflated by average total assets (ABSACC), annual market returns (MKRTX), and an indicator variable (LOSS) of “1” if the firm reports a loss for fiscal year 2000. In addition, Matsumoto (2002) suggests that firms with higher growth prospects are more likely to manage earnings. Growth prospects is measured by the market-to-book ratio (MKBKF). This study also includes leverage (LEVERG), measured as the ratio of total liabilities to total assets, and a financing indicator variable (FINACQ) of “1” if the firm issued equity or debt securities during 2000. Prior studies find leverage and need for external financing are related to earning management (Becker et al. 1998; DeAngelo et al. 1994). Finally, this study controls for firm size measured as the natural log transformation of market value of equity (LNMVE).

We estimate the following logistic regression model, where \( \text{RESTMT} = 1 \) if the firm restated its earnings for fiscal year 2000 and “0” otherwise. \( \text{FEEVAR} \) indicates the alternative measures of the auditor fee variables and “\( \varepsilon \)” the error term. All the other variables are as discussed above. Table 1 summarizes the definitions of all variables.

\[
\text{RESTMT} = \beta_0 + \beta_1 \text{FEEVAR} + \beta_2 \text{BIG5} + \\
\beta_3 \text{AUDTEN} + \beta_4 \text{CFO} + \\
\beta_5 \text{ABSCFO} + \beta_6 \text{ACC} + \\
\beta_7 \text{ABSACC} + \beta_8 \text{MKRTX} + \\
\beta_9 \text{LOSS} + \beta_{10} \text{MKBKF} + \\
\beta_{11} \text{LEVERG} + \beta_{12} \text{FINACQ} + \\
\beta_{13} \text{LNMVE} + \varepsilon
\]

### Table 1

**Definitions of Variables**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>RESTMT</td>
<td>An indicator variable equal to “1” if the sample firm restated its earnings, “0” otherwise (the Dependent Variable);</td>
</tr>
<tr>
<td>FEEVAR:</td>
<td></td>
</tr>
<tr>
<td>LNTLFEE</td>
<td>Natural logarithm of total fees paid to the auditor;</td>
</tr>
<tr>
<td>LNAUFEE</td>
<td>Natural logarithm of audit fees paid to the auditor;</td>
</tr>
<tr>
<td>LNNONAU</td>
<td>Natural logarithm of non-audit fees paid to the auditor;</td>
</tr>
<tr>
<td>FEERATIO</td>
<td>Ratio of non-audit fees relative to total fees paid to the auditor;</td>
</tr>
<tr>
<td>BIG5</td>
<td>An indicator variable equal to “1” if the auditor is a Big-5 firm, and “0” otherwise;</td>
</tr>
<tr>
<td>AUDTEN</td>
<td>Number of years the auditor has audited the firm’s financial statements;</td>
</tr>
<tr>
<td>CFO</td>
<td>Cash flows from operating activities, deflated by average total assets;</td>
</tr>
<tr>
<td>ABSCFO</td>
<td>Absolute value of cash flows from operating activities, deflated by average total assets;</td>
</tr>
<tr>
<td>ACC</td>
<td>Total accruals (i.e., net income minus cash flows from operating activities), deflated by average total assets;</td>
</tr>
<tr>
<td>ABSACC</td>
<td>Absolute value of total accruals (i.e., net income minus cash flows from operating activities), deflated by average total assets;</td>
</tr>
<tr>
<td>MKRTX</td>
<td>Annual market return of the firm’s common stock;</td>
</tr>
<tr>
<td>LOSS</td>
<td>An indicator variable equal to “1” if the firm reported loss for the fiscal year, and “0” otherwise;</td>
</tr>
<tr>
<td>MKBKF</td>
<td>Market value to book value for common equity to measure growth prospects;</td>
</tr>
<tr>
<td>LEVERG</td>
<td>Leverage ratio defined as ratio of total liabilities relative to total assets;</td>
</tr>
<tr>
<td>FINACQ</td>
<td>An indicator variable equal to “1” if the firm issued equity or debt securities during the fiscal year, and “0” otherwise;</td>
</tr>
<tr>
<td>LNMVE</td>
<td>Natural logarithm of market value of equity at year end.</td>
</tr>
</tbody>
</table>
EMPIRICAL RESULTS

Univariate Correlations

Table 2 reports the univariate Spearman’s rank correlations and Pearson’s correlations between earnings restatement (RESTMT) and the auditor fee variables. The results indicate that total fees, audit fees, and non-audit fee are significantly positively correlated with earnings restatements. While the fee ratio (non-audit fees relative to total fees) is positively correlated with earnings restatements, the correlation is not significant at the 5% level. Overall, the results suggest that purchases of audit and/or non-audit services are positively correlated with earnings restatements. However, these results on the relationships between earnings restatements and fee variables are obtained without controlling for other factors related to the characteristics of the auditor and the firm. To control for these factors, the multivariate logistic regressions are used with results discussed next.

<table>
<thead>
<tr>
<th>Panel A: Pearson Correlations</th>
<th>LNLTFEE</th>
<th>LNAUFEE</th>
<th>LNNONAU</th>
<th>FEERATIO</th>
</tr>
</thead>
<tbody>
<tr>
<td>RESTMT</td>
<td>0.154**</td>
<td>0.162**</td>
<td>0.050</td>
<td>0.058</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Panel B: Spearman’s Rank Correlations</th>
<th>LNLTFEE</th>
<th>LNAUFEE</th>
<th>LNNONAU</th>
<th>FEERATIO</th>
</tr>
</thead>
<tbody>
<tr>
<td>RESTMT</td>
<td>0.125**</td>
<td>0.134**</td>
<td>0.109*</td>
<td>0.063</td>
</tr>
</tbody>
</table>

Notes:
1. **,*: Significant at the 0.01 and the 0.05 levels, respectively;
2. See Table 1 for variable definitions.

Multivariate Logistic Regression Results

Table 3 reports the results from the three separate logistic regressions for total fees, audit and non-audit fees, and ratio of non-audit fees to total fees for the full sample. The first logistic regression results are based on total auditor fees. As indicated in Table 3, total fees paid to auditors have a significantly positive relationship with the occurrence of earnings restatement (p-value = 0.002). The results are consistent with the argument that higher total fees paid to the auditor (regardless of types of services) strengthen economic bond of the auditor to the client, which in turn impairs auditor independence. As a result, the auditor is less willing to challenge its client’s questionable accounting practices to manage earnings, which have to be restated in the future.

Prior studies often fail to consider the relationship between audit fees and earnings quality (e.g., Raghunandan et al. 2003). Thus, the second logistic regression model includes variables based on separate fees for audit and non-audit services. The results in Table 3 suggest that audit fees are positively associated with incidences of earnings restatement (p-value = 0.001). However, there is no significant relationship between non-audit fees and occurrences of earnings restatement (p-value = 0.657). The significantly positive association between audit fees and earnings restatement is consistent with the argument that higher fees of either kind (audit or non-audit) would increase the economic bond of the auditor to the client, which results in impaired auditor independence and, thus, lower quality of reported earnings. The insignificant relationship between non-audit fees and earnings restatement appears to be inconsistent with the study results by Frankel et al. (2002) and much of the comments on negative effect of non-audit services on audit quality in the popular press. However, the lack of a significant association between earnings restatement and non-audit fees is consistent with the results reported in other recent studies (e.g. Chung and Kalapur 2001; Raghunandan et al. 2003).

The third logistic regression results are based on the ratio of non-audit fees to total fees. As shown in Table 3, there
### TABLE 3
Summary Statistics from Logistic Regressions

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient Estimate</th>
<th>Coefficient Estimate</th>
<th>Coefficient Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>6.369 (&lt;0.001)</td>
<td>7.342 (&lt;0.001)</td>
<td>1.367 (0.067)</td>
</tr>
<tr>
<td>LNTLFEE</td>
<td>0.480 (0.002)</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>LNAUFE</td>
<td>N/A</td>
<td>0.586 (0.001)</td>
<td>N/A</td>
</tr>
<tr>
<td>LNNONAU</td>
<td>N/A</td>
<td>0.013 (0.657)</td>
<td>N/A</td>
</tr>
<tr>
<td>FEERATIO</td>
<td>N/A</td>
<td>N/A</td>
<td>0.053 (0.931)</td>
</tr>
<tr>
<td>BIG5</td>
<td>0.943 (0.077)</td>
<td>1.083 (0.043)</td>
<td>1.040 (0.052)</td>
</tr>
<tr>
<td>AUDTEN</td>
<td>0.020 (0.345)</td>
<td>0.027 (0.209)</td>
<td>0.021 (0.328)</td>
</tr>
<tr>
<td>CFO</td>
<td>0.832 (0.473)</td>
<td>0.979 (0.399)</td>
<td>0.085 (0.489)</td>
</tr>
<tr>
<td>ABSCFO</td>
<td>1.728 (0.218)</td>
<td>2.119 (0.129)</td>
<td>2.980 (0.029)</td>
</tr>
<tr>
<td>ACC</td>
<td>0.997 (0.371)</td>
<td>1.020 (0.372)</td>
<td>1.250 (0.268)</td>
</tr>
<tr>
<td>ABSACC</td>
<td>2.191 (0.076)</td>
<td>2.478 (0.052)</td>
<td>2.333 (0.063)</td>
</tr>
<tr>
<td>MKRTX</td>
<td>0.002 (0.147)</td>
<td>0.002 (0.142)</td>
<td>0.001 (0.697)</td>
</tr>
<tr>
<td>LOSS</td>
<td>0.444 (0.192)</td>
<td>0.394 (0.251)</td>
<td>0.515 (0.124)</td>
</tr>
<tr>
<td>MKBFK</td>
<td>0.005 (0.324)</td>
<td>0.005 (0.319)</td>
<td>0.005 (0.294)</td>
</tr>
<tr>
<td>LEVERG</td>
<td>0.306 (0.471)</td>
<td>0.451 (0.351)</td>
<td>0.086 (0.784)</td>
</tr>
<tr>
<td>FINACQ</td>
<td>0.718 (0.183)</td>
<td>0.671 (0.221)</td>
<td>0.641 (0.230)</td>
</tr>
<tr>
<td>LNMVE</td>
<td>0.138 (0.137)</td>
<td>0.105 (0.215)</td>
<td>0.077 (0.248)</td>
</tr>
</tbody>
</table>

Notes:
1. P-value in parentheses after coefficient estimate.
2. See Table 1 for variable definitions.
3. N/A: Not Applicable

is no significant association between the non-audit fee ratio and earnings restatement. The results are inconsistent with those reported by Frankel et al. (2002). However, the results are consistent with recent research results (Chung and Kalapur 2001; Raghunandan et al. 2003) and also consistent with the results on the relationship between non-audit fees and earnings statement discussed above.

### Additional Analyses

The following additional analyses are performed as part of our sensitivity tests to determine the robustness of the results discussed above. First, each restatement firm is matched with one control firm (one-to-one) based on the four-digit SIC code and firm size, resulting in a reduced sample of 234 firms. The logistic regression results (not tabulated here for brevity) are virtually the same as those for the sample using a one-to-two match (the full sample). Second, the rankings of total fees, audit and non-audit fees, and non-audit fee ratio are used in separate logistic regressions for both the full and the reduced samples. The results are no different from those discussed earlier. Third, the logistic regressions are repeated using total fees, audit fees, and non-audit fees, all deflated by the firm=s total assets. The inferences drawn from the results are essentially the same as those drawn from the results reported above. We also include in the logistic regressions additional variables, such as the ratios of accounts receivable and inventory relative to total assets and Altman’s Z score to measure overall financial condition, that have been used to detect materially misstated earnings due to error or financial reporting fraud (Arens et al. 2003; Lin et al. 2003). Again, the results are no different from those presented above. Overall, the results reported earlier are quite robust and do not seem to be dependent on measurements of the auditor fees or different proportion of restatement firms relative to non-restatement firms in the sample, or affected by omission of other variables.

### SUMMARY AND CONCLUSIONS

This study examines the association between earnings restatements and auditor fee measures: total fees, audit fees, and non-audit fees. These
findings are robust to alternative model specifications and variable. Contrary to the concerns of many in accounting practice or research, and the results in prior research, this study finds no statistically significant relationship between earnings restatements and non-audit fees. This does not support the claim that non-audit fees paid to the auditor are the primary reason for auditor independence impairment that results in lower audit and earnings quality. On the other hand, this study provides evidence that total fees and audit fees are positively associated with earnings restatements.

One limitation of this study is that it is solely based on the first year of disclosed fees. Data from later years might provide additional insights. In addition, this study makes no distinction among different components of non-audit fees because insufficient number of sample firms report such data. Research on the relationship between earnings restatements and different components of non-audit fees might yield different findings.

REFERENCES


AN APPROACH TO TEACHING ETHICAL DECISION-MAKING IN ACCOUNTING: ANALYZING THE MORAL ISSUE

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ABSTRACT

There is definitely a need for greater emphasis in teaching ethics in the accounting curricula. The recent accounting scandals suggest that more time should be spent on accounting ethics through classroom or training instruction. This paper suggests an approach to studying the moral intensity of ethical issues in moral decision-making. The focus, here then, is on the characteristics of the ethical issue. This framework shows good potential for analyzing ethical conflicts in the accounting field.

INTRODUCTION

For years the accounting profession has been urging reforms in accounting and business education to include more emphasis on integrity and ethical behavior. In response to this call for increased emphasis on ethics, the American Institute of Certified Public Accountants (AICPA), in 1986, issued a report “Education Requirements for Entry into the Accounting Profession”. This report stressed the importance of developing ethical values in accounting along with the technical knowledge. Later, in 1989, the AICPA issued the “Perspectives on Education: Capabilities for Success in the Accounting Profession”, which stressed the need for communication, intellectual and interpersonal skills. In addition, it stressed that accountants must be able to identify ethical issues and apply value-based reasoning skills in moral situations (Mintz, 1992).

Most recently, the AICPA published The CPA Vision Project (the Vision) which is aimed at gaining insight into the future of the accounting profession (AICPA, 1999). It identifies key values, services and competencies that are considered crucial to future accountants facing an ever changing business environment. Integrity is identified as a core value that CPAs must possess in order to meet the challenges of the future.

In order to achieve the skills identified in the Vision, a committee of the AICPA developed “The AICPA
Core Competency Framework for Entry into the Accounting Profession" (AICPA Accounting Educators Conference, 1999). This framework provides educators with curricula, teaching methods, and assessment tools that outline functional, personal and broad business competencies important for students entering into the profession. An important area, addressed in the personal competencies is the ability of accounting professionals to demonstrate commitment towards integrity and ethical behavior (AICPA, 1999)

The recent accounting scandals (Enron, WorldCom, and Aldelphi) have also encouraged business organizations to examine their ethics policies and codes of conduct. In July 2002, Congress passed the Sarbanes-Oxley Act which now requires publicly-held corporations to disclose, in periodic reports, whether they have adopted a code of ethics for their senior financial officers, controllers, or principal accounting officers (H.R. 3763, 2002). In response to this new legislation, many companies are reviewing their codes of conduct and ethics training programs (Myers, 2003).

In most accounting courses, ethics is taught through an analysis of various professional codes of conduct. Studying moral issues in accounting typically focuses on identifying the affected stakeholders and code violations. However, most approaches fail to consider the characteristics of moral issues and their influences on moral decision-making. The purpose of this paper is to introduce a different approach to ethics education. This approach integrates the theoretical issue contingent model proposed by Jones (1991) and encourages students to think about the moral intensity of the presented issue. The moral intensity approach may be incorporated into accounting curricula through case-method approaches to enhance accounting student’s moral decision-making capabilities.

This paper will first discuss moral decision-making approaches in the existing literature. The second section presents the issue contingent framework, including a discussion of each step. The final section suggests how to integrate the framework into an accounting course.

EXISTING MORAL DECISION-MAKING APPROACHES

Many professional accountants belong, through a certification process, to either the American Institute of Certified Public Accountants (AICPA), the Institute of Management Accountants (IMA), or the Institute of Internal Auditors (IIA). The AICPA’s Code of Professional Conduct, initially developed during the turn of the century, provides guidance and rules to all members in public practice. Likewise, the IMA’s and the IIA’s Standards of Ethical Conduct provide guides for ethical conduct for member accountants. Each code identifies principles such as professional responsibilities, integrity, objectivity, independence, due care and confidentiality. Violations of these codes may result in criminal actions, in some cases, as well as loss of one’s certification in other situations.

A major emphasis of the AICPA’s and the IMA’s Code of Professional Conduct is that ethical awareness is a professional responsibility, requiring accountants to exercise moral sensitivity and judgment in all their professional activities. One of the most important things these codes do is provide guidance to members in assessing issues facing the accounting professional. The principles, such as independence or integrity, can be used as tools for evaluating code violations (Oddo, 1997). In instances where the moral conflict is clear, the codes of conduct provide the accountant with a method to recognize and respond to various situations. Where the ethical conduct is less clear, it is important for accountants to consider other tools to help them make decisions that are for the greater good of society.

Several approaches to ethical decision-making in accounting have been suggested in the existing literature. These approaches advocate exposing accountants to rules, either utilitarian (the end justifies the means) or deontology (obligations, rights and duties) concepts. These theoretical ideas are thought to guide the accountant faced with ethical conflict in arriving at morally acceptable decisions. Through thorough analyses these concepts give the accountant various ways of looking at ethical issues and ethical decisions.

Langenderfer and Rockness (1989) even suggest an eight-step process that emphasizes morally right and/ or wrong issues and methods of applying moral standards to business and accounting institutions,
policies and behavior. This approach emphasizes moving away from concentrating on accounting rules and regulations by using an eight-step model, integrating deontological and utilitarian elements. The steps are: (1) state the facts, (2) state the ethical issues and the stakeholders involved, (3) identify the norms, principles, and values of the conflict, (4) present alternative courses of action, (5) state the best course of action consistent with norms, principles, and values, (6) identify the consequences of each possible course of action, (7) discuss the acceptable courses of action with an outside observer, (8) make the decision (Langenderfer & Rockness, 1989). The eight-step model can be used in case studies that include moral conflicts involving technical accounting issues.

Armstrong (1990) points out, however, several weaknesses in the eight-step method and make some suggestions to improve it. She notes that the method should place more emphasis on the professional guidance offered in existing accounting codes (AICPA, IMA, IIA). For example, considering the principles of integrity and objectivity when faced with a moral conflict should help the accountant make more ethical decisions. Armstrong (1990) also notes that while it is good to make accountants aware of consequences, stakeholders, values, principles and norms, there should also be greater guidance in integrating these considerations within the decision framework. Simply considering them may not lead to ethical decision-making. Finally, she urges that students need to understand the principles behind the codes of conducts, along with the accountant’s role of responsibility to society (Armstrong, 1990).

Similarly, Bebeau (1994) suggests a linear approach that may be useful in moral decision-making. 1) Gather the facts, 2) Define the ethical issues, 3) Identify the affected parties (the stakeholder), 4) Identify the consequences, 5) Identify the obligations, 6) Consider your character and integrity, 7) Think creatively about potential actions, and 8) Check your gut. This approach, while very similar to the others mentioned integrates the theories of consequentialists (focusing on the consequences), deontological (focusing on duties, obligations, and principles), and virtue (focusing on integrity) ethics (Trevino & Nelson, 2004).

The approaches presented above offer some useful tools for moral decision analysis. However, an important aspect of the moral decision process, that has received less attention, involves the assessment of the specific issues, the components of these issues, and their relevance to the decision-maker. Many of the theoretical ethical models assume that individuals utilize the same decision processes regardless of the nature or importance of the issues (Jones, 1991). For example, these models assume that individuals utilize the same cognitive processes regardless of whether the issue involves the theft of a paper clip or the distortion of financial data. Marshall & Dewe (1997) noted that the individual’s assessment of a particular situation is a critical determinant in the individual’s interpretation, and ultimately influences the ethical decision process.

THE PROPOSED FRAMEWORK

In order for accounting students to be exposed to real-world ethical issues a different approach may be needed. What is proposed here, based primarily on Jones (1991) ideas, is a method that emphasizes analyzing the ethical conflict and its moral intensity in terms of multiple components.

Step 1: Identify the moral issue(s).

Students should think about the important issue(s) in the moral conflict. Oftentimes this involves looking beyond the surface of the issue. Many moral conflicts involve multiple ethical issues. In accounting, the student should realize that moral issues can violate personal, corporate and professional principles. For example, Joan is pressured by her boss to defer a large inventory adjustment which would affect this year’s profits. In this situation, one ethical issue focuses on whether this violates generally accepted accounting
principles (GAAP). In some situations, the adjustment may or may not be material and therefore the decision enters into a gray area in GAAP. On a more personal basis, an ethical issue exists relating to the values of honesty and loyalty. Joan must also consider her personal values in deciding whether to comply with her supervisor’s directive.

**Step 2: Analyze the characteristics of the moral issue(s).**

The next step, based upon Jones’ (1991) model, stresses that the moral decision-making process is issue contingent and should include the characteristics of the moral issue. He outlined the components of moral intensity as independent variables (magnitude of consequences, social consensus, concentration of effect, probability of effect, temporal immediacy, and proximity) affecting all four stages (moral sensitivity, moral judgment, moral intentions, and moral behavior) of Rest’s (1986) model of moral decision-making.

Jones (1991, 374) identified six components in his model which supposedly incorporate the influence of moral intensity. Magnitude of consequences is the sum of the harms (benefits) felt by victims arising from a moral act. Social consensus refers to the level of social agreement of the proposed act as being either ethical or unethical. Probability of effect is the likelihood that the act will in fact take place and cause harm (benefit). Temporal immediacy is defined as the perceived length of time between the act and its consequences. Concentration of effect relates to the inverse function of the number people affected by the act. Proximity refers to how close (socially, culturally, physically) the victim is to the decision-maker. According to this model, Jones (1991) suggested that each stage of moral decision-making (moral sensitivity, moral judgment, moral intentions, and moral behavior) is influenced not only by the previous stage but also the components of moral intensity.

This step is comprised, then, of questions that can stimulate thinking about the various characteristics of the ethical conflict. The questions can be utilized as cues or “tools” to reduce ambiguity and enhance understanding of the moral conflict that the decision-maker faces in each ethical situation. The questions (Figure 1), adapted from previous studies (Singhapakdi, Vitell & Kraft, 1996; May & Pauli, 2000), are open-ended and are used to stimulate thinking about the different aspects of the moral conflict. This type of questioning permits students more freedom in their responses and hopefully adds additional insight into the decision-making process.

**Magnitude of consequences.**

a. Will the consequences of this action have a significant impact on the financial statements of this firm?

According to Jones (1991), magnitude of consequences can be thought of “the sum of the harms done to victims of the questionable moral action” (p. 374). This is a critical factor coming from the utilitarianism philosophy perspective, which focuses on the results of a decision. This thinking seems to be incorporated in much of the business and economic literature (Davis, Johnson, Ohmer, 1998). The perceived harm of a particular moral issue may influence the ultimate moral decision. The potential consequences of an act can, of course, often be complex and far-reaching. Therefore, it is often difficult to quantify and estimate consequences within a particular ethical situation. Again, clarifying the consequences through discussion may help.

This question refers to the impact the action may have on the company’s financial statements. The magnitude of consequences component recognizes that moral issues can be classified according to how significant the potential harms are (Jones, 1991). In an accounting context, the magnitude of consequences would be the amount of harm (or benefit), typically translated into dollars, the users of the financial information (statements) would incur. For example, in the Enron situation, the $50 billion bankruptcy, $32 billion loss in market cap, and more than $1 billion losses to employees’ retirement funds represent a significant magnitude of consequences (Business Week, 2002).

Jones (1991) noted that the inclusion of magnitude of consequences as a component of moral intensity is based on understandings of human behavior and empirical evidence. For example, he stated that an act that would cause death would have a greater magnitude of consequence than one that would cause minor injuries. While many moral issues possess small consequences to other individuals, more serious consequences should become a signal in the moral decision-making process. Collins
(1989), for one, noted that the nature of the ethical issue under consideration influences moral judgment. More specifically, he felt that ethical issues could be classified according to their type of harm; physical, economic, and psychological. He suggested a four step process, organizational harm analysis, which could be used to analyze ethical issues confronting organizations. Fritzschke (1988) also noted a link between more serious consequences in marketing and ethical judgments. Likewise, Weber (1990) found in issues where the magnitude of consequences was higher, moral reasoning was also at a higher level. Finally, Leitsch (2003), using various accounting issues with accounting students found magnitude of consequences to be a significant predictor of the moral decision-making process.

Social consensus
b. Will others, such as co-workers or the accounting profession, support this action?

The social consensus related to a moral issue, a second component of moral intensity, refers to the degree of social agreement about the good or evil of a particular act (Jones, 1991). This concept relates to the degree to which other individuals are perceived to agree that a particular action is questionable. For instance, in ethical situations, individuals often look to their referent groups for approval or disapproval. The executive management team of Enron Corporation looked to its accountants, Arthur Anderson, as the referent group and unfortunately they did not seem to look to other accounting groups nor the codes of those groups.

The social consensus question asks if other people would support this action. Davis et al. (1998) noted that social consensus can sometimes even supply the rationalization rather than the endorsement of an unethical act. For example, while most students would agree that cheating on an exam is unethical, they may use the social consensus that everyone does it to justify their behavior.

This question is directed at whether others in the accounting profession would support the action. For example, social consensus may be high if an action (decision) results in a clear violation of GAAP. The accounting profession itself acts as a significant referent for public and private accountants. Such factors as professional standards, codes of conduct, behavioral guidelines, internal controls, team auditing, peer reviews and regulations all work together to enhance ethical behavior in accounting situations (Stanga & Turpen, 1991). In addition, professional affiliation and peer pressure aid the accountant in everyday practice (Rest & Narvaez, 1994). In this respect, the professional society may be viewed as an authoritative figure that guides and expects ethical behavior among its members.

Probability of effect.
c. What are the chances that the action will actually cause any harm?

A third component of moral intensity, according to Jones (1991), is probability of effect, which refers to the probability that the act in question will actually take place and will cause harm (benefit). This question addresses the likelihood that the consequences of the action will in fact occur. If the probability that an act will occur is very low, the intensity of the issue will be also much less than if the probability is high (Jones, 1991). Likewise, if the probability that a particular action will cause harm is high, the moral intensity will also be very high. Ketchand, Morris & Shafer (1999) note an interesting point that the probability of effect of a questionable accounting practice will be lower if users of financial statements have other information that they can rely on. The total information available clearly may affect this component.

This question also asks the reader to estimate the expected effect of the action. In an accounting context, the probability of effect would be influenced by the likelihood that stockholders would rely on the financial statements, and the probability of sustaining substantial monetary losses. In the Enron situation, for example, the probability of effect should have been considered high due to the probability of losses sustained by investors and employees. Probability of effect, then, is seen as a major factor associated with moral intensity.

Temporal immediacy.
d. When will the consequences of this action actually be felt?

Temporal immediacy, another component of moral intensity, refers to the length of time between the present and the beginning of the consequences of
the questionable act (Jones, 1991). The question associated with temporal immediacy focuses on the length of time before the beginning of the consequences will be felt. In most cases, the longer the perceived length of time, the lower the moral intensity of the situation. A very long time period may be perceived as increasing the opportunity for intervention and resolution of the problem, and therefore reducing the urgency of the problem (Jones, 1991).

For example, relying on misrepresented financial statements for an immediate pending business purchase would have a higher temporal immediacy and increase the likelihood that the stakeholders would be harmed. In comparison, if the business purchase were to occur at year-end or five years from now, the influence of temporal immediacy may be much lower that misrepresented financial statements would harm the stakeholders, at least at the present time. One might say, then, that in the Enron situation temporal immediacy should have been higher since investors and employees were relying on misrepresented annual financial statements that may have impacted them in the not too distant future (Business Week, 2002).

Concentration of effect.

Concentration of effect, another moral intensity component, refers to an assessment of the individuals affected by an act of a given magnitude (Jones, 1991). This question asks the respondent to identify all the individuals that may be impacted by this action. Sometimes, the smaller the number of individuals perceived to be affected by a particular significant unethical action, the higher the level of moral intensity. Jones (1991) noted, even, that individuals may perceive that cheating a corporation out of money has less of a concentration of effect than cheating an individual out of the same amount of money. Again, a decision maker may view an action as more unethical if it hurts one individual rather than a group of individuals (Carlson, Kagmar, & Wadsworth, 2002). Similarly, Ketchand et al. (1999) suggested that an auditor may be less likely to subordinate his judgment if only a few, as opposed to many, stakeholders are affected by a moral decision. In the classroom, the instructor may use a current ethical event to assess the number of individuals potentially impacted by the moral decision.

Proximity.

Proximity, the last component of moral intensity, refers to the perception of nearness (social, cultural, psychological, or physical) that an individual has for victims (beneficiaries) of the questionable act (Jones, 1991). This question asks the respondent to think about all of the individuals who will be affected by the unethical action and how close they are to the issue. Situations involving others who are close in proximity, either socially, culturally, psychologically, or physically will be perceived to possess a higher moral intensity than those situations in which people are more distant (Jones, 1991).

The proximity question also looks more specifically at the manner in which the action will affect co-workers. Davis et al. (1998) noted that the role of personal proximity relates to the common belief that personal association or relationships demand special privileges. They noted that individuals maintain a different standard of conduct towards their family, friends, employer, community and nation. As personal proximity narrows, strong attachments contribute to feelings of moral obligation. Likewise, as the distance increases, the individual may feel less of a moral obligation and the moral intensity may diminish (Davis et al., 1998). For example, an auditor who develops a close relationship with a client may be more willing to act in the client’s best interests. Acting as Enron’s outside auditor and conducting its internal audits should have been considered a serious conflict of interest for the accountants of Arthur Anderson (Business Week, 2002). In fact, the AICPA Code of Professional Conduct discourages this type of relationship because it may impair the auditor’s independence (ability to fairly judge the financial position of the company). Stressing this principle with students by exposing them to this Enron issue may impact their decision-making processes.
Step 3: Identify and assess all possible courses of action

In this step the accountant should list all possible courses of action and evaluate them in relation to the relevant accounting principles, regulations and their personal values. This is a time to step back and think about professional and personal responsibility. For example, going along with suggested changes to accounting procedures that are not in conformance with GAAP may violate the principles of competence and integrity. The accountant must be aware, foremost, that in this situation they have the utmost responsibility to perform in an ethical manner.

Step 4: Recommend the appropriate decision.

After analyzing the above questions the final step is to recommend a final ethical decision. The accountant may even use empathy to become more aware that an individual(s) will be harmed. Intuition may also be extremely important in making sound business decisions. If an accountant feels uncomfortable about a final decision, even at the “gut” level, this may be a cue that they are facing an ethical conflict. The above steps are presented as guidance for the decision-making process.

INTEGRATION OF THE FRAMEWORK

This framework can be easily integrated into accounting courses during the semester (Figure 1). As was mentioned above, the instructor should present background material concerning business ethics and the more important ethical theories. Next, the framework questions could be introduced to students, along with a sample case, as tools to help clarify the often ambiguous situations that can be found in accounting. This part often stimulates student interest, especially if it is related to “real world” experiences or events.

After a discussion of the framework, another hypothetical case could be distributed to students. Students should be then given about 30 minutes to read and respond to the framework questions. This assignment may be completed individually or in groups. At the end of the time, the instructor should briefly discuss the scenario and the components of moral intensity with the students. Special emphasis should be placed on using the moral intensity components as tools or “cues” that can be used to identify critical determinants of the moral decision-making process (moral sensitivity, moral judgment, or moral intentions). Assessments can be made, at the end of the semester, measuring the effectiveness of the framework as a tool in assessing moral intensity of an ethical issue.

The four step framework outlined here for studying moral issues in accounting has several benefits. First, students become aware of the ambiguous nature of many ethical issues that they may face in the working world. Second, students are introduced to a different approach to analyzing ethical conflict. This approach hopefully will enhance their sensitivity towards ethical issues and help them in future accounting courses. Third, students realize that moral issues can be examined from different perspectives. Fourth, students become aware of the “situation-specific” nature of ethical conflict. Fifth, they develop skills for analyzing moral situations; ones can be used in the workplace. Sixth, they begin to realize that multiple components should be considered in analyzing ethical issues and that each should be given careful attention.

CONCLUSION

This paper suggests an approach to studying ethical decision making in accounting courses. The approach emphasizes analyzing moral intensity of moral issues and utilizes a case-method approach. By analyzing the aspects of moral intensity, students become familiar with a tool that can be used to examine real-world moral conflicts in the work setting. Hopefully, this approach will help to reduce unethical behavior in the accountants of the future.
<table>
<thead>
<tr>
<th>STEP</th>
<th>QUESTIONS</th>
<th>RESPONSES</th>
</tr>
</thead>
</table>
| 1.   | Identify each of the moral issue(s) | - List the moral conflict(s).  
  - Identify any violations of accounting principles.  
  - Does there appear to be any violations of corporate and / or personal values? |
| 2.   | Analyze the characteristics of the issue: | | |
| a.   | Will the consequences of this action have a significant impact on the financial information of this firm? | | |
| b.   | Will others, such as co-workers or the accounting profession, support this action? | | |
| c.   | What are the chances that the action will actually cause any harm? | | |
| d.   | When will the consequences of this action actually be felt? | | |
| e.   | State the individuals that will be affected by the consequences of this action. | | |
| f.   | How will the consequences of this action impact individual(s) close to the company; such as co-workers, stakeholders? | | |
| 3.   | Identify and assess all possible courses of action | - List the possible courses of action in this situation  
  - Consider the impact that each course of action will have on stakeholders |
| 4.   | Recommend an appropriate decision. | - Does this decision take into account professional and personal responsibility?  
  - What effect will this decision have on society as a whole? |
REFERENCES


HOW TAXPAYERS PERCEIVE AND ARE INFLUENCED BY THE FEDERAL INCOME TAX

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ABSTRACT

Each year as income tax season looms, discussions turn to the burden imposed on taxpayers and often focus on the level of complexity of the system as well as the causes of this complexity. Many citizens expend considerable time, effort and resources in order to comply with the law, which results in the incurrence of direct, substantial opportunity costs. As these reports of increasing tax complexity and the growing tax burden resurface, tax reform proposals gain considerable national attention.

Much of the discussion surrounding these related topics of burden and reform fails to consider or explicitly address the inherently individualistic nature and application of the tax law. To pinpoint the most unfair and burdensome aspects of the current tax code and develop logical remedies, policymakers must study the individual circumstances of the taxpayers in question. Income level and source, family and employment status, education, gender, and age are just a few of the numerous factors that can influence how the tax law impacts citizens. This research will specifically discuss the impact of income level on taxpayer behavior in response to tax policy changes and taxpayer perception of the tax system.

HOW TAXPAYERS PERCEIVE AND ARE INFLUENCED BY THE FEDERAL INCOME TAX

Tax policy is a frequently debated topic at all levels of government, especially the federal level. One might recall Steve Forbes touting the flat tax during the 1996 presidential campaign, or, more recently, George W. Bush’s promise of lower taxes that arguably helped him prevail in the last election. Taxation is a topic that touches the lives of every U.S. citizen and often elicits emotional responses. In fiscal year 2000, 178 million federal income tax returns were filed, including 127.6 million by individual taxpayers. As the April 15th filing deadline for most individuals inches closer each year, new reports draw attention to the annual tax burden imposed on citizens, and the alternative tax systems that could be the public’s saving grace.

The Economic Growth and Tax Relief Reconciliation Act (EGTRRA) of 2001 set forth many of the most recent changes in federal tax policy. If fully implemented, the EGTRRA is expected to result in $1.3 trillion in tax cuts over ten years. While many view the expected tax savings as welcome relief, the savings come at a cost – increasing complexity. In
fact, the EGTRRA resulted in 441 changes to the Internal Revenue Code including several complex phase-in and/or phase-out rules and a sunset provision at the end of 2010. A number of changes have been adopted since the passage of EGTRRA, further support for the proposition that the tax law continues to be, and will remain, a favorite moving target of the federal government. As the nation’s deficit grows, and the need for revenue increases, the tax law’s present status quo may once again be short-lived.

U.S. taxpayers bear a significant tax burden consisting of the direct costs of compliance as well as indirect costs associated with lost opportunities and mental anguish. According to the Tax Foundation, individuals, businesses, and non-profits spent an estimated 5.8 billion hours in 2002 complying with the federal tax code. At an hourly cost of $29.98 for individuals and $27.36 for business and non-profits, the estimated compliance costs in 2002 were $194 billion, approximately the same amount as the revenue of Wal-Mart, the second largest company in America. The Tax Foundation projects that compliance costs will grow to $244.3 billion by 2007, without taking the EGTRRA of 2001 into account. When the EGTRRA is taken into account, the Tax Foundation estimates that total compliance costs will fall somewhere between $267 and $350 billion in 2007. Even more startling is the fact that by 2007, the Tax Foundation predicts that the cumulative compliance costs associated with the EGTRRA will be twice the size of the tax reduction - $1.3 trillion in compliance costs versus $630 billion in tax relief. In addition to compliance costs, there is the direct expense, $8.2 billion in 2000, associated with the IRS administering and enforcing the federal tax code (Moody, 2002). While the exact cost of administering the U.S. tax system is difficult to measure, even the U.S. government admits that the total annual costs currently hover around $300 billion (U.S. Senate, 2000).

Many factors contribute to tax complexity in the U.S. Specifically, William Gale of the Brookings Institute has identified four factors that contribute to the overall burden including: a conflict among the consensus goals of tax policy; the political process itself; the need to deter tax avoidance; and the fiscal needs of the government (Gale, 2001). The central point of contention arises between simplicity and equity. The simplest tax is a single rate tax applied to all levels of all types of income. However, some taxpayers, politicians and lobbyists favor specific subsidies that reduce taxes for certain constituents or for socially beneficial activities, such as buying a home or saving for retirement. However, subsidies create distinctions among taxpayers as well as income sources and uses. These distinctions, which may improve the perceived equity of the system, may add complexity. To further complicate things, detailed rules are frequently needed to tighten or close loopholes, created by the subsidies, which taxpayers might use to their unfair advantage.

The EGTRRA of 2001 is just one of the recent tax acts which have supplied supposed tax relief at the expense of tax complexity. Most likely, the only way to significantly reduce the complexity of the current system is to reform the entire federal income tax system. In a 1999 Associated Press poll, 66 percent of the individuals surveyed indicated that the current tax system was too complicated, and 44 percent wanted to change to an entirely new tax system (Office of Tax Policy Research, 2002). As the intensity of the tax reform debate has fluctuated in recent years, several tax reform proposals have been presented. The most well-known reform proposals are the flat tax and the national retail sales tax (value-added tax). The national retail sales tax moves away from the concept of taxing income completely and taxes consumption instead. The flat tax uses cash flow as opposed to accrued income as the tax base. Both proposals would eliminate the taxation of savings and presumably boost economic performance while dramatically decreasing the complexity of the tax code (Moody, 2002).

Recall that in the 1999 Associated Press poll, a majority of respondents thought the current tax system was too complicated, and 44 percent of them wanted a new system. However, when the same group of individuals was asked if they would be willing to give up tax deductions to decrease the complexity of the system, 56 percent flatly stated that they would be unwilling to sacrifice deductions. Only 34 percent of the respondents said they would be willing to give up deductions to make the tax system simpler. Although the American public has consistently indicated in polls that progressivity is an important part of the tax system, 51 percent of the respondents (in the same Associated Press poll) asserted that a flat tax would be fairer than the current tax system despite the fact that a flat tax may reduce the progressivity of the tax system (Office of Tax Policy Research, 2002).

Much of the discussion surrounding these related topics of burden and reform fails to consider or explicitly address the inherently individualistic nature
and application of the tax law. To pinpoint the most unfair and burdensome aspects of the current tax code and develop logical remedies, policymakers must study the individual circumstances of the taxpayers in question. (This latter comment ignores the more fundamental but tougher question of what group of taxpayers should “benefit.”) Income level and source, family and employment status, education, gender, and age are just a few of the numerous factors that can influence how the tax law impacts citizens. Specifically, this paper will consider the impact of income level on taxpayer behavior in response to tax policy changes and taxpayer perception of the tax system. Statistically significant findings that reveal differences in behavior and perceptions among taxpayers will be discussed.

STUDY PROCEDURES

In order to gain a better understanding of how the federal tax law influences the behavior of taxpayers, questionnaires were administered to more than 350 taxpayers. These taxpayers were asked their opinions on a variety of substantive questions, including:

- The current spending and savings habits of taxpayers (specifically, spending on durable goods, non-durable goods, and housing related expenses; saving for retirement and other needs; investing in income producing assets; contributions to charity; and payment of all taxes);
- How the present and anticipated tax law, economic climate, and political climate affect these habits;
- How proposed changes in the tax law would impact these habits;
- Preferences as to how the tax law should be structured; and
- Whether the tax law should take into account income levels of taxpayers when determining taxable income, deductions, and credits.

Considerable demographic information was also collected from study participants. The usual characteristics of age, gender, occupation, level of education, income bracket, and political affiliation were collected. In addition, information on characteristics that would reasonably be expected to impact taxpayer survey responses was also collected, and includes the following:

- Do they own or rent their home?
- Do they itemize or take the standard deduction?
- Have they ever been audited by the IRS?
- Are they the main financial provider for the family?
- Are they subject to the alternative minimum tax (AMT)?

Two groups of students enrolled in an upper division business (finance) class and graduate accounting class were given the opportunity to distribute surveys to taxpayers in exchange for extra credit points. Students were provided explicit taxpayer eligibility guidelines to follow in administering the questionnaire. Approximately fifteen minutes of class time were used to discuss the guidelines in order to answer questions and to reduce the potential for confusion.

SAMPLE CHARACTERISTICS

A total of 362 completed surveys were returned as a result of this process, for a response rate of slightly more than 80%. The demographic responses revealed that most of the survey participants (48%) are white collar workers, consider their income level to be middle income (66%), and receive most of their annual income from salary or wages (85%). The majority are between the ages of twenty-one and thirty-five (43%), and the highest level of education for the majority of respondents is a college or technical school degree (51%). In addition, most respondents file the 1040 long form (51%), claim the standard deduction (61%), and typically are not subject to the alternative minimum tax (76%).

Survey participants were asked what percent of their current annual household income goes toward various spending and saving activities. A majority of respondents (55%) indicated that they spend 20 percent or more of their current annual household income on housing-related expenses. In addition, 38% of respondents spend 20 percent or more of their current annual household income on non-durable goods. The majority of respondents (over 66%) spend less than 20 percent of current annual household income on payment of taxes, and 77% spend less than 20 percent on durable goods. Finally, more than 70% of respondents indicated that they spend less than 10 percent of current annual household income on investments in income-producing assets and contributions to charity. As expected, taxpayers spend a larger portion of their current annual household income on necessities and less on luxury items.

In order to study the impact of income level on taxpayer behavior in response to tax policy changes and taxpayer perception of the tax system, the sample was divided into three groups: low income, middle income, and high income. The division was based on each survey respondent’s opinion of his/her current income level. There were 103 survey respondents who
considered themselves to be low income, 241 middle income, and only 18 high income.

Throughout the paper we report results that illustrate how the respondents answered the survey questions for the entire sample as well as the sample divided by income level. After dividing the sample by self-reported income level, we analyzed the data using t-test statistics for inequality in means between income levels. For example, the responses for each question were analyzed to see if the mean response for the low income group differed from the middle income group as well as the high income group. The same t-tests were also done to compare middle income taxpayers to high income taxpayers. T-tests that yield significant results are discussed throughout the paper.

**SURVEY RESULTS**

**Current Tax Policy**
All survey respondents were asked about the impact that the present and anticipated tax law, economic climate, and political climate have on spending and savings habits. All taxpayers agreed that present federal and/or state income tax policy and present state, national and/or global economic climate have the most impact on current spending and savings habits.

When asked to respond to the effect of current federal income tax laws on spending/saving decisions, a majority of taxpayers from all income levels contradicted their stated beliefs by responding that federal income tax law has either no effect or a slightly positive effect on various spending/savings decisions such as contributing to charities, investing in income-producing assets, spending on durable goods, spending on non-durable goods, spending on housing-related expenses, saving for retirement, and saving for other than retirement needs. The greatest positive impact was on saving for retirement and the smallest impact was on contributing to charities. This result is consistent with taxpayers filing the 1040 long form and claiming the standard deduction, as many of the survey participants indicate they do.

The only significant difference in means between groups of taxpayers was for low income versus middle income taxpayers on the question of the impact of tax policy on retirement savings. Low income taxpayers indicated that current federal income tax laws have a less positive effect on retirement savings, while middle income taxpayers indicated that federal income tax laws have a more positive effect on retirement savings.

**Potential Changes in Tax Policy**
Taxpayers were surveyed on the effect various tax policy changes might have on taxpayer spending and saving habits.

1. **Changes in Existing Income Tax Rates and/or Capital Gains Tax Rates**
The responses provided by all three groups of taxpayers, low income, middle income, and high income, suggest that taxpayers would not change or would slightly decrease spending and saving habits if regular income tax rates and/or capital gain rates were increased. The only significant difference in mean responses for questions concerning changes in income tax rate and capital gains tax rates occurred when taxpayers were asked if changes in regular income tax rates would impact that amount they invested in income-producing assets each year. The mean responses were statistically different for the low income versus the high income taxpayers, as well as the middle income versus high income taxpayers. It appears that higher income taxpayers would decrease their purchases of income producing assets more than low income or middle income taxpayers if regular income tax rates increased.

The consistency of responses across income levels is interesting. All taxpayers are more affected by an increase in regular income tax rates, while taxpayers with investments or business interests are affected by an increase in capital gain rates. Although 85% of respondents (85% of low income, 88% of middle income and 78% of high income taxpayers) indicated that the source of most of their annual income is from salary or wages, their response to an increase in capital gains tax rates was comparable to an increase in the regular income tax rate.

All groups of taxpayers generally agreed that they would not change or would slightly increase spending and saving habits if there was a decrease in regular income tax rates or a decrease in capital gain rates. However, there were a few responses which yielded significant differences. For example, when asked how a decrease in capital gains rates would impact spending on non-durable goods, saving for retirement and saving for needs other than retirement, high income taxpayers responded differently than low income taxpayers. Specifically, more high income taxpayers would be inclined to increase their spending on non-durable goods, their saving for retirement, and their saving for needs other than retirement than low
income taxpayers. Middle income taxpayers also gave significantly different responses than low income taxpayers when questioned about how decreases in capital gains rate would impact their saving for needs other than retirement. Middle income taxpayers were somewhat more likely to increase their savings or keep their savings constant if capital gains rates were decreased.

The responses to questions about how decreases in regular income tax rate would affect saving for retirement and each year were significantly different for low income versus high income and middle income versus high income taxpayers. Not surprisingly, more high income taxpayers would increase their retirement savings if regular income tax rates decreased.

2. Substantial Modification of the Current Tax Code

When asked about the impact of the repeal of the alternative minimum tax (AMT), the majority of all taxpayer respondents (about 75%) were indifferent. The t-tests for differences in mean responses did not indicate any significant differences between high income taxpayers and low or middle income taxpayers. Even though the mean responses were not significantly different, more high income taxpayers did indicate that the repeal of the AMT has the potential to slightly increase spending on durable and non-durable goods and saving for reasons other than retirement. It is interesting to note that few taxpayers thought that repeal of the AMT would increase retirement savings or contributes to charity. The demographics of this survey indicate that most taxpayer respondents were typically not subject to the alternative minimum tax (76%), which might help explain an apathetic response to a repeal of the alternative minimum tax (AMT).

It is not surprising that the number of individuals who claim the standard deduction varies widely across taxpayer income level; the mean response of each group of taxpayers was significantly different when tested using a t-test. While 84% of low income taxpayers and 55% of middle income taxpayers claim the standard deduction, only 17% of high income taxpayers claim the standard deduction. However, when asked about the impact of the elimination of all itemized deductions on spending and savings habits, all groups of taxpayers, including high income taxpayers, were relatively indifferent. The responses of high income taxpayers were only significantly different from low and middle income responses when asked about how the elimination of itemized deductions would impact retirement savings. Eighty-nine percent of high income taxpayers indicated that they would decrease their savings for retirement if itemized deductions were eliminated, but only 26% of middle income and 11% of low income taxpayers would decrease their retirement savings if itemized deductions were eliminated.

Table 1 gives the taxpayer responses to several questions about the impact of a national retail sales tax in place of the current income tax. The mean response for all three groups of taxpayers was about 3, i.e., the midpoint response, suggesting that many of the taxpayers in this sample were indifferent to the adoption of a national retail sales tax. However, there were a fairly substantial proportion of responses (more than 20%) that suggested taxpayers would slightly decrease their consumption of durable and non-durable goods if a national retail sales tax were adopted. A t-test for differences in sample means indicated that there were significant differences in means between low income and middle income taxpayers as to the effect of a national retail sales tax on their non-durable goods purchases. The means for the low income versus the high income sample were significantly different on the questions that asked about durable goods spending and spending on housing-related expenses.

**TABLE 1**

Taxpayer Perceptions of How Adoption of National Retail Sales Tax in Place of Current Income Tax Effect the Amount They Would:

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Mean</th>
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</thead>
<tbody>
<tr>
<td><strong>Low Income Taxpayers</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spend each year on durable goods</td>
<td>3.9</td>
<td>11.7</td>
<td>54.5</td>
<td>24.3</td>
<td>5.8</td>
<td>3.17</td>
</tr>
<tr>
<td>Spend each year on non-durable goods</td>
<td>4.9</td>
<td>12.6</td>
<td>48.5</td>
<td>29.1</td>
<td>4.9</td>
<td>3.17</td>
</tr>
<tr>
<td>Spend each year on housing–related expenses</td>
<td>1.0</td>
<td>20.4</td>
<td>56.5</td>
<td>19.4</td>
<td>2.9</td>
<td>3.03</td>
</tr>
<tr>
<td><strong>Middle Income Taxpayers</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spend each year on durable goods</td>
<td>4.1</td>
<td>19.1</td>
<td>48.5</td>
<td>20.3</td>
<td>5.8</td>
<td>2.98</td>
</tr>
<tr>
<td>Spend each year on non-durable goods</td>
<td>5.8</td>
<td>20.7</td>
<td>42.7</td>
<td>22.8</td>
<td>5.4</td>
<td>2.94</td>
</tr>
</tbody>
</table>
Table 2 illustrates that the majority of taxpayers in this sample, whether their income level is low, middle or high, are indifferent to the adoption of a flat tax. The highest mean score for all three groups was for the question about the impact of a flat tax on charitable contributions. There was little consensus across the three groups regarding the impact of a flat tax on other spending and saving issues. It is logical that the implementation of a flat tax would impact contributions to charity because a flat tax would presumably eliminate the mortgage interest and charitable contribution deductions. Again, in light of the fact that 61% of the taxpayer respondents claim the standard deduction, it is not surprising that the taxpayer respondents were indifferent to flat tax adoption.

Significant differences in mean scores between groups occurred in three instances. Low income and middle income and low income and high income taxpayers had significantly different means responses for the question about spending on housing related expenses as well as the question about saving for needs other than retirement. There was also a significant difference in mean responses for the low income and high income groups for the question about how a flat tax would impact retirement savings.

3. Implementation of New Deductions
Low, middle and high income taxpayer respondents all agreed that the majority of taxpayers would not change or would slightly increase spending and saving habits if there was a new deduction for sales tax or a new deduction for consumer interest expense.

As shown by Table 3, low and middle income taxpayers in this sample were indifferent to more accelerated depreciation rates and a reinstatement of the investment tax credit. These responses are consistent with the fact that 85% of taxpayer respondents derive their income from salary or wages. However, high income taxpayers saw the

### Table 2

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<th>Mean</th>
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<tbody>
<tr>
<td><strong>Low Income Taxpayers</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contribute to charity each year</td>
<td>0</td>
<td>5.8</td>
<td>76.7</td>
<td>12.6</td>
<td>4.9</td>
<td>3.17</td>
</tr>
<tr>
<td>Spend each year on housing–related expenses</td>
<td>2.9</td>
<td>15.5</td>
<td>61.2</td>
<td>17.5</td>
<td>2.9</td>
<td>3.02</td>
</tr>
<tr>
<td>Save each year for reasons other than retirement</td>
<td>3.9</td>
<td>13.6</td>
<td>59.2</td>
<td>19.4</td>
<td>3.9</td>
<td>3.06</td>
</tr>
<tr>
<td>Save each year for retirement</td>
<td>2.9</td>
<td>20.4</td>
<td>58.3</td>
<td>13.6</td>
<td>3.9</td>
<td>2.92</td>
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<td><strong>Middle Income Taxpayers</strong></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>Contribute to charity each year</td>
<td>1.7</td>
<td>7.5</td>
<td>64.7</td>
<td>19.9</td>
<td>4.6</td>
<td>3.13</td>
</tr>
<tr>
<td>Spend each year on housing–related expenses</td>
<td>6.2</td>
<td>18.7</td>
<td>56.8</td>
<td>13.7</td>
<td>2.5</td>
<td>2.81</td>
</tr>
<tr>
<td>Save each year for reasons other than retirement</td>
<td>4.1</td>
<td>22.0</td>
<td>54.4</td>
<td>14.9</td>
<td>2.1</td>
<td>2.81</td>
</tr>
<tr>
<td>Save each year for retirement</td>
<td>3.3</td>
<td>24.5</td>
<td>50.6</td>
<td>15.4</td>
<td>2.9</td>
<td>2.80</td>
</tr>
<tr>
<td><strong>High Income Taxpayers</strong></td>
<td></td>
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TABLE 3
Taxpayer Perceptions of How New Deductions and Credits Effect the Amount Taxpayers Would Invest Each Year in Income-Producing Assets

<table>
<thead>
<tr>
<th></th>
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<th>5</th>
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</thead>
<tbody>
<tr>
<td>More Accelerated Depreciation Rates</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low income taxpayer perceptions</td>
<td>1.9</td>
<td>21.4</td>
<td>62.1</td>
<td>8.7</td>
<td>2.9</td>
</tr>
<tr>
<td>Middle income taxpayer perceptions</td>
<td>4.6</td>
<td>22.8</td>
<td>59.8</td>
<td>8.3</td>
<td>2.5</td>
</tr>
<tr>
<td>High income taxpayer perceptions</td>
<td>0</td>
<td>50</td>
<td>38.9</td>
<td>5.6</td>
<td>0</td>
</tr>
</tbody>
</table>

| Reinstatement of Investment Tax Credit |         |         |         |         |         |
| Low income taxpayer perceptions | 3.9     | 23.3    | 65.0    | 4.9     | 1.0     |
| Middle income taxpayer perceptions | 6.2     | 26.6    | 56.4    | 7.1     | 2.1     |
| High income taxpayer perceptions | 0       | 72.2    | 22.2    | 5.6     | 0       |

4. The Structure of Tax Laws
Two survey questions asked taxpayers’ preferences as to how the tax laws should be structured. The questions were derived from the American Institute of Certified Public Accountants (AICPA) framework containing the ten guidelines of good tax policy (Fiore, 2002). Taxpayers at every income level felt that equity and fairness are the most important policy considerations. While all taxpayers indicated that simplicity and certainty are important policy considerations, low and high income taxpayers placed more importance on economy of calculation, whereas middle income taxpayers placed more importance on transparency and visibility.

The statements in Table 4 reveal that taxpayers at all income levels in this sample prefer lower tax rates applied to a broader tax base with fewer deductions and exemptions. These preferences are consistent with simplicity, an important policy consideration as discussed earlier. Interestingly, low and middle income taxpayers in this sample also prefer rates that increase with income levels, which is not consistent with equity and fairness, the most important policy consideration of taxpayers at every income level. Low
and middle income taxpayers also prefer varying rates applicable to different types of income. In contrast, high income taxpayers preferred the same tax rate for all types of income over varying tax rates; this preference is consistent with simplicity and equity. Developing policy that addresses equity and fairness as well as simplicity appears to be a point of contention for taxpayers in this sample.

Three survey questions asked about taxpayers’ opinion on whether the tax law should take income levels of taxpayers into account when determining taxable income, deductions and credits. Consistent with the desire for equity and fairness, the majority of respondents from all three income levels indicated that all taxpayers should include sources of income such as corporate interest and dividends, state and local interest, gifts/inheritances, child support received, and scholarships. The majority of respondents from all three income levels also indicated that no group of taxpayers should have to pay tax on life insurance proceeds. The majority of low and middle income taxpayers thought that gains from sales of investments, alimony received, and U.S. government interest should be taxable for all groups of taxpayers; high income taxpayers disagreed. Low income taxpayers also thought that social security benefits should be taxable to all taxpayers, but middle and high income taxpayers disagreed.

One final point of the interest is the fact that the majority of high income taxpayers indicated that no group of taxpayers should pay tax on unemployment benefits, public assistance payments, retirement plan/IRA distributions, or gains from the sale of a residence; the majority of low and middle income taxpayers did not agree. Because of the way this question was asked, mean responses are meaningless, and we were not able to perform t-tests on these responses.

Similarly, the majority of taxpayers from all income levels agreed that most expenses (medical expenses, child care expenses, interest expense on education loans, education expenses, retirement savings, charitable contributions, property taxes, state and local income taxes, loss on the sale of personal residence, losses on sales of investments, alimony paid, interest expense on investments, mortgage interest expense, consumer interest expense, expenses commuting to and from work, home office expenses, sales tax and depreciation on house or car), except for alimony paid, should be deductible for all groups of taxpayers. While the majority of high income respondents did think that alimony paid should be a deductible expense, slightly less than 50% of the middle income and low income taxpayers agreed. Again, mean responses are meaningless for this data because of the numerical coding scheme used, and t-tests can not be performed.

TABLE 4

<table>
<thead>
<tr>
<th>Taxpayer Preferences</th>
<th>Percentage of Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low Income</td>
</tr>
<tr>
<td>Lower tax rates applied to a broader tax base (i.e., more taxable items)</td>
<td>60.2%</td>
</tr>
<tr>
<td>Higher tax rates applied to a limited tax base (i.e., more excluded items)</td>
<td>39.8%</td>
</tr>
<tr>
<td>Lower tax rates, with fewer deductions and exemptions</td>
<td>75.5%</td>
</tr>
<tr>
<td>Higher tax rates, with more deductions and exemptions</td>
<td>24.3%</td>
</tr>
<tr>
<td>Varying tax rates applicable to different types of income (e.g., lower or higher rates for capital gains compared to ordinary income rates)</td>
<td>68%</td>
</tr>
<tr>
<td>The same rate of tax applicable to all types of income</td>
<td>32%</td>
</tr>
<tr>
<td>Variable tax rates depending on amount of reported taxable income</td>
<td>70%</td>
</tr>
<tr>
<td>One rate of tax applicable to whatever level of reported taxable income</td>
<td>30%</td>
</tr>
</tbody>
</table>

With respect to claiming tax credits, the majority of taxpayers agree that all groups of taxpayers should be able to claim the child/dependent care, education, child tax, and investment tax credits. Furthermore, the majority of taxpayers indicate that all taxpayers should be able to claim the credit for the elderly and the...
earned income credit.

In summary, although taxpayers consider federal and/or state income tax policy the most important factor affecting current spending and savings habits, most respondents indicated that many of the specifically-identified tax law changes have no effect or a slight effect (less than 10% increase/decrease from the current level) on spending or savings habits. The majority of respondents indicated that they prefer tax policy that is fair, equitable and simple. Yet when asked their preference on specific policies, it became difficult for respondents to consistently choose policy that is fair, equitable and simple. Equity and fairness interfere with simplicity in many cases. Government leaders as well as taxpayers find tax simplification a worthy but difficult goal to attain.

Taxpayers did indicate that certain tax law changes should be expected to impact taxpayer behavior. For example, all three groups of taxpayers, low income, middle income, and high income, indicated that they would not change or would slightly decrease spending and saving habits if regular income tax rates and/or capital gain rates were increased. All three groups also agreed that if a national retail sales tax were adopted, taxpayers would be likely to decrease spending on durable and non-durable goods. All groups of taxpayers, including high income taxpayers, were relatively indifferent to the elimination of all itemized deductions. However, more high income taxpayers did indicate that they would decrease their savings for retirement if itemized deductions were eliminated. All groups also indicated that adoption of a flat tax could decrease contributions to charity.

PROJECT IMPACT

The potential impact of this project is broad and multi-faceted. As mentioned previously, national organizations such as the American Tax Association are interested in the behavioral response of taxpayers to changes in tax policy, and the issue is one of national interest as Congress continues to debate potential tax reform packages. Through this research, we hope to document how taxpayers perceive and are influenced by changes in tax policy. This type of information is not available in ordinary textbooks, but it is crucial knowledge not only for policy makers at all levels of government, but also for accounting and finance students as they embark on their future careers. The results of this research should be of interest to a variety of governmental and educational constituencies as Congress and individual states deal with potential tax law changes. We plan to make the results of this research available not only to policy makers, but also to tax educators for use in the classroom and to students as they prepare for their careers. From an educational standpoint, the results of this research will enhance the accounting curriculum, where students learn about current tax law and proposed tax law changes, by allowing professors to tell their students how taxpayers behave in response to current tax law and how they would be expected to react to proposed changes. The finance curriculum, particularly investments and portfolio management classes, can also be enhanced by a discussion of the incentives and disincentives provided by the current tax system with respect to investment and saving decisions. This research, therefore, is important not only from a policy point of view but also because it has the potential to enrich the classroom experience for thousands of business students each year.

REFERENCES

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Sarbanes-Oxley Act of 2002

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ABSTRACT
The Enron debacle and similar corporate abuses of accounting rules and financial statement reporting resulted in enactment of the Sarbanes-Oxley Act of 2002 (Act). The Act dramatically changed oversight of the accounting profession and rules relating to corporate governance. Coverage of the Act is still absent from most accounting textbooks, yet accounting faculty must determine how and where to fit this important topic into the curriculum. The purpose of this paper is to provide an overview of Title I of the Act. This paper is an outgrowth of a class research project and may afford accounting faculty with information that enhances effectiveness in incorporating this important legislation into the curriculum.

SARBANES-OXLEY ACT OF 2002
Title 1 – Public Company Accounting Oversight Board
With this title, Congress has provided for the creation of the Public Company Accounting Oversight Board (the “Board”) to oversee public company audit functions and hopefully prevent further accounting scandals. The members of the five-person Board are to be appointed by the Securities and Exchange Commission (SEC), with the idea that this Board will be independent and will set clear standards to uphold the integrity of public audits, and have the authority to investigate abuses and discipline offenders.

The Board is a private-sector, non-profit corporation, to be funded primarily by fees collected from public companies and fees paid by registering firms. The Board is fully functional with the appointment of the first permanent chairperson in April 2003. William McDonough, former president of the Federal Reserve Bank of New York, chairs the Board, for which he will be paid $560,000 a year. All members, including McDonough, are appointed for five-year terms but may be removed by the commission “for good cause.” All of the Board’s operations are subject to direct and substantial oversight by the SEC.

The Board’s responsibilities include:
- registering public accounting firms (Section 102),
- establishing or adopting, by rules, auditing, quality control, ethics, independence and other standards relating to financial audit report preparation (Section 103),
- conducting inspections of registered firms (Section 104),
- conducting investigations and disciplinary proceedings (Section 105),
- recognizing, as ‘generally accepted’, any accounting principles established by a standard setting body meeting certain qualifications (Section 108).

Sec. 102. Registration with the Board.
Public accounting firms must register with the Board no later than 180 days after April 26, 2003. After this date it will be unlawful for unregistered CPAs or CPA firms to in any way participate in the preparation or issuance of audit reports. The Board will approve (or not) the application within 45 days after it is received. If the Board disapproves an application for any reason the firm will receive written notification that will be treated as a disciplinary sanction (per §105(d) and 107(c)).

The registration application contains the following information:
- the names of all clients for which the firm prepared or issued audit reports in the previous calendar year,
- the names of clients the firm expects to issue audit reports for in the current year,
- the dollar amounts the firm received from each client for audit services, other accounting services, and non-audit services,
- a statement of the firm’s quality control policies,
- a list of names and license numbers for all accountants associated with the firm who assist or participate in any way with the preparation or issuance of audit reports,
- all information relating to criminal, civil, or administrative actions or disciplinary proceedings against the firm or any individual at the firm,
copies of any disclosure filed with the SEC in the previous year that related in any way to accounting disagreements between the firm and the issuer,
- consent from the firm to cooperate and comply with any request from the SEC.
- consent from each individual employed by the firm to the firm to cooperate and comply with any request made by the SEC.

In addition, each firm is required to submit annual and possibly more frequent reports updating the application contents. All of the information in the application and subsequent periodic reports, except information violating confidentiality of individuals and information identified by the Board as proprietary, is available for public inspection.

Sec. 103. Auditing, quality control, and independence standards and rules.
As of April 26, 2003, the Board has adopted Interim Professional Auditing Standards to govern the conduct of audits of public companies. In Release No. 2003-005, the Board announced its intention to establish Professional Auditing Standards through an open process in which the accounting profession, the preparers of financial statements, the investor community, and others will have the opportunity to participate. The Board also announced in that release a plan to review existing GAAS and, when appropriate, change or establish new GAAS.

Sec. 104. Inspections of registered public accounting firms.
The Board will conduct continuing inspections of public accounting firms and their staff to ensure the adherence to this Act, the rules of the Board, and the rules of the Commission or professional standards in connection with their performance of audits. Inspections will be conducted at least annually for firms providing audit reports for more than 100 issuers and at least every three years for firms that audit 100 or fewer. Additional inspections may be conducted as the Board sees fit.

In each inspection the Board seeks to identify any act or omission to act by the CPA firm that may be in violation of the Act or the rules of the Board or Commission, or the firm’s own quality control policies or professional standards. Any identified act must be reported to the Commission and appropriate state regulatory authority. The Board will conduct investigations and take disciplinary action with respect to the violations.

The Board must do the following in conducting an investigation:
- Select certain audits and review engagements conducted by various offices and people associated with the firm. These could include audits subject to ongoing litigation.
- Evaluate the firm’s quality control system and how the firm documents and disseminates that information to its staff.
- Perform other testing of the firm’s audit, supervisory, and quality control procedures as deemed necessary.
- Public Accounting firms may be required to retain records otherwise not required by Section 103.
- The Board will provide procedures for the CPA firm to review and respond to the draft inspection report.
- All the information gathered shall be sent as a written report to the Commission and each appropriate state regulatory authority, and made available to the public.

Exceptions:
- Confidential and proprietary information will not be released to the public (as determined by the Board).
- Board criticisms of defects in the firm’s quality control system that have been adequately addressed by the firm will not be released to the public.

If the firm has provided a response to violations in the draft inspection report, or if the firm disagrees with the Board’s determination that the firm has not addressed criticisms, the firm may request an interim review.

Sec. 105. Investigations and disciplinary proceedings.
The Board has the authority to investigate any act of any public accounting firm or its staff that may violate the Act. With regards to testimony and document production the Board may demand the testimony of any firm or staff associated with the firm, any audit work papers, and the testimony and production of documents of any person, including the client, the Board considers relevant to an
investigation. The Board will also include procedures for the Commission to seek subpoenas to any person or entity the Board considers relevant to the investigation.

If a public accounting firm or its staff refuses to cooperate, the Board may:
- suspend or bar that individual from being associated with a public accounting firm,
- suspend or revoke the registration of the firm,
- invoke lesser sanctions that is deemed appropriate.

Potential violations of securities laws will be reported to the Commission to instigate action by the Division of Enforcement. The Board can also refer an investigation to any other federal or state regulator.

All documents prepared or received by the Board are confidential and privileged as evidence in any proceedings in federal or state court. All documents and information are available to the Commission and, at the discretion of the Board, to the Attorney General of the United States, and federal and state regulatory agencies. Board employees are immune from civil liability related to investigations.

With respect to disciplinary actions the Board shall specify the charges against a firm or person associated with the firm, shall notify the firm or individual, and provide an opportunity to defend against the charges. Generally speaking, records will be kept and these hearings will not be public.

The following sanctions may apply:
- suspension or revocation of registration,
- suspending or barring a person from association with a public accounting firm,
- limiting the activities or operations of the firm or individual,
- civil monetary penalties for each violation in an amount equal to not more than $100,000 for a natural person or $2,000,000 for any other person,
- for situations involving intentional, reckless, or negligent conduct, the civil monetary penalty is not more than $750,000 for a natural person or $15,000,000 for any other person,
- censure,
- required additional CPE or training,
- any other appropriate sanction.

The Board can impose sanctions against firms that fail to supervise its employees according to the Board’s rules if that employee has violated the Act. If a person has been suspended by the Board, that person cannot be associated with a public accounting firm or an issuer in an accounting or financial management capacity. If the Board imposes sanctions it shall report them to the Commission, any appropriate state regulatory authority or foreign accountancy licensing board, and the public. Sanctions will be delayed if the Board reviews any disciplinary actions.

REFERENCES
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ABSTRACT

Major changes are scheduled for the Uniform CPA exam beginning in 2004. The changes are dramatic. The exam will utilize computer-based testing. The underlying skills and knowledge necessary to pass the exam will reflect a shift in focus. Accounting educators and their accounting students should be aware of the nature of the changes. An assessment is necessary to and be able to ascertain to what extent school curriculum are adequately prepared to address the changes.

The exam changes are, in part, reflective of the AICPA Core Competency Framework for Entry into the Accounting Profession (the Framework). The examination will be given to some extent “on demand” not just in May & November. Candidates will be assessed on their written communication skills and their ability analyze and judge information for the purpose of deriving solution(s) to questions. The new exam will require candidates to perform research and search professional literature via on-line data bases.

The purpose of this paper is to provide information about changes in the exam.

THE CBT UNIFORM CPA EXAM

Exam Content
The new examination will have the four following sections:

- Auditing & Attestation (4.5 hours)
- Financial Accounting & Reporting (4 hours)
- Regulation (3 hours)
- Business Environment & Concepts (2.5 hours)

The total length of the exam will be 14 hours.

The topics covered in each section of the exam are outlined below. In all sections, except Business Environment & Concepts, the exam will be designed to test the skills needed to apply knowledge about the topic area. Auditing & Attestation section will cover the following topics:

- Auditing Procedures
- Generally Accepted Auditing Standards
- Other Standards Related to Attest Engagements

The Financial Accounting & Reporting section will cover Generally Accepted Accounting Principles for:

- business enterprises
- not-for-profit organizations
- government entities

The Regulation section will cover the following topics:

- Federal Taxation
- Ethics
- Professional and Legal Responsibilities
- Business Law

Business Environment & Concepts section will cover the following topics:

- Business Structures
- Economic Concepts
- Financial Management
- Information Technology
- Planning and Measurement

Exam Content Changes
The exam content differences are detailed in the chart below.

Current examination weights:

<table>
<thead>
<tr>
<th>Section</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auditing</td>
<td>100%</td>
</tr>
<tr>
<td>Financial Accounting &amp; Reporting</td>
<td>60%</td>
</tr>
<tr>
<td>Managerial</td>
<td>10%</td>
</tr>
<tr>
<td>Taxation</td>
<td>30%</td>
</tr>
<tr>
<td>Gov/NPO</td>
<td>10%</td>
</tr>
</tbody>
</table>

Financial Accounting & Reporting Business Enterprises 100%
“New” CBT Examination weights:
- Audit & Attest 100%
- Financial Accounting & Reporting
  - Business Enterprises 80%
  - Governmental 10%
  - Not-For-Profits 10%
- Regulation
  - Taxation 60%
  - Law & Professional Responsibilities 40%
- Business Environment
  - Business Structures 20%
  - Managerial Accounting 10%
  - New Areas 70%

Examination Format
The examination format will include both multiple choice questions and case-based simulations. Case-based simulations are assessment of knowledge and skills in a context approximating that found on the job through the use of realistic scenarios and tasks, and access to normally available and familiar resources. The simulations will be designed to:
- test integrated knowledge
- more closely replicate practice
- assess research, written communication and other skills
- analytical skills

Administrative Issues
Candidates can now request applications and register with their state accountancy boards to sit for the first CBT examination. Once a candidate receives a “notice to schedule” they can contact Prometric to schedule to take one or more sections of the exam. To schedule testing sessions a candidate should visit www.prometric.com/cpa, call 1-800-580-9648 or Call a Local Prometric Test Center. Testing will begin on April 5th, 2004.

The CBT Uniform CPA Examination will still be created and graded by the AICPA. Exam grades will be distributed by the appropriate State Boards of Accountancy. Credit for passed section(s) retained for 18 months from date exam taken. There will no longer be a minimum score requirement for failed sections.

REFERENCES

A WRITING ASSIGNMENT TO RECRUIT ACCOUNTING STUDENTS: ONE SCHOOL’S EXPERIENCE

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ABSTRACT

This article presents the processes of an assignment that incorporates the necessity of recruiting accounting majors with career advisement into communications assignments within a principles of accounting course to help enhance the critical thinking and other skills demanded by employers. The literature contains information about accounting career knowledge assignments and assignments to enhance students’ communication, critical thinking, and social skills. However, absent in the accounting education literature is information about how to incorporate an accounting major recruitment focus with a “Writing-Across-the-Curriculum” process. This article describes an example of a project that instructors can easily adopt.

INTRODUCTION

The number of students selecting to major in accounting is declining and thus fewer are entering the accounting profession than ever before. There exists a 50% decrease in the numbers of accounting majors from 1990 through 2000 (AICPA 2000). From 1999 through 2001, enrollments dropped 22%. Studies have revealed that commonly argued causes such as the 150-hour requirement, the licensing exam and continuing education are not barriers to entry (Rooney 2001). Bea Sanders, director of Academic and Career Development for the AICPA, stated, “The profession isn’t attracting people. The studies specifically probed these issues and the message clearly said that these are not barriers for students.”

Such educational programs as the MBA or the MIS major appear to be more attractive because they offer more options for career choices. Students choosing a non-accounting career path view the accounting profession as dull and boring and accounting as a major seems to be too limited (Ahmed et al. 1997). Negative, narrow and stereotypical attitudes exist. It is apparent students as a whole do not know about available career tracks and the range of activities accounting positions offer (AICPA 1992).

Educational efforts must include a focus on conveying information about accounting career options. For example, students should be counseled that majoring in accounting is an excellent path to the career areas of finance and MIS (Vangermeersch 2001). Double majors or
minors in accounting should not be underemphasized. An emphasis on recruitment needs to be incorporated into accounting courses. The Accounting Education Change Commission (AECC) Issues Statement No. 4 states that students should obtain information about career opportunities and the job search. It further provides in Position Statement No. 1 that faculty should communicate knowledge about accounting careers to their students (AECC 1990). Also, the AECC in Issues Statement No. 5 includes guidance and advising as characteristics of effective teaching. It provides that an effective teacher advises in matters relating to exploration of potential careers and job placement (AECC 1993).

This article focuses on one recruiting effort imbedded in the first principles of accounting course at a western four-year university. It uses the Writing-Across-the-Curriculum (WAC) Concept to achieve multiple academic objectives. Specifically, objectives espoused by the AAA (1986), the “White Paper” of the managing partners of the largest accounting firms (Kulberg, et.al. 1989), and the AECC Position Statement No. 1 (1990) can be focuses.

To help expand accounting career knowledge, a WAC assignment is made in the first principles of accounting course. The assignment’s contents are to choose an accounting career option to write about. Students are permitted to choose their own topics. Research about the career choice follows. This may include an interview with a professional. The final product is a written letter in response to a fellow student’s question about that accounting career. A debriefing occurs after students have submitted their letters. Selected students each make a short summary presentation about the career alternative on which he/she has written to the class section as a whole. Since the instructor knows the topics of all students prior to letter submissions due to the Peer Review process, the selection of students to make short presentations can be made in advance.

**Writing Process**

Generally, the process the student goes through to complete a written assignment does not replicate the writing process of an accountant or other business executive. For example, students receive an assignment, do some research on the topic, prepare a draft, and hand it in. Rarely is feedback received or revisions completed. Therefore, written WAC assignments were designed to create an environment that captures the elements of the traditional writing process of professionals. The traditional writing process has several well-defined steps (Laufer and Crosser 1990):

1. Creation of an environment for ideas
2. Consultation of resources
3. Outline, rough notes, and time to think
4. Completion of a first draft
5. Rereading and feedback from others
6. Revision(s)
7. Completion

The WAC writing assignments incorporate these steps to achieve the aforementioned goal. (See Appendices 1 through 4 for examples of writing assignment instructions, the assignment flow chart used at to assist students in understanding the process, and grading instrument.)

**Summary**

More accounting programs are needed to produce sufficient numbers of graduates who possess solid accounting knowledge, strong communication and analytical skills, and capabilities demanded by employers. Accordingly, accounting programs must place more emphasis on recruitment while providing opportunities for students to enhance the demanded critical skills.

This article discussed how written assignments are integrated into existing accounting principles courses. A goal was to create an atmosphere that enhanced the writing process and contributed to high-quality communications while providing students the opportunity to learn more about the accounting profession and career options. Those goals have been met.

The ultimate goal is to recruit more accounting majors by dispelling misinformation and negative perceptions of careers and options available. Although anecdotal information from students indicates the recruitment goal is being attained, definitive answers are not available. Obtaining
those outcome assessments should be the next step in the information gathering process.

We hope that the experiences shared in this article will be of value to other accounting and business educators. Information about this particular recruitment endeavor and structure of the written assignments should facilitate greater use of this approach in the classroom without excessively increasing an instructor's workload.

APPENDCIES

Appendix 1
Writing Assignment: Careers in Accounting

ACC 2010

Due: at the beginning of class time on Tuesday, April 6, 2003

The Scene: You are a student in a principles of accounting course. Your next door neighbor is a high school senior and is wondering what to major in when she gets to college next fall. Since she knows you are enrolled in the principles of accounting course, she asks you for information about a career in accounting.

So, your task is to consider a career opportunity in the accounting profession. Research that career opportunity. This activity can consist of library work, the internet, or an interview with one or more professionals in the line of work you would like to explore.

Choose only one line of work. Your classmates in the principles of accounting class will be exploring many different accounting opportunities. Therefore, you will have a multitude of alternatives to present to your neighbor.

Required:
1. Determine an accounting career to research, and complete the necessary research to sufficiently understand what the selected career alternative is all about.
2. Write a formal letter to your neighbor addressing your knowledge concerning the accounting career opportunity you researched. Be thorough in your explanations. However, remember who your audience is when writing the correspondence.

Dates: Step: Procedures:
3/20-25 Step #1 Discuss ideas with classmates, make notes, consider impact of audience on form and style of correspondence. Begin work on the assignment.

3/25-30 Step #2 Trade paper (and keep copy), for purposes of peer reviewing. You will need to select a reviewer to exchange papers with. Review your colleague’s paper and complete the Peer Review Sheet.

3/30 Step #3 Return papers (marked up) and Peer Review Sheet. Submit copies of the paper you reviewed and Peer Review Sheet to instructor.

3/30-4/6 Step #4 Edit your paper based on Peer Reviewer’s comments. Submit final letter to your instructor for grading. You may wish to visit the Writing Center for assistance from their tutors prior to submitting your paper for grading.
Appendix 2: Write-To-Communicate Assignment

Flow Chart

"Step One" Consider topic & assignment

Do appropriate thinking, reading & research... make outlines, scratch notes, etc. RESULT: FIRST DRAFT

Go to MSCD Writing Center for input, etc.

"Step Two" Exchange drafts with reviewer
(i.e. peer, fellow student, etc.)

Read peer’s paper provide constructive feedback, complete Peer Review Sheet

Make copy of Peer Review sheet and the related first draft

"Step 3"

Copy of draft & peer review sheet turned in to instructor

Copy of draft & Peer Review returned to writer

Keep the Peer Review sheet and first draft you received back from the reviewer

Work towards final draft of paper: consider input from reviewer, visit writing center, etc. Complete final draft.

"Step Four" Submit final draft of paper to instructor.
Appendix 3: Peer Review Sheet

Reviewer's Name:

Author's Name:

Audience:

Directions: Consider the following questions thoughtfully as you evaluate the draft you are reviewing. Mark the draft where you think it needs revising. Feel free to show the author possible ways to improve the paper's style, clarity, grammar, organization, or content. You will be evaluated on the thoughtfulness and helpfulness of your responses.

| I. Reader Analysis | RATING |  
|---|---|---|---|---|---|---|---|
| a. Will the reader be able to understand this document? | 1 | 2 | 3 | 4 | 5 | Def* | Yes | Yes | N/A | No | No |
| b. Is the document written in an appropriate style and tone? | 1 | 2 | 3 | 4 | 5 | Def* | |

| II. Organization | RATING |
|---|---|---|---|---|---|---|---|
| a. Does introduction identify subject and purpose of document? | 1 | 2 | 3 | 4 | 5 | |
| b. Does organization of thought follow logically? | 1 | 2 | 3 | 4 | 5 | |
| c. Is the conclusion (if necessary) consistent with the body of the paper? | 1 | 2 | 3 | 4 | 5 |

| III. Style | RATING |
|---|---|---|---|---|---|---|---|
| a. Is the document as concise as possible? | 1 | 2 | 3 | 4 | 5 | |
| b. Are the ideas presented with precision and clarity? | 1 | 2 | 3 | 4 | 5 | |
| c. Are the ideas explained concretely? | 1 | 2 | 3 | 4 | 5 | |
| d. Does any part of the paper contain too much detail? | 1 | 2 | 3 | 4 | 5 | |

| IV. Accounting Content | RATING |
|---|---|---|---|---|---|---|---|
| a. Have all relevant accounting issues been identified and addressed? | 1 | 2 | 3 | 4 | 5 | |
| b. Is the accounting content correct and complete? | 1 | 2 | 3 | 4 | 5 | |

| V. Timeliness | RATING |
|---|---|---|---|---|---|---|---|
| a. Deadlines met | 1 | 2 | 3 | 4 | 5 | |
| b. Cooperation | 1 | 2 | 3 | 4 | 5 | |
Appendix 4
Instructor Grading Sheet

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Excellent</th>
<th>Good</th>
<th>Acceptable</th>
<th>Below average</th>
<th>Unacceptable</th>
</tr>
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<tbody>
<tr>
<td>Design &amp; Appearance</td>
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<tr>
<td>Introduction</td>
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<tr>
<td>Paper organization</td>
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<td></td>
</tr>
<tr>
<td>Flow of thought &amp; Clarity of presentation</td>
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<tr>
<td>Summary/Conclusion</td>
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<tr>
<td>Analysis correct</td>
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<tr>
<td>Analysis complete</td>
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<td></td>
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<tr>
<td>Level of complexity</td>
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<tr>
<td>References/Cites</td>
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<td></td>
</tr>
<tr>
<td>Mechanics &amp; Word usage</td>
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</tbody>
</table>

- **Format**
  Is the document design appropriate? (e.g. headings, layout spacing, margins) Is the appearance eye pleasing? Reasonable quality printer and paper utilized?

- **Paper Structure**
  Does the first paragraph identify the subject of the paper? Appropriate closing/summary paragraph? Is the paper clear and concise? Does paper have smooth flow or are topics presented in choppy style? Is the tone and word choice appropriate for the audience? Is the organization and flow of thought logical and easy to follow?

- **Technical Content**
  Are the appropriate authorities utilized and correctly applied to the issue(s)? Is there support for conclusions? Is analysis appropriate and complete? Are sources and references cited?

- **Mechanics**
  Are words used properly? Does the paper contain grammar, spelling or punctuation errors? Is the paper free of mechanical and typographical errors? Are reference cites included and proper?

**GRADING:**
If all areas rated excellent than score = 100
If average rating is good than score = 85
If average rating is acceptable than score = 75
If average rating is below average than score = 65
If average rating is unacceptable than score = 50 or less

Points earned on assignment

Less: Penalty points (late, high sticking, etc.)

Plus: Writing center bonus (if applicable)

Score on paper
REFERENCES


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CONCEPTS AND CONSEQUENCES OF INTERNAL AUDITOR
JOB STRESS

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ABSTRACT

This paper presents the results of a large-scale national survey designed to examine how potential sources of job stress affect job dissatisfaction and job burnout among those in the internal auditing profession.

Using the data collected, fifteen job stress scores, a job burnout score, and a job dissatisfaction score were calculated for each respondent. After factor analysis was conducted, ordinary least squares regression was used to determine how the stressors and demographics are related to job burnout. Then ordinary least squares regression was used once more to examine how the stressors, demographics and job burnout are related to job dissatisfaction.

In the first regression, both stress factors (environmental and workload stress) had positive relationships with job burnout. In the second regression, the environmental stress factor showed a significant and positive relationship with job dissatisfaction. In contrast, the workload factor displayed an inverse relationship. The negative coefficient indicates that job dissatisfaction decreases as the workload stress factor increases, when all other variables are held constant.

Implications for the profession are clear. Managers should be aware of the burnout potential inherent in the nature of the job and take steps to reduce both environmental and workload job stress for individuals who are showing signs of burnout.
THE RELATIONSHIP BETWEEN EMBEDDED INFLATION IN TIPS BONDS AND THE GSCI

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ABSTRACT

This paper examines the relationship between estimates of expected inflation derived from analysis of Treasury Inflation Protected Securities (TIPS) bonds and inflation estimates provided by the Goldman Sachs Commodity Index (GSCI) futures prices. Specifically, we examine the correlation between weekly estimates of expected inflation derived from the July 2002 TIPS bond and inflation estimates derived from weekly prices of the GSCI second nearest to expiration futures contract. We also compare the volatility of the TIPS estimates to the volatility of those derived from the GSCI. The time period of the study is based on data availability and runs from August 1, 1997 through July 20, 2001.

INTRODUCTION

This paper studies the relationship between expected inflation estimates derived from two sources: Treasury Inflation-Protected Securities (TIPS bonds) and the Goldman Sachs Commodity Index. We test whether the estimates from the two sources are related. This research is important since an unbiased estimate of the rate of future inflation will more adequately enable traders in the fixed income markets to price fixed income securities. The identification of an appropriate index that would provide an unbiased estimate of future inflation would be an important piece of information.

BACKGROUND

Treasury Inflation-Protected Securities
TIPS were first issued by the U. S. Treasury in January, 1997. The securities offer investors protection against inflation in the following ways. First, the principal amount purchased by an investor is adjusted quarterly, on a lagged basis, using the Consumer Price Index (CPI); and, at maturity, the investor will receive the resulting inflation-adjusted value of their bond holdings. Second, the coupon that is paid semiannually on the TIPS reflects the stated real rate of return relative to the inflation-adjusted principal amount (DePrince and Ford, 1998). The tax characteristics of the TIPS tend to limit the interest of investors. The IRS taxes both the semiannual interest payments paid to the investor and the accretion to principal that occurs even though it is not yet received. Partly owing to these tax consequences, the size of the market for TIPS is relatively small compared to the entire market of Treasury securities. In 1998, the size of the TIPS market was US$107 billion (McCulloch & Levis, 1998). By July, 2003, the market was US$165 billion compared to US$2.48 trillion for all marketable Treasury Notes and Bonds (McCulloch, 2003). Thus, TIPS currently make up 6.7% of the entire Treasury market. Nevertheless, the potential importance of TIPS within the marketplace cannot be overstated. As noted in 1997 by then-Treasury Secretary Rubin, evidence existed that investors demanded compensation for the uncertainty associated with future inflation. Investors would impound a premium into the yields on conventional Treasury securities reflecting their estimate of future inflation.

Goldman Sachs Commodity Index
The Goldman Sachs Commodity Index (GSCI) is a world-production weighted index that currently contains 26 commodities representing all of the major commodity sectors, including six energy commodities (crude oil, Brent crude oil, unleaded gas, heating oil, gasoil, and natural gas), five industrial metal
commodities (aluminum, copper, lead, nickel, and zinc), two precious metal commodities (gold and silver), nine agricultural commodities (wheat, red wheat, corn, soybeans, cotton, sugar, coffee, cocoa, and orange juice), and three livestock commodities (live cattle, feeder cattle, and lean hogs). The quantity of each commodity in the index is based on the quantity of world production of that commodity during the last five years. Given this, the energy sector, as of August 15, 2003, represented 66.9% of the GSCI, the agricultural sector represented 17.2%, livestock represented 7.2%, industrial metals represented 6.3%, and precious metals represented 2.4% (Goldman Sachs webpage: www.gs.com/gsci/). The GSCI reflects a passive portfolio of long positions in the futures contracts of those commodities in the index. Nevertheless, even though the index is a “passive” index, changes to the index have to be made on a regular basis since futures contracts expire. Without going into too much detail, the roll process takes place from the end of the 5th business day of a particular month until the end of the 9th business day of that month, with 20% of the contracts rolling from the nearby contract to the second nearby contract each business day. By the end of the 9th business day, the GSCI contract contains 100% of the second nearby contracts of the commodities in the index.

The pricing of TIPS in the marketplace may prove to be an easier, more accurate exercise if an investor has a reasonably accurate measure of the rate of inflation. The GSCI, given its composition, could prove to be a useful measure of inflation in this regard. While other measures of expected inflation in the U.S. are produced on a regular basis, deriving such estimates via the GSCI is relatively low-cost and simple.

LITERATURE REVIEW

The study of expected inflation, including measuring and forecasting its rate of change, is tied strongly to the study of the relationship between nominal rates of return and the rate of expected inflation. Fisher, in his seminal work on the subject (1896) argued that rational investors operating in a competitive market would demand compensation for the affects of the loss of purchasing power. He argued that the nominal return (N) would approximately equal the sum of the expected real rate (R) and expected inflation (I); thus, he hypothesized that R and I are independent of each other and that any change in I would be incorporated directly into N on a one-for-one basis. Mundell (1963) argued that the presence of inflation would lead individuals to increase their earnings to make up for the decline in their real wealth caused by an increase in I. This action by savers would cause R to decline. Thus, changes in N would be less than one-for-one with changes in I. Darby (1975) argued that changes in N will be greater than one-for-one with changes in I since any increase in I will cause investors to demand even higher levels of R.

Several studies have tested these ideas. Mishkin (1992) found no relationship between short-term interest rates and expected future inflation in the U.S., but he did hypothesize that a long-run relationship exists. Evans and Lewis (1995) could not reject the hypothesis of the presence of a long-run Fisher effect. Kandel, et al. (1996) found evidence supporting the hypothesis of both Mundell and Darby, but not Fisher. In their study of TIPS bonds, Laatsch and Klein (2003) could not reject the hypothesis of a one-for-one relationship between changes in N and changes in I.

Methods used to forecast inflation have been the focus of much research. Two recent studies are noted here. Thomas and Grant (2000) performed a study of various models used to forecast inflation. These models included theoretical auto-regressive integrated moving average (ARIMA) models as well as structural models. The study also considered the results of two well-known surveys – the Livingston Survey and the Michigan Survey. The Livingston Survey is conducted by the Federal Reserve Bank of Philadelphia and involves sampling professional economists on a semi-annual basis. These economists are queried as to their forecast of the level of key economic variables, including inflation (represented by the CPI), several months ahead. The results of the Michigan Survey, by contrast, are based on responses to questions provided by more than 500 Michigan respondents who are solicited by telephone. The results provided by Thomas and Grant indicate that simple methods of forecasting inflation, such as through the use of surveys, were not significantly inferior to results provided through more sophisticated models.

Saitta (1999) provides a straightforward study of the strength of the relationship between inflation forecasts derived from various commodity-based indices and the rate of inflation as measured by the CPI. Saitta measured the degree of correlation between the rate of change in the level of each index and the rate of
change in the CPI. The indices that are compared are the Commodity Research Bureau (CRB) Futures Index, the CRB Spot Index, the Journal of Commerce Industrial Price Index, and the GSCI. The correlation analysis indicated that over the entire 20 year time period of the study (1979-1998), the GSCI had the strongest correlation with the rate of change in the CPI with a correlation coefficient as high as 0.72 (in the 1995-98 time frame). The results of these studies, and others (e.g., Fama and Gibbons, 1984), indicate that forecasters and traders can adopt relatively simple forecasting methods and still be able to reasonably estimate expected inflation. Thus, continued study of the GSCI as a means to forecast expected inflation seems reasonable.

DATA AND METHODOLOGY

TIPS
We collected ask prices for one TIPS bond (maturing July, 2002) and twenty-three ordinary U. S. Treasury bonds as reported weekly in Barron's. The time period of the study runs from August 1, 1997 through July 20, 2001. The non-seasonally adjusted consumer price index (CPI-U) based adjustment values, which are used to adjust the coupon and principal of the inflation adjusted bonds, were downloaded from the Bureau of Public Debt website: http://www.publicdebt.treas.gov/of/ofinflin.htm.

As its name suggests, the index ratio is the CPI-U on the coupon date divided by the base period CPI-U. The adjustments incorporate a lag such that the January 1st index ratio is actually based on the October CPI-U and the February 1st ratio is based on the November CPI-U. The index ratios for the remaining days of the month of January are linear interpolations of the beginning and ending January index ratios. The daily index ratios for every month in the year are similarly calculated. The November CPI-U is typically released by the Bureau of Labor Statistics in mid-December. Thus, one knows, with certainty, in mid-December, the coupons to be paid on the 3+5/8 Jul 02 TIPS bond are linearly interpolated from the beginning and ending December index ratios to generate the daily index ratios for the days of December. In a similar fashion, the July 15th coupon is known around mid-June.

For a discussion of the bootstrapping algorithm used here, see John Burr Williams' classic text *The Theory of Investment Value* (1938), pp.120-124. For a more recent treatment see Taggart (1996).

The nominal (not inflation-adjusted) bond prices collected are first used to generate the nominal, zero-coupon, present value factors associated with the coupon/maturity dates of each bond. Most of these bonds have coupon/maturity dates of the 31st of the month, although some have coupon/maturity dates of the 15th. The bootstrapping algorithm presented below generates the nominal present value factor for each of the ten coupon/maturity dates associated with the 3+5/8 July 02 TIPS bond, iteratively, beginning with January 15, 1998 and proceeding, in turn, to July 15, 2002 (the maturity date of the July 02 TIPS bond). For those nominal bonds with coupon/maturity dates on the 31st, the bootstrapping algorithm adjusts their present value factors to the 15th by either (1) discounting the factor an additional 16 days at the zero-coupon spot rate discovered by the algorithm (for settlement dates before the 15th or after the 31st of either January or July) or by (2) compounding the present value factor out to the next coupon/maturity date at the discovered spot rate (for settlement dates after the 15th of January or July but prior to the 31st of January or July).

The 3+5/8 Jul 02 inflation protected bond itself is not used in the bootstrapping. When multiple quotations are available for a date, the average present value factor is used as the present value factor for that date. The invoice prices used in the bootstrapping algorithm assume that settlement is on the Monday following the quotation date, unless the market is closed, in which case the following Tuesday is used as the settlement date.

Let $Z_i$ stand for the $i^{th}$ coupon/maturity date's nominal present value factor. Let $IP$ denote the invoice price of the bond on the settlement date, let $C$ be the bond's (annual) coupon, and allow $M$ to be the bond's maturity payment. For $i = 1$ (i.e., for the bond maturing on January 15, 1998)

$$Z_i = \frac{IP_1}{C_1/2 + M_1}$$  \[1a\]

while for $1 < i \leq 10$ (i.e., bonds maturing from July 1998 through July, 2002, in order),

$$Z_i = \frac{\left[ IP_i - (C_i/2) \right]}{C_i/2 + M_i}$$  \[1b\]

For discussion of the bootstrapping algorithm used here, see John Burr Williams' classic text *The Theory of Investment Value* (1938), pp.120-124. For a more recent treatment see Taggart (1996).

The ten $Z$ values per settlement date that result from equation $[1a,b]$ provide the market's then current statement as to the present value of $1.00 to be received on the relevant coupon/maturity date. The 3+5/8 Jul 02 inflation protected bond pays coupons on the first nine coupon/maturity dates and matures.
on the tenth date. To avoid (quasi-) arbitrage, the present value per dollar of the inflation-protected coupons and maturity must be consistent with the Z factors estimated above. Of course, the precise dollars of coupon and maturity that the inflation-protected bond will pay on each of these dates is not known on the settlement date (although the lag in the CPI used to make the inflation adjustment allows one to know the value of the next coupon when it is within an approximately one-month window).

The invoice price of the inflation-protected bond, $IP_{(i)}$, must reflect the consensus estimate of expected inflation. That is,

$$IP_{(i)} = \left( \frac{AC}{2} \right) (1+I)^{t_1} Z_1 + \left( \frac{AC}{2} \right) (1+I)^{t_2} Z_2 + \ldots + \left( \frac{AC}{2} + AM \right) (1+I)^{t_{10}} Z_{10}$$

where AC stands for the adjusted coupon value and AM is the adjusted principal value using the index adjustment already “built-in” as of the settlement date; I is the expected annual inflation rate; and, $t_1$, $t_2$, … $t_{10}$ are the times, expressed in years or fractions thereof, between the settlement date and the relevant coupon/maturity dates. Equation [2] makes no attempt to estimate the term structure of expected inflation. It merely provides a point estimate of expected inflation for each week in the study. Furthermore, our methodology cannot distinguish between inflation per se and any possible inflation uncertainty premium.

The adjusted principal is calculated by multiplying the initial par value of the bond (100) by the index ratio for the settlement date. The adjusted coupon is the coupon rate times this adjusted principal value. Estimates of expected inflation, I, are calculated by setting I equal to the value that generates an $IP_{(i)}$ using equation [2] which is equal to the actual invoice price of the inflation-protected bond (within ± 0.01 per cent of the actual invoice price).

Estimates of the nominal rate of return, N, for each week, are the weighted averages of the nominal spot rates implied by [1a] and [1b]. The weights used are the present values of the adjusted coupons and adjusted maturity of the July 02 TIPS bond relative to the sum of these present values. Nominal rates so calculated are the equivalents of yields-to-maturity (Santomero and Babbel, 1997). As these weighted averages are based on the zero-coupon equivalent spot rates determined by [1a] and [1b], potential distortions caused by semi-annual compounding do not result.

Estimates of the real rate of return, R, are fashioned from the Fisher equation:

$$(1 + N) = (1 + R) (1 + I)$$

These estimates of N, R, and I are stated in annual terms. All three are calculated with reference to the implied zero-coupon spot rates of [1a], [1b], and [2]. They thus avoid potential distortions caused by any given compounding assumption, semiannual or otherwise. Two-hundred eight weekly sets of estimates of N, I, and R, spanning the time period of the study, are generated from applying equations [1], [2], and [3] to the data.

GSCI

Prices of the Goldman Sachs Commodity Index near and next-near futures contracts were collected from Barron’s. When available, the spot contract was also collected (the spot contract value was not reported in Barron’s before May 18, 1998). If available, the spot and the near contract were used to calculate the implied rate of inflation. Otherwise, inflation was estimated using the near and next-near contracts. The implied rate of inflation was calculated as the percentage change between the two contracts, annualized without compounding. We rolled to the next contracts when the near contract moved to within 13 days of expiration. Due to missing quotations, only 200 estimates of inflation were generated from the GSCI data.

EMPIRICAL RESULTS

Table 1 provides the simple statistics for the estimates of inflation from the TIPS bonds and from the GSCI contracts. Note the large differences between the estimates based on the TIPS bond and those based on the GSCI futures contract. The GSCI estimates are much larger on average, and far more variable.

Table 2 shows the correlations between the TIPS-based estimates and the GSCI-based estimates. Pearson correlation, Spearman’s rho, and Kendall’s tau all confirm the result – the two sets of estimates are not highly correlated, although the Spearman and Kendall results support (at a 5% significance level) the hypothesis that the correlations are different from zero.
Table 1
Simple Statistics

<table>
<thead>
<tr>
<th></th>
<th>Inflation Estimates from the TIPS Bond Study</th>
<th>Inflation Estimates Embedded in the GSCI Quotations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>208</td>
<td>200</td>
</tr>
<tr>
<td>Mean</td>
<td>0.01919</td>
<td>0.09141</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>0.00507</td>
<td>0.48937</td>
</tr>
<tr>
<td>Median</td>
<td>0.01949</td>
<td>0.00037</td>
</tr>
<tr>
<td>Minimum</td>
<td>0.00705</td>
<td>-0.74201</td>
</tr>
<tr>
<td>Maximum</td>
<td>0.02924</td>
<td>2.86278</td>
</tr>
</tbody>
</table>

Table 2
Correlations (p-values for H0: = 0 in parentheses)

<table>
<thead>
<tr>
<th></th>
<th>Pearson</th>
<th>Spearman</th>
<th>Kendall</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.13075 (0.0650)</td>
<td>0.14301 (0.0434)</td>
<td>0.09584 (0.0439)</td>
</tr>
</tbody>
</table>

Table 3
Correlations (p-values for H0: = 0 in parentheses)
Clipping GSCI Outliers > ± 2 Std. Dev.

<table>
<thead>
<tr>
<th></th>
<th>Pearson</th>
<th>Spearman</th>
<th>Kendall</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.14111 (0.0420)</td>
<td>0.15548 (0.0249)</td>
<td>0.10185 (0.0291)</td>
</tr>
</tbody>
</table>

Table 4
Correlations (p-values for H0: = 0 in parentheses)
Clipping GSCI Outliers < 0.0091 or > 0.0293

<table>
<thead>
<tr>
<th></th>
<th>Pearson</th>
<th>Spearman</th>
<th>Kendall</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.07079 (0.3096)</td>
<td>0.09003 (0.1960)</td>
<td>0.07290 (0.1929)</td>
</tr>
</tbody>
</table>

Table 3 reports the results of re-running the correlations analysis after “clipping” all GSCI estimates that have absolute values more than two standard deviations above or below the mean. That is, values below -0.8873 were reset to -0.8873 and those in excess of 1.0702 were reset to 1.0702.

Table 4 reports the correlations when the clipping occurs at ± two standard deviations based on the TIPS estimates. That is, GSCI-based estimates below 0.0091 were reset to 0.0091; estimates above 0.0293 were reset to 0.0293.
Little changes in the results. The correlations remain low, although in Table 3 they are statistically significantly different from zero.

**CONCLUSIONS**

This paper provides evidence that inflation estimates taken from TIPS bonds and inflation estimates based on Goldman Sachs Commodity Index futures are not highly correlated. It is doubtful that GSCI futures trading can provide hints as to when TIPS bond markets may be mis-priced, and vice-versa. The estimates based on TIPS bonds appear to be more reasonable given the levels of inflation experienced over the period of the study. Furthermore, the GSCI based estimates are so erratic as to cast doubt on using these contracts to gain insight into inflation in general. GSCI contracts appear to not be useful hedges against inflation; they have too much basis risk because of their excess variability. Follow on research may attempt to explain this failure of the GSCI to capture inflation expectations and to provide a useful hedge.

**REFERENCES**


ABSTRACT

The Internal Revenue Service has proposed changing the treatment of unutilized basis in a stock redemption that is treated as a distribution of a dividend under Internal Revenue Code Section 301. These proposed regulations would replace the adjustment to basis rule of Reg. 1.302-2(c), with a rule allowing a loss in the amount of the unutilized basis in a year subsequent to the year of the redemption. While primarily intended to prevent taxpayer’s from using “basis-shifting tax shelters” to create tax losses, if enacted these regulations will have a significant impact on all stock redemptions. The proposed regulations have not been well received by practitioners, however, and several questions regarding their implementation remain. This paper reviews the proposed regulations and discusses alternative methods of addressing “basis-shifting tax shelters.”
A Multivariate Comparative Examination of Deposit Generation in Banks and Credit Unions

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ABSTRACT

Using a sample of 63 community banks and 58 credit unions operating in a rural Great Plains state, nonparametric efficiency models were estimated for deposit generating activities. Technical efficiency estimates were computed for each observation for a three year study period. In each year of the study period community banks reflected greater technical efficiency than did credit unions. The majority of community banks and credit unions exhibited decreasing returns to scale when compared to the data set. To control for variations in local operations, virtual observations were projected for each financial institution to estimate industry segment differences between community banks and credit unions. Relative efficiency estimates for the virtual observations were consistent with estimates using actual observations. There were no significant shifts in returns to scale when modeling benchmark observations. The evidence appears to suggest community banks are relatively more efficient in deposit generation than are credit unions.

This paper reports the results of a comparative study of the costs of generating deposits for community banks and credit unions in one rural Great Plains state. Community banks and credit unions display similar characteristics in terms of geographic limitations to their market area, relatively limited customer base and type of financial products offered to consumers. The two types of institutions operate in a competitive environment seeking deposits which can be converted into earning assets. Although the financial services market is relatively similar for the two types of institutions, the regulatory environment differs between the two segments. As cooperatives, credit unions are deemed not-for-profit institutions and are not subject to federal taxation. The question arises as to whether credit unions operate as efficiently as community banks in operating activities, specifically, in this case, in attracting deposits to the institution.

Customer deposits in financial institutions provide a foundation for lending activities. In the case of credit unions it is a function of members pooling their resources to make such resources available for lending to other members. For community banks deposits from the community are converted into loans to other members of the community. The cost of acquiring deposits reduces either the rate of return depositors can earn or it reduces available resources that might be loaned to borrowers. Minimizing these costs leads to potential benefits for depositors and borrowers. Identifying potential areas of efficiency improvement in financial institutions is a step in economic development.

DATA ENVELOPMENT ANALYSIS

The differentiation approach used in this study was first reported by Charnes, Cooper and Rhodes (1981) in an analysis of the effects of an education reform program. Another instance of this approach was used by Zenios, Zenios, Agathocleous, and Soteriou (1999) as they looked at location effects of rural and tourist oriented bank branches of the National Bank of Cyprus.

The methodology used to estimate the relative efficiencies is nonparametric. To be consistent the statistical techniques were also nonparametric in
nature. Because DEA estimates relative efficiencies groups cannot be compared directly unless they are included in a common set of observations during the DEA evaluation process.

Data envelopment analysis was first set forth by Farrell (1957) in a special case single-input/single-output technical efficiency model. Charnes, Cooper and Rhodes (1978) generalized the special case model by applying mathematical programming to construct a single “virtual” input and a single “virtual” output from multiple variables. This non-parametric approach calculates a discrete piecewise frontier for each observation rather than optimizing a single regression plane for all the data. The focus of data envelopment analysis is on individual observations in contrast to the emphasis on averages associated with other statistical approaches.

Data envelopment analysis does not require assumptions about the functional form of relating independent variables to output variables. The analysis calculates a maximum performance measure relative to all other observations in an observed population. The sole requirement is that each observation either lies on or below a frontier function. An observation that lies below the frontier is classified as inefficient and the analysis identifies the source and level of the inefficiency.

The issue of relative efficiency depends on the orientation of the model. Charnes, Cooper and Rhodes identified two primary orientations: input and output. In an input orientation, a DMU is not efficient if it is possible to augment any output without increasing any input and without decreasing any other output. In an output orientation, a DMU is not efficient if it is possible to decrease any input without augmenting any input output and without decreasing any output. In the oriented evaluation systems all excess input and output slack are valued at a negligible value.

The various DEA models evaluate efficiency based on three essential components: the form of the envelopment surface, orientation, and relative tradeoffs implicit in the lower multiplier bounds (Ali, Lerme and Sieford 1995). An inefficient DMU can be made fully efficient by projection onto a point \((X_0, Y_0)\) on the envelopment surface. The selected point of projection is dependent on the orientation of the model employed (Charnes, Cooper, Lewin and Sieford, 1994, 31; Ali, Lerme and Sieford 1995).

The notation for the model definitions is as follows. It is assumed there are \(n\) DMUs to be evaluated. Each DMU consumes varying amounts of \(m\) inputs to produce \(s\) different outputs. DMU \(i\) consumes \(X_{il} > 0\) of input \(i\) and produces \(Y_{il} > 0\) of output \(r\). \(X_i\) and \(Y_i\) denote the vectors of input and output values for DMU \(i\) while the \(m \times n\) matrix of inputs is denoted \(X\) and the \(s \times n\) matrix of outputs is denoted \(Y\). \(\lambda\) is the vector of lower multiplier bounds that optimizes the efficiency measure for DMU \(i\). The \(s\)-vector \(s_i\) is the vector of output slacks and the \(m\)-vector \(e_i\) is the vector of excess inputs. The vectors \((u_i, v)\) are the coefficients of the objective function.

In the envelopment-projection models the vectors \((u_i, v)\) are the coefficients of the objective function and a component of the evaluation mechanism. The projection of an efficient DMU to an efficient point \((X_0, Y_0)\) on the envelopment surface depends on the values of the vectors \((u_i, v)\).

By pooling all observations and calculating the relative efficiency of each observation the resulting efficiency score reflects the proportion of output obtained relative to the virtual reference set for the observation. Such efficiency variances may be attributed to management but the situation is more complex in that some observations operate in alternate environments (Charnes, Cooper and Rhodes 1981). This pooled analysis identifies the combined inefficiencies that arise from variations in the environment and variations of the observations within their respective environments. Later analyses which isolate differences between the environments and differences of the observations within the environments may also allow for estimates of interactions of the between group and within group

<table>
<thead>
<tr>
<th>Figure 1</th>
<th>Generalized Data Envelopment Analysis Models</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Constant Returns to Scale</strong></td>
<td><strong>Variable Returns to Scale</strong></td>
</tr>
</tbody>
</table>
| \[
max \quad z = \phi + \mu (Ss + Ss) \\
\text{s.t.} \quad \varphi Y - YX + s' = 0 \\
X\lambda - s' = X_0 \\
\lambda, s', s \geq 0
\] | \[
max \quad z = \phi + \mu (Ss + Ss) \\
\text{s.t.} \quad \varphi Y - YX + s' = 0 \\
X\lambda - s' = X_0 \\
S\lambda = 1 \\
\lambda, s', s \geq 0
\] |

Source: Charnes, Cooper, Lewin and Sieford (1993), pages 34, 39
inefficiencies.

To test for possible differences between programs it was first necessary to control for variations created by the management of the individual observations. This was accomplished in three steps. In the first step DEA models were run for each observation and virtual observations were created by projecting the observations to the efficiency frontier as suggested by Charnes, Cooper and Rhodes (1981) and Zenios, et al. (1999). The virtual observation reflects the existing input or output relationships in relation to the efficient reference set for each observation. This step was completed using both an input orientation and an output orientation. Later analysis suggests that although the projections to the virtual observation differs depending on the orientation, the efficiency scores are not affected.

Scale efficiency is an estimate of how an observation operates relative to the observations that define the efficiency envelope. This study is based on an output orientation so scale efficiency is based on the possible changes in output assuming changes in the quantities of inputs holding the input mix constant. Returns to scale are estimated in reference to observed productivity of other observations, not in reference to observed productivity of an observation over time. Returns to scale can be estimated by reference to the projections of the observed data using the constant returns to scale assumption of Banker, Charnes and Cooper (1984). An observation is assumed to exhibit constant returns to scale if marginal productivity is equal to average productivity. Any observation operating at or projecting on to the CCR efficiency frontier is assumed to be operating at constant returns to scale (Seiford and Zhu 1999). An observation operating at or projecting on to the BCC efficiency frontier is assumed to be operating at non-constant (increasing or decreasing) returns to scale. An observation is assumed to be operating at increasing (decreasing) returns to scale if marginal productivity is greater (lesser) than average productivity defined by the data set.

Banker, Charnes and Cooper (1984) defined the process to examine returns to scale locally on the efficiency frontier and related it to the sign of the intercept of the hyperplane which defaults that frontier. the hyperplane given by

\[ S u^* y - S v^* x - u^*_0 = 0 \]

is a supporting hyperplane of the efficiency frontier for the observed data set \( u^* \), \( v^* \) and \( u^*_0 \) are coefficient estimates that maximize the objective function of the efficiency model. \( u^*_0 \) is the constant term of the hyperplane that defines a facet of the variable returns to scale envelopment surface on which the projected point lies. The coefficients of the hyperplane are good by the prices estimated in the modeling process.

The Mann-Whitney-Wilcoxon test was used to determine if there was a difference between the two populations in the annual examinations. The hypothesis for the annual evaluation is that there is no statistically significant difference between the rankings of community banks and credit unions who the efficiency estimates are ordered from most efficient to least efficient.

\[ H_0: \text{The two populations are identical in terms of technical efficiency} \]

The Kruskel-Wallis test was used to determine whether there was a statistically significant difference between the two populations when all three years were evaluated at once. The hypothesis for the evaluation of the pooled data is that there is not statistically significance among the rankings for the community banks and credit union in the three years of the study period when the efficiency estimates are ordered from most efficient to least efficient.

\[ H_0: \text{All populations are identical in terms of technical efficiency} \]

The chi-square test was used to test for independence when evaluating the returns to scale estimates. The hypothesis for the evaluation was the relationship between marginal productivity and average productivity (returns to scale) was independent of the type of institution.

\[ H_0: \text{Classification by returns to scale is independent of type financial institution} \]

**THE DATA SET**

Data were collected for each community bank reporting a South Dakota headquarters. Dependent variables included “Total Transaction Accounts” and “Total Nontransaction Accounts.” Transaction accounts include checking accounts and similar demand accounts. Nontransaction accounts include savings accounts and certificates of deposit. Independent variables included Interest Expense on Deposits, Total Noninterest Expense, Salaries &
Employee Benefits, and number of Full Time-Equivalent Employee. Interest expense on deposits reflects the dollar amount banks spend on customer deposits. Total noninterest expense reflects the cost of operating the institution excluding employee compensation and benefits. Employee costs are represented by two independent variables: compensation and benefits and number of employees. Employee compensation and benefits reflect the financial costs of personnel providing service to customers. The cost of employee compensation and benefits when measured in conjunction with the number of full-time equivalent employees provides an estimate of relative employee costs.

Data were also collected for each active credit union operating in the state of South Dakota. Dependent variables included “Total Shares and Deposits.” Credit unions, as cooperatives, report ownership interests based on the amount of deposits. Total shares and deposits are divided into “share drafts” which reflect share draft accounts and other demand deposit type accounts. Share drafts were identified for this study as transaction accounts. The remainder of the shares and deposits were classified as nontransaction accounts. Independent variables included cost of funds, total other operating expenses, salaries and benefits and an estimate of number of employees. Cost of funds included dividends on shares and interest on deposits. These costs are comparable to the interest on deposits reported by commercial banks. Other operating expenses included all reported operating expenses except salaries and benefits (included as a separate variable) and provision for losses on loans and leases. The provision for loan losses and leases were omitted from both samples because it reflects a management decision based on loan performance and does not directly impact the cost of generating deposits in a given year. Salaries and benefits were included as a variable and reflect the financial costs of personnel providing service to customers. Credit unions report the number of full-time employees [more than 25 hours per week] and part-time employees [less than 26 hours per week]. For purposes of this study an estimate of full-time equivalency was computed by treating each full-time employee as a full-time equivalent and each part-time employee as a half-time equivalent.

Data were collected for sixty-three community banks and fifty-eight credit unions for the years ended December 31, 1999, 2000, and 2001. Commercial banks reflected on average approximately three time the level of nontransaction deposits and total deposits than were reported by credit unions. The average cost of funds as estimated by interest costs divided by nontransaction deposits were higher for commercial banks in all three years of the study period. When total deposits were used as the denominator for calculating the average cost of funds, credit unions reported higher rates of return. This reflects the proportionately larger transaction deposits reported by commercial banks. The average number of employees reported by commercial banks was approximately twice the number of employees reported by credit unions. The average compensation and benefits cost per employee was approximately fifty percent greater for commercial banks as compared to credit unions. Summary statistics for deposit amounts, cost of funds and compensation costs per employee are shown in Table 1.

In terms of absolute numbers, community banks are, on average, about three times larger than credit unions. Transaction accounts represent a relatively

<table>
<thead>
<tr>
<th>Year Ended</th>
<th>N</th>
<th>Average Deposits (000 omitted)</th>
<th>Average cost of funds</th>
<th>Employees</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Nontransaction Deposits</td>
<td>Total Deposits</td>
<td>Nontransaction Deposits</td>
</tr>
<tr>
<td>December 31, 1999</td>
<td>63</td>
<td>$23,357</td>
<td>$33,024</td>
<td>5.412%</td>
</tr>
<tr>
<td>Banks</td>
<td>63</td>
<td>$8,107</td>
<td>$9,313</td>
<td>4.653%</td>
</tr>
<tr>
<td>Credit Unions</td>
<td>58</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>December 31, 2000</td>
<td>63</td>
<td>$24,533</td>
<td>$34,645</td>
<td>5.855%</td>
</tr>
<tr>
<td>Banks</td>
<td>63</td>
<td>$8,805</td>
<td>$10,163</td>
<td>5.083%</td>
</tr>
<tr>
<td>Credit Unions</td>
<td>58</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>December 31, 2001</td>
<td>63</td>
<td>$26,134</td>
<td>$36,779</td>
<td>5.524%</td>
</tr>
<tr>
<td>Banks</td>
<td>63</td>
<td>$9,840</td>
<td>$11,384</td>
<td>4.859%</td>
</tr>
<tr>
<td>Credit Unions</td>
<td>58</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
larger percentage of total deposits for community banks with a correspondingly higher average cost of funds. Community banks reflected approximately 25 percent greater total deposits per full-time equivalent employee than was reported by credit unions. The average community bank reported on average twice as many full-time equivalent employees and a greater average cost per full-time equivalent than was reported by the average credit union, but the dollar amount of total deposits reported per dollar of compensation and benefit cost was only marginally different when comparing community banks and credit unions. The difference appeared to be greater when comparing the total nontransaction deposits per dollar of compensation and benefit cost was only marginally less for community banks than for credit unions, perhaps reflecting the difference in the relative levels of transaction deposits between the two groups.

**Technical and Scale Efficiency Estimates of Individual Institutions**

DEA models were estimated for each year using both the Charnes, Cooper, and Rhodes (1978) constant returns to scale models and the Banker, Charnes, and Cooper (1984) variable returns to scale models. Institutions reflecting the most transaction deposits and nontransaction deposits for a given quantity and mix of input resources define the efficiency frontier and are described as operating at maximum relative technical efficiency. Commercial banks outnumbered credit unions on the efficiency frontier when individual institutions comprised the data set. Consistent efficient observations were identified when assuming constant returns to scale or variable returns to scale. The relative number of commercial banks to credit unions on the efficiency frontier remained consistent across the three years of the study period and when the three years were pooled into a single data set. The number of commercial banks and credit unions defining the efficiency frontier for each year are reported in Table 2, Panel A.

Observations were ranked from most efficient (frontier observations) to least efficient for each year. In each year community banks ranked better (more efficient) than credit unions. In all three years the difference in rankings was statistically significant when constant returns to scale were assumed. When variable returns to scale were assumed the differences in rankings were statistically significant in the first and last years (1999 and 2001) of the study period. Results of the annual model are summarized in Table 2, Panel B. Observations were classified as exhibiting increasing returns to scale, constant returns to scale, or decreasing returns to scale relative to other observations in the data set. Both community banks and credit unions showed a majority of their observations as exhibiting decreasing returns to scale. This suggests that a majority of the institutions in the data set could increase their technical efficiency by reducing the quantity of input resources (holding the resource mix constant). The probable result is expected to be a reduction in total deposits, but the relative decrease in resource consumption is greater than the relative decrease in deposits generated. There was no significant difference in the distribution of community banks and credit unions in the first two years of the study period. This may be a function of the limited number of observations in the increasing returns to scale category in 1999 and 2000. The distribution of community banks and credit unions in 2001 and when modeling using pooled data reflected statistically significant differences with credit unions showing an increase in the number of observations exhibiting increasing returns to scale and a decrease in the number of observations exhibiting decreasing returns to scale. The shift toward increasing returns to scale either suggests a shift in the financial services industry in 2001 or improvements in the individual credit unions putting them in a potentially more advantageous position for future growth. The

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**Table 2**

<table>
<thead>
<tr>
<th>Number of Commercial Banks and Credit Unions Defining of The Efficiency Frontier For Years Ended December 31, 1999, 2000, and 2001</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant Returns to Scale</td>
</tr>
<tr>
<td>Banks</td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>1999</td>
</tr>
<tr>
<td>2000</td>
</tr>
<tr>
<td>2001</td>
</tr>
<tr>
<td>Pooled Data</td>
</tr>
</tbody>
</table>

---

<table>
<thead>
<tr>
<th>Sum of Relative Efficiency Rankings for Commercial Banks and Credit Unions For Years Ended December 31, 1999, 2000, and 2001</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant Returns to Scale</td>
</tr>
<tr>
<td>Banks</td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>1999</td>
</tr>
<tr>
<td>2000</td>
</tr>
<tr>
<td>2001</td>
</tr>
</tbody>
</table>
distribution of observations in terms of returns to scale is reported in Table 3, Panel A.

The efficiency frontier modeling process is based on relative relationships. One result is that institution size as measured by total deposits is not a discriminating factor in the evaluation process. As might be expected, within each industry category firms exhibiting increasing returns to scale appear to be smaller than the average firm. Firms exhibiting decreasing returns to scale appear to be larger than the average firm. The difference in average size between the categories is a function of the differing relative sizes of the institutions in the two categories. The average total deposits for community banks and credit unions for returns to scale categories are reported in Table 3, Panel B.

To compare performance across the years the three years were pooled to estimate relative efficiencies. Observations were ranked from most efficient to least efficient. Rankings for the pooled data were consistent with the rankings for the individual years. The differences in rankings for the three years were not statistically significant for either constant returns to scale or variable returns to scale assumptions. Under either assumption both types of institutions were less efficient in 2000. Community banks reflected greatest relative efficiency in 1999. Credit unions reflected their best relative efficiency in 2001 [Table 4].

**Technical and Scale Efficiency Estimates of Industry Classes**

DEA models were estimated for each year using virtual observations based on projections of the actual observations to the BCC variable returns to scale efficiency frontier. Virtual observations control for the local variations in management and treat each observation as if it were operating at its benchmark potential. This projection to the benchmark potential allows for an evaluation of the industry segment in addition to the earlier evaluation of the individual observations. After controlling for variations within the individual observations, the modeling results for the industry segments appear consistent with the relative efficiency estimates for the individual firms. Community banks populated the efficiency frontier in greater numbers than did credit unions in each year of the study period. The relative ranking of the observations also reflected greater relative efficiency for community banks than for credit unions in each year and in the pooled data. Consistent with the rankings for the individual firms, the difference in the rankings for the virtual observations were statistically significant in the first and last years of the study period (1999 and 2001) and for the pooled data. The difference in the rankings for 2000, while appearing consistent with the other years, was not significant at

---

### Table 3

<table>
<thead>
<tr>
<th>Year</th>
<th>Increasing</th>
<th>Constant</th>
<th>Decreasing</th>
<th>Increasing</th>
<th>Constant</th>
<th>Decreasing</th>
<th>Chi-square</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999</td>
<td>6</td>
<td>20</td>
<td>37</td>
<td>7</td>
<td>12</td>
<td>39</td>
<td>0.18794</td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td>4</td>
<td>16</td>
<td>43</td>
<td>2</td>
<td>10</td>
<td>46</td>
<td>0.18952</td>
<td></td>
</tr>
<tr>
<td>2001</td>
<td>6</td>
<td>15</td>
<td>42</td>
<td>11</td>
<td>10</td>
<td>37</td>
<td>0.03778</td>
<td></td>
</tr>
<tr>
<td>Pooled Data</td>
<td>23</td>
<td>27</td>
<td>139</td>
<td>41</td>
<td>13</td>
<td>120</td>
<td>0.00000</td>
<td></td>
</tr>
</tbody>
</table>

Amounts reported in thousands of dollars (000 omitted)

### Table 4

<table>
<thead>
<tr>
<th>Year</th>
<th>Pooled Data</th>
<th>Constant Returns to Scale</th>
<th>Variable Returns to Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Community Banks</td>
<td>Credit Unions</td>
<td>Community Banks</td>
</tr>
<tr>
<td>1999</td>
<td>21,363.5</td>
<td>8,344.0</td>
<td>13,019.0</td>
</tr>
<tr>
<td>2000</td>
<td>24,709.0</td>
<td>10,572.5</td>
<td>14,136.5</td>
</tr>
<tr>
<td>2001</td>
<td>19,993.5</td>
<td>8,521.0</td>
<td>11,472.0</td>
</tr>
<tr>
<td>Pooled Data</td>
<td>23</td>
<td>27</td>
<td>139</td>
</tr>
</tbody>
</table>

p-value 0.1159 0.0000 0.0824 0.0000 0.0000 0.0000

---
TABLE 5

Table 5
Definition of The Efficiency Frontier and Sum of Relative Efficiency Rankings for Commercial Banks and Credit Unions
Assuming Variable Returns to Scale
Virtual Observations Assuming Industry Segment Benchmark Performance
For Years Ended December 31, 1999, 2000, and 2001

<table>
<thead>
<tr>
<th></th>
<th>Definition of Efficiency Frontier</th>
<th>Sum of Relative Ranks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Banks</td>
<td>Credit Unions</td>
</tr>
<tr>
<td>1999</td>
<td>41</td>
<td>27</td>
</tr>
<tr>
<td>2000</td>
<td>40</td>
<td>33</td>
</tr>
<tr>
<td>2001</td>
<td>40</td>
<td>24</td>
</tr>
<tr>
<td>Pooled Data</td>
<td>103</td>
<td>103</td>
</tr>
</tbody>
</table>

Table 5
Distribution of Observations Reflecting Increasing, Constant or Decreasing Returns to Scale
For Years Ended December 31, 1999, 2000, and 2001

<table>
<thead>
<tr>
<th></th>
<th>Commercial Banks</th>
<th>Credit Unions</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increasing</td>
<td>7</td>
<td>21</td>
<td>35</td>
</tr>
<tr>
<td>Constant</td>
<td>1</td>
<td>14</td>
<td>43</td>
</tr>
<tr>
<td>Decreasing</td>
<td>4</td>
<td>16</td>
<td>41</td>
</tr>
<tr>
<td>Pooled Data</td>
<td>23</td>
<td>28</td>
<td>138</td>
</tr>
</tbody>
</table>

The distribution of observations based on exhibited returns to scale when virtual observations were evaluated [Table 5] was nearly identical to the distribution observed when modeling actual data [Table 3]. The consistency in exhibited returns to scale characteristics suggests no material managerial inefficiencies or resource misallocations in either commercial banks and credit unions on an individual basis.

SUMMARY AND CONCLUSIONS

Using a multivariate nonparametric modeling process commercial banks reflected greater relative technical efficiency than did credit unions in generating deposits. This relative efficiency advantages holds true when using actual observations to evaluate individual firms or when using virtual observations based on industry segment benchmark estimates to evaluate industry segments. At the same time it appears that there are potential material resource shifts that might be made to make both segments of the industry more efficient in deposit generating activities. Most actual observations reflected decreasing returns to scale when estimated against other firms suggesting increases in resources will yield less than proportionate increases in deposits. Estimating technical efficiency using an input orientation will yield similar relative efficiency rankings as did this study, but the sources of the inefficiency would focus on controlling resource consumption rather than augmentation of outputs.

REFERENCES


CAN STUDENTS EVALUATE PERFORMANCE?
ACCOUNTING VS. FOREIGN LANGUAGES

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ABSTRACT

The skills necessary to develop competence in accounting are often the same skills needed to evaluate competence in accounting. When accounting students are unable to judge their own achievement, they are in a double bind; they have neither a particular skill nor the cognitive ability to realize their own level of incompetence. If accounting students are unaware of their poor performance on tests, they are unlikely to realize their limitations. Correspondingly, the high performers may not recognize their ability to be successful. An earlier study (Joyce and Kopel, 2003) tests accounting students’ self-recognized competence by having them estimate the grade they expected to receive on a test immediately following its completion. In managerial accounting classes, poorer accounting students significantly overestimated their performance; better accounting students underestimated their performance. Poorer accounting students became better estimators over time, while there was no similar improvement in better accounting students’ self-assessments.

Is this true for students in other fields that are less “numbers oriented”? For example, do foreign language students have the ability to evaluate their competence in their foreign language courses? This study will compare the ability of accounting students to evaluate their own performance on exams with the ability of foreign language students. Students will be asked to estimate their exam scores immediately upon completion of their exams. The differences between actual scores and estimated scores will be compared between the accounting students and the foreign language students. Also, over the semester, we will test to see if either category of students improves in the ability to evaluate performance.
INTERNATIONAL CORPORATE IDENTITY THEFT: A CASE STUDY

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ABSTRACT

Identity theft is one of the fastest growing crimes worldwide. Its pervasiveness is due in large part to the vast amounts of information gathered and made available on the Internet. The same array of electronic networks spanning the globe that makes Internet connectivity and electronic communication seamless also makes identity theft an international threat. This paper presents a case study of an actual occurrence of an international corporate identity theft perpetrated on a U.S. company by an individual residing outside of the United States. It goes on to assess the vulnerability to corporate identity theft that CPA firms face. This assessment utilizes the same techniques that were used by the perpetrator in the case study, and finds that 63% of the CPA firms analyzed could easily be the targets of corporate identity theft.

INTRODUCTION

Identity theft is one of the fastest growing crimes in the United States. It occurs when personal information such as a social security number or a credit card number is stolen and used to perpetrate fraud or some other crime. With this personal information, the identity thief is able to go on spending sprees using existing credit card accounts, open new credit card or bank accounts in the victim’s name, establish telephone or wireless service in the victim’s name, and even give the victim’s name to police during an arrest.

Identity thieves, however, do not just target individuals. They also target businesses, stealing bank account and credit card numbers, employee and client information, supplier account numbers, etc. In today’s electronic environment, one of the easiest ways for the identity thief to operate is to masquerade as the business by stealing its online identity. This is done through a technique known as web spoofing whereby part or all of the company’s web site is reproduced under a similar domain name that is controlled by the identity thief (Felton, et al, 1997).

The paper begins by providing an overview of how web spoofing is being used to steal corporate identities. It then describes in detail how an actual corporate identity was stolen using Internet based technologies. Next, an analysis of how vulnerable 100 randomly selected CPA firms are to identity theft is provided. Then steps that businesses can take to protect themselves from corporate identity
theft are given. Finally, concluding comments are offered.

WEB SPOOFING

To understand how web spoofing occurs, one needs to be aware of the three basic components needed to publish a web site. One of the components is the domain name, which is a unique Internet identity such as amazon.com or cnn.com. The first part of the domain name is often the business name or some variation of that name. The second part is the extension which represents the category of the domain name. For example, .com represents the word commercial and .org represents the word organization. Domain names can be purchased from a number of online sources for as little as $4.95. They can contain whatever combination of letters, dashes, and/or numbers is desired. If a particular domain name is already in use, a variation could likely be found by including a dash, making a singular word plural, making a plural word singular, adding some type of qualifier such as cpa, or choosing a different extension. For example, kpmg.com is already in use. However, kpmgcpa.com, kpmgcpas.com, kpmg-cpa.com and kpmg-cpas.com are currently available for purchase (NetworkSolutions, 2003).

The second ingredient needed to publish a web site is the actual content. The content is the package of information available to a visitor to a web site. It includes such things as text in hypertext markup language (HTML) or other acceptable language, scripts, images, forms, links, and streaming media.

The content of a web site needs to reside on a server that has a direct connection to the Internet, and a number of technical configurations that allow the site to be accessible on the World Wide Web. Termed web hosting, this is the final ingredient needed to publish a web site. Web hosting can be done in house or through companies known as web presence providers. The cost of using a web presence provider can range from zero to hundreds of dollars per month. Oftentimes, the web hosting includes customized e-mail addresses with the form yourname@companyname.com.

If all that is needed to publish a legitimate web site are a domain name, content, and web hosting, then all that is needed to publish a spoofed web site are a domain name, content, and web hosting.

The easiest way for a web spoofer to deal with the domain name issue is to use one that is deceptively similar to the real domain name. For example, if you wanted to access information about President Bush’s latest State of the Union Address, would you use the domain name whitehouse.com or the domain name whitehouse.gov? If you chose whitehouse.com, guess again. Whitehouse.com is a web site containing sexually-oriented adult material.

Unless steps are taken to protect the content, parts or all of the web site can be easily downloaded with a few clicks of the mouse. To download a logo or other image, all that one needs to do is to position the mouse over the image, right-click, and save image as. To download an entire page and all of the underlying code, one merely chooses file, save page as, and then web page complete. An entire web site can be easily downloaded by using the import web wizard in Microsoft FrontPage.

Once the content is downloaded, the web spoofer can package it in any way desired. For example, the web spoofer could start with the exact home page that appears in the legitimate web site, and add bogus content behind that homepage. When the unsuspecting visitor clicks on a link, he or she could be taken to a page that contains misinformation about the real company, a page that asks for confidential login information, a pornography site, or any number of other pages designed with a malicious intent.

With the domain name and content in hand, the web spoofer’s final task is securing a web hosting service. As previously indicated, web hosting can be done in house or through a web presence provider. If the web hosting includes customizable e-mail addresses, the web spoofer can assume not only the firm’s online identity, but also the online personal identity of the firm’s owners and/or employees.

CASE STUDY

One of the things made possible by the Internet is electronic intermediation. This is an electronic business that operates as a middleman, bringing together employers and employees, suppliers and
businesses, professionals and clients, services and customers, etc. For example, eBay acts as an electronic intermediary between sellers and buyers of all sorts of merchandise.

This case study revolves around one such electronic intermediary that brought physicians who were seeking employment opportunities together with hospitals who were looking for physicians to fill specific needs. The owner, Patricia, spent a considerable amount of time and money putting the business together and successfully marketing it. Part of the marketing focused on branding the business around the domain name, docjob.com. The hard work paid off as more and more physicians and hospitals subscribed to the services offered by docjob.com.

One day, out of the blue, Patricia received an e-mail from an irate physician demanding that his name be removed from the listing and vowing to have nothing further to do with docjob.com. The e-mail described the web site as a front for pornography. Patricia was quite perplexed until she discovered that the web site serving as a front for pornography was found at docjobs.com, not docjob.com. When an unsuspecting physician or hospital mistakenly added an “s” to the URL, the homepage that appeared was identical to that found at the real web site. However, when one of the links was clicked on, pornographic content appeared.

How could this be? Recall the three ingredients required for web spoofing: a deceptively similar domain name, actual content from the legitimate web site, and a web hosting service. Someone had purchased the domain name docjobs.com. By adding an “s” to the domain name, the perpetrator now owned a deceptively similar domain name to docjob.com. That same someone had successfully downloaded part or all of the legitimate content from docjob.com. By using the actual homepage, the perpetrator reproduced a web site that looked identical to the real thing until an unsuspecting visitor to the site clicked on a link. Finally, someone contracted with a service to host the spoofed web site.

That someone turned out to be Joe Korea (nicknamed by Patricia). Joe Korea first surfaced when he sent an email to Patricia wherein he claimed responsibility for the spoofed web site and demanded money to shut the spoofed web site down. The e-mail did not reveal Joe Korea’s identity. Rather, by taking information from the domain name registrar and tracing the origins of the e-mail, Patricia was able to determine Joe Korea’s real identity and the fact that he resided in South Korea. Numerous calls to the local authorities, the FBI and the FTC proved fruitless because of the lack of U.S. jurisdiction over someone residing in South Korea. In the end, Patricia was forced to abandon docjob.com and start from ground zero to rebuild her electronic business and its reputation.

ONLINE IDENTITY VULNERABILITIES

The story of docjob.com could easily be retold numerous times for companies that have not taken adequate steps to protect themselves from corporate identity theft. Specifically, the two elements of a legitimate web site that potentially expose it to web spoofing are domain name and content. If a deceptively similar domain name can be purchased, and if part or all of the content of a legitimate web site can be downloaded, then the web site is vulnerable to web spoofing and the business is vulnerable to corporate identity theft.

To assess the potential vulnerability of CPA firms to corporate identity theft, the authors randomly selected 100 CPA firms listed on CPAFirms.Com (Magal and Albrecht, 2003). Touting 3,671 individual U.S. CPA firms, CPAFirms.Comclaims to be the most complete directory of CPA firms available on the Internet.

During the week of August 25th, 2003, the authors visited the web sites of each of the 100 firms chosen to determine what domain name characteristics were likely to be present. The pattern that quickly emerged in that examination was that the first part of the domain name tended to include some variation of the firm name or initials, and some variation of cpa. Therefore, the following information about domain name was captured: (1) whether the domain name included some variation of the firm’s name, firm’s initials, or other; (2) whether the domain name included cpa or some variation thereof, such as cpas, -cpa, or -cpas; and (3) what extension was contained in the domain name, i.e., .com or other.

The authors then used NetworkSolutions, a domain name registration company, to determine if a domain name similar to the legitimate one could be purchased. If the domain name included
the firm’s name, variations on that name were checked for availability. For example, if the domain name was smithjones.com, could smithjones.com be purchased? If the domain name included a variation of cpa, other variations were checked. For example, if the domain name was sjcpa.com, could sjcpas.com, sj-cpa.com, or sj-cpas.com be purchased? When one of these variations was available for purchase, the domain name was deemed unprotected and therefore vulnerable.

Table 1 contains the characteristics of domain names of the 100 CPA firms used in the analysis.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variation of Firm’s Name</td>
<td></td>
</tr>
<tr>
<td>Firm’s name with cpa</td>
<td>24</td>
</tr>
<tr>
<td>Firm’s name without cpa</td>
<td>30</td>
</tr>
<tr>
<td>TOTAL</td>
<td>54</td>
</tr>
<tr>
<td>Firm’s initials with cpa</td>
<td>32</td>
</tr>
<tr>
<td>Firm’s initials without cpa</td>
<td>8</td>
</tr>
<tr>
<td>TOTAL</td>
<td>40</td>
</tr>
<tr>
<td>Did not use firms names (other)</td>
<td>6</td>
</tr>
<tr>
<td>Variation of use of cpa</td>
<td></td>
</tr>
<tr>
<td>cpa</td>
<td>45</td>
</tr>
<tr>
<td>cpas</td>
<td>4</td>
</tr>
<tr>
<td>-cpa</td>
<td>7</td>
</tr>
<tr>
<td>-cpas</td>
<td>2</td>
</tr>
<tr>
<td>TOTAL</td>
<td>56</td>
</tr>
<tr>
<td>Extension</td>
<td></td>
</tr>
<tr>
<td>.com</td>
<td>98</td>
</tr>
<tr>
<td>.net</td>
<td>2</td>
</tr>
<tr>
<td>Unprotected domain names</td>
<td></td>
</tr>
<tr>
<td>Variation on firm’s name with cpa</td>
<td>23 of 24</td>
</tr>
<tr>
<td>Variation on firm’s name without cpa</td>
<td>13 of 30</td>
</tr>
<tr>
<td>Variation on firm’s initials with cpa</td>
<td>31 of 32</td>
</tr>
<tr>
<td>Variation on firm’s initials without cpa</td>
<td>2 of 8</td>
</tr>
<tr>
<td>Variation on other</td>
<td>2 of 6</td>
</tr>
<tr>
<td>TOTAL</td>
<td>71 out</td>
</tr>
</tbody>
</table>

As shown in Table 1, 54 of the domain names included some variation of the firm’s name and 58 included some variation of cpa. What this means is that if the firm’s name was Smith and Jones, the domain name contained smithjones, smith-jones, smithjonescpa, etc. Of the 54 domain names containing components of the firm name, 24 also included some variation of cpa. Forty of the domain names contained the firm’s initials. For example, with a firm name of Smith and Jones, the domain name would include sj, sjcpa, etc.

Of the 100 CPA firms used in the analysis, 71 had unprotected domain names. This vulnerability appeared most often when the domain name included some variation of cpa. For example, if the domain name was smithjonescpa.com, then smithjonescpas.com, smithjones-cpa.com, and/or smithjones-cp.as.com could be purchased. If the domain name was sjcpa.com, then sjcpas.com, sj-cpa.com, and/or sj-cp.as.com were available.

In visiting the 100 web sites, the authors were also interested in how vulnerable the content was to web spoofing and how easy it would be to assume the online identity of one of the firm’s principals or employees. The three things important here were: (1) whether the homepage could be downloaded in its entirety; (2) whether the entire web site could be downloaded using the import wizard in Microsoft FrontPage; and (3) whether the principals’ and/or employees’ names and email addresses were listed. The results of the content analysis are shown in Table 2.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Download complete homepage</td>
<td>83</td>
</tr>
<tr>
<td>Download entire web site</td>
<td>90</td>
</tr>
<tr>
<td>Names and E-Mail Addresses</td>
<td>64</td>
</tr>
</tbody>
</table>

What is particularly sobering from Table 2 is that 83 out of the 100 homepages and 90 out of 100 web sites could be downloaded in their entirety. The reason that the 17 homepages could not be completely downloaded was that they contained either flash components or roll over images. The 10 web sites that could not be downloaded in their entirety all used either active server pages or java script. The 64 firms whose web sites listed both principals’ and/or employees’ names and email addresses potentially created an environment where someone else could assume those individuals’ online identity.

Table 3 combines the domain name and content characteristics to show that 63 out of the 100 firms analyzed have both unprotected domain names and unprotected content. These firms are
therefore vulnerable to online identity theft. Included with these 63 firms are 40 whose site listed both names and e-mail addresses of the principals and/or employees. The significance here is that if a variation of domain name were used, then a variation of e-mail address could also be used. For example, if john.smith@smithjonescpa.com were the legitimate e-mail address, then john.smith@smithjonescpas.com could be used as a bogus e-mail address. A visitor to the spoofed web site using john.smith@smithjonescpas.com to communicate with John Smith would actually be communicating with the web spoofer. Therefore, these 40 firms are exposed to online identity theft at not only the firm level, but also the individual level.

<table>
<thead>
<tr>
<th>Content</th>
<th>Domain Name</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Unprotected</td>
<td>Protected</td>
<td>Total</td>
</tr>
<tr>
<td>Unprotected</td>
<td>63</td>
<td>27</td>
<td>90</td>
</tr>
<tr>
<td>Protected</td>
<td>8</td>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>Total</td>
<td>71</td>
<td>29</td>
<td>100</td>
</tr>
</tbody>
</table>

**Table 3**  
Vulnerability to Online Identity Theft

**PROTECTING ONLINE IDENTITY**

The same array of electronic networks that allows for the online publication of company information also exposes the company to online identity theft. Table 4 lists a number of steps that can be taken to protect the company’s online identity.

**Table 4**  
Protect Online Identity

- Register several variations of the domain name for up to ten years.
- Ensure that domain names are registered with and managed by a reputable U.S. based company.
- Ensure that the web presence provider is a reputable U.S. based company.
- Invest in a more sophisticated technology such as active server pages to protect your content.
- Protect content by encrypting the code.
- Don’t publicize e-mail addresses unless absolutely necessary.
- Don’t reveal any more about the firm or its members than is absolutely necessary.
- Use password protected areas on the web site judiciously.

A well thought out domain name helps current and potential clients locate a firm’s web site instead of its competitors’ web sites. As previously mentioned, the cost of registering a domain name is minimal, especially if one considers its increasing importance in firm branding. To protect that domain name, the firm should ensure that it also owns variations of that name. In addition, the firm should consider multiple year domain name registration contracts. If the registration fees are not paid in a timely manner, then the domain name becomes available for someone else to purchase.

The adage that “you get what your pay for” is especially fitting when it comes to both domain name registration and web presence providers. Some of the low cost domain name registrars include a clause in their fine print that states that the domain name belongs to them, not the company paying the registration fee. The same is true for web presence providers relative to the content that resides on their servers. In addition, one cannot assume that either the domain name registrar or the web presence provider is a U.S. based company. The significance here is that U.S. laws designed to thwart online identity theft do not generally apply to companies or individuals outside of the U.S.

With very little training, one can easily build a legitimate web site using HTML. Therefore, with very little training, one can easily build a spoofed web site, or modify a legitimate web site. If the web site is built with a more sophisticated technology such as active server pages or java script, then web spoofing becomes more complicated.

Even if HTML is used to build the web site, the content can still be protected with encryption. HTML encryption software such as HTML Guardian can protect HTML code, java scripts, active server pages, pages that use server-side includes, style sheets, images, etc., by making it impossible to reuse them if they are downloaded.

CPA firms that publicize the email addresses of their principals and/or employees expose these individuals to not only online personal identity theft, but also a spammer technique known as harvesting. Harvesting is a process that uses software to scan web sites for any text containing
the @ symbol used in e-mail addresses. Once the e-mail addresses are located, they are recorded in a database and used for whatever purpose the spammer has in mind.

A CPA firm's most valuable asset is its people. Therefore, a natural tendency is for the firm to advertise the expertise of its principals and employees, and to make it easy for current and potential clients to contact them via e-mail. Firms should weigh the benefits of making this information available online with the potential costs that could result if a web spoofer assumed the online identity of one or more of these individuals.

Of the 100 web sites visited by the authors, 11 contained client login pages. If a web spoofer included a bogus client login page, then he or she could obtain both the userid and password entered by an unsuspecting client. With the userid and password, the web spoofer could access confidential client information from the legitimate web site. Therefore, firms should assess whether the benefits of allowing client login outweigh the potential threats.

**CONCLUDING COMMENTS**

Ten years ago, very few companies boasted an online presence. Today, very few companies operate without some type of online presence. With the continued explosion in electronic communication made possible by the Internet, companies face an increasing expectation of an online presence by their current and potential clients and customers.

Companies already take a number of precautions to protect their physical location and client records. They lock their windows and doors to prevent intrusions and theft. As a company's web site take on an increasingly important role in branding the firm name, projecting a desired image, and providing information, care should be taken to lock the doors and windows to the web site as well.

**REFERENCES**


ABSTRACT

This paper examines the first annual report of the United States Steel Corporation for the year ended December 31, 1902, one of the first annual reports to contain an audit opinion. The first annual report of U.S. Steel, issued in 1903, is an exceptionally fine example of detailed, comprehensive reporting of business operations to shareholders and other stakeholders. This paper analyzes the “certificate of the chartered accountants” which appeared prior to the Balance Sheet in the annual report. The six-paragraph audit opinion was much longer and comprehensive than what was typically in use during this period.
The Entrepreneurship Valuation Method

Herbert E. Kierulff

Seattle Pacific University
Abstract

An analyst must take into account the same five factors economists say are responsible for economic growth—land; labor (including management); capital; technology; and entrepreneurship in arriving at a value for a company, or a range of values. The usual techniques of valuation—the asset, market and the income methods—do not explicitly account for the value of entrepreneurship. This failure may result in serious over or under valuations. This article demonstrates how this omission occurs, why it can be serious, and how the value of entrepreneurship can be estimated.
Introduction

The components of growth in an economy and in a business—land; labor; capital; technology; and entrepreneurship—all have value in a business and should be accounted for when arriving at a fair price and terms. The three traditional methods of valuation may account for the first four factors, but may not adequately value the fifth, the contribution of the entrepreneur. The subject of this article is why this aspect may not be taken into account, the reasons the contributions of the entrepreneur are of value, and how the entrepreneurial value may be estimated. Two acquisitions—California Plant Protection's acquisition of Pinkerton's Inc. and Boeing's acquisition of McDonnell Douglas—will be given as examples.

How Value is Determined

Mr. Tom Wathen, CEO and sole owner of California Plant Protection, Inc., acquired the detective agency, Pinkerton's Inc., from American Brands, Inc. in 1987 for $95 million in cash (HBS Case, 1991). It is difficult to arrive at anything close to this price using the three methods usually employed in valuation: asset, market, and income (West and Jones, 1999), given the data in Exhibit 1.
Exhibit 1. Pinkerton's: A Division of American Brands, Inc.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>$296</td>
<td>$307</td>
<td>$312</td>
<td>$367</td>
<td>$408</td>
</tr>
<tr>
<td>.4</td>
<td>.7</td>
<td>.4</td>
<td>.7</td>
<td>.3</td>
<td></td>
</tr>
<tr>
<td>Operating Profit</td>
<td>16.4</td>
<td>15.2</td>
<td>1.2</td>
<td>0.7</td>
<td>(0.4)</td>
</tr>
<tr>
<td>Total Tangible Assets</td>
<td>63.5</td>
<td>65.0</td>
<td>71.0</td>
<td>78.5</td>
<td>87.0</td>
</tr>
<tr>
<td>Current Liabilities</td>
<td>29.7</td>
<td>30.1</td>
<td>28.0</td>
<td>27.3</td>
<td>30.7</td>
</tr>
<tr>
<td>Capitalization</td>
<td>33.8</td>
<td>34.9</td>
<td>43.0</td>
<td>51.2</td>
<td>56.3</td>
</tr>
</tbody>
</table>

Source: Harvard Business School Case #291-051

The Asset Method

The asset method involves valuing the tangible and intangible assets, and subtracting the liabilities to obtain the net worth or equity value. Tangible assets include (1) operating assets such as inventories, plant and equipment, and other valuable things which can be seen, counted and created by
nature or physical work, and (2) financial assets, including cash, accounts receivable, debts owed the company by employees and others, and investments in other valuable properties (bonds, non-operating real estate, company stocks). The book value of these assets, of course, may not fairly represent their market value because of the company's policies on such things as depreciation and inventory valuation.

Intangible assets include good will, patents, trade and service marks, copyrights, trade secrets, employee know-how, customer lists, and the like. Although extremely hard to value, such assets often make up many times the worth of the tangible assets when a company, division, or product line is sold.

In the case of a detective and guard agency, however, it is difficult to justify a value of intangibles at approximately $38.7 million ($95 million less $56.3 million tangible assets at book value). According to the Internal Revenue Service there must be returns in excess of industry averages to justify good will. The Pinkerton name is famous—we all remember the pursuers of Butch Cassidy and the Sundance Kid, and some of the other famous names in the Old West associated with the company. On the other hand, mystique, heritage, and longevity are not intangible assets and, in the presence of declining and finally negative operating profits, do not indicate that the name itself
as a service mark is enough to support an ongoing business (Reilly and Schweihs, p8).

The Market Method

The market value (usually referred to as fair market value) represents what a willing buyer will pay a willing seller in a free and open market where both parties are in possession of all of the relevant information pertaining to the entity. The market value of a publicly traded company may be determined by multiplying the number of common shares outstanding times the appropriate price earnings ratio times the earnings per share. This figure is adjusted upward to account for the control and other options when large blocks of stock—or the entire company—is being purchased.

In the case of a private company or a division (such as Pinkerton), value would be estimated using the price earnings ratio of comparable public companies. Also, the price would be adjusted to account for such factors as the lack of a public market, excesses or deficiencies of assets, cost irregularities, and terms of purchase.

The only publicly traded company in Pinkerton's industry was Wackenhut. In 1987, it enjoyed a return on book equity of 14 percent and sales of $382 million. Its price / earnings ratio was 12.25 with a market-to-book value ratio of 1.76.
Pinkerton's earnings per share, if it had shares, would be negative in 1987 since operating profits were negative. The average profit for the previous three years 1985 - 1987 was $0.5 million. That figure multiplied by Wackenhut's 12.25 gives a nonsense figure of $6.13 million.

The market to book value ratio suggests that a company like Wackenhut might have intangible asset value since its market value is 76 percent above its book value. When 1.76 is applied to the book value of Pinkerton, the potential asset value is nearly $100 million.1 On the other hand, Wackenhut was profitable and healthy while Pinkerton's was not.

The Income Method

The income method of deriving equity value involves (1) forecasting the dividends or net cash flow to equity over some time horizon, (2) estimating the terminal value of the entity at the end of that time using one of several alternatives such as the market method or expected cash flow in perpetuity from the horizon period, and (3) discounting both expected dividends and terminal value back to the present by a rate that takes into account risk and the time value of money if the money were invested in a risk less security.

1 The price / earnings comparison is inexact in that Pinkerton's profits are shown as operating profits (before interest and taxes) while Wackenhut's profits are after interest and taxes. Wackenhut had debt of $10.6 million at the time.
A review of the available data suggests that, even if new plant and equipment purchases were equal to depreciation in the years after 1987, cash flow very likely would be negative. The reason for this is that operating profits would appear to be very low or negative, and working capital needs would increase as sales increased. Under any reasonable assumption, a valuation using the income method would produce a value below net worth.

Subsequent to the Acquisition

The first year after the acquisition of Pinkerton's was marked by a severe cash shortage and the need to restructure the debt. After that, however, the acquisition became a significant success, well worth the $95 million expenditure. There were several reasons for this. In a private conversation with the author in 1999, Mr. Wathen said that the acquisition was "a no-brainer." "All I had to do was superimpose a map of Pinkerton's office locations over a map of ours. The fit was almost perfect." This meant that Mr. Wathen could reduce the total number of offices and enjoy a significant savings.

In addition, Mr. Wathen took the risk of raising prices for Pinkerton work to increase profitability (although at the expense of losing some business). He also believed that better working capital management could lower cash requirements. He
did believe that the Pinkerton's name would allow him to increase the margin on CPP business, but this was considered a risky proposition at the time.

This case clearly demonstrates that a significant amount of the value added to Pinkerton came because of the entrepreneurial, or at least innovative, efforts of CPP management in addition to the land, labor, capital, and technology of Pinkerton. And yet all or most of the present value added beyond the net worth of Pinkerton went to the stockholders of American Brands (Berger, 1991).

Mr. Wathen realized his dream—to own Pinkerton's. He also made an investment that could be expected to more than cover his cost of capital in the long run. Yet it took the contribution of his talents to make the difference between a losing venture and a profitable one. Clearly, this was the major intangible value that made Pinkerton's worth the $95 million. The three usual methods would not arrive at that figure using data supplied by American Brands.

At the same time, a fair value would recognize that the entrepreneurial value should be credited to Mr. Wathen and his management team, not to American Brands. An independent evaluator estimating fair market value likely would arrive at a range close to the tangible net worth based upon the market value of the assets.
The Acquisition of McDonnell Douglas by Boeing

Valuations that appear mismatched because the value of entrepreneurship is insufficiently appreciated seem relatively common. For example, on July 25, 1997, The Boeing Company gave notice of a shareholders' meeting to approve its merger with McDonnell Douglas (Notice). Boeing hired the investment banking firm of CS First Boston to value McDonnell Douglas, while the latter used J.P. Morgan for that purpose.

Although information about the merger is sketchy, Exhibit 2 shows that, using somewhat different variants of the market and income methods, these two investment banking firms came up with close to the same average value for McDonnell Douglas on a stand-alone basis. On the basis of these valuations, Boeing agreed to a conversion ratio of 1.3 shares for one of McDonnell Douglas. Relevant valuation data are shown in Exhibit 2.
Exhibit 2. Per Share Valuation of McDonnell Douglas Common Stock

<table>
<thead>
<tr>
<th>Valuation of McDonnell Douglas by:</th>
<th>Stand Alone Value</th>
<th>Synergy</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS First Boston for Boeing client, December 14, 1996</td>
<td>$49.18 to $65.13</td>
<td>$15.50 to $18.00</td>
<td>$64.68 to $83.13</td>
</tr>
<tr>
<td>Average</td>
<td>$57.16</td>
<td>$16.75</td>
<td>$73.91</td>
</tr>
<tr>
<td>JPMorgan for MD client, December 14, 1996</td>
<td>$43.00 to $64.00</td>
<td>No Estimate</td>
<td>N/A</td>
</tr>
<tr>
<td>Average</td>
<td>$53.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>December 13, 1996 market price of MD</td>
<td></td>
<td></td>
<td>$52.00</td>
</tr>
<tr>
<td>June 19, 1997 market price of Boeing multiplied by the 1.3 conversion rate</td>
<td></td>
<td></td>
<td>$73.45</td>
</tr>
</tbody>
</table>

Source: Notice, pp. 31-41

Between December 13, 1996 (the day prior to the merger agreement date) and June 19, 1997 (the day prior to the proxy
statement date), Boeing stock rose 17 percent from $48.375 to $56.50. A McDonnell Douglas shareholder enjoyed a 41 percent increase—from $52.00 per McDonnell Douglas share to $73.45 for 1.3 Boeing shares (Notice, p. 17).

The book value per share of Boeing as of March 31, 1997 was $14.36; the equivalent value for McDonnell Douglas was $18.67 (Notice, pp. 13-14). If the book value represents a reasonable proxy for the market value of the land and capital less liabilities and debt, then any above market value of the labor and management know-how, and the value of technological intangibles and entrepreneurship must be represented by the difference. This is (very roughly) $56.50 - $14.36 or $42.14 for Boeing and $73.45 - $18.67 or $54.78 for McDonnell Douglas. The 30 percent difference between the two companies suggests either (1) a difference between Boeing management and their advisors and the marketplace about the value of McDonnell Douglas know-how, intangible technology, and entrepreneurship, or (2) a willingness of Boeing management to pay a premium for the option to control 100 percent of McDonnell Douglas.

In the Notice of Special Meeting of Shareholders, little mention was made of the entrepreneurial potential of either company, per se. What was stressed in this and other publications was that McDonnell Douglas was established in the defense business, but was rapidly losing position in the
commercial aircraft business, while growth in Boeing's commercial aircraft business was upsetting the commercial / defense balance at Boeing. Furthermore, McDonnell Douglas could not afford the technological advances necessary to compete effectively in commercial aircraft. (Notice, pp. 25-26; Grimaldi, p.1).

Minimizing risk by diversification into each other's businesses seemed to be a prime motive for the merger; but this would not be to the stockholders' advantage since stockholders could buy shares of both companies in the open market. The other key motive—achieving certain economies of scale and other synergies (if any)—would be the entrepreneurial work of management in both companies (Notice, pp. 29-30).

Boeing, the initiator of this merger, would appear to have an entrepreneurial edge. It was not losing business to superior competitors and was the initiator of the merger. Also, Boeing was the larger company in 1996 ($22.7 vs. $13.8 billion in sales), and size does suggest success in entrepreneurial endeavors. Yet that edge was never discussed directly in the (admittedly sketchy) public documents dealing with the merger, and possibly was never valued as such. And it was Boeing stockholders who gained the least from the merger.

Any conclusions must be speculative. However, it seems to be reasonable to maintain that a fair and explicit evaluation of
the entrepreneurial capability of both firms may have changed
the valuation of McDonnell Douglas. In particular, it would
influence the estimate of synergy.

A New Approach to Valuation

The Pinkerton and Boeing examples suggest that independent
valuation experts seeking a true fair value and applying the
three common basic methods of valuation—asset, market, and
income—could benefit from considering a fourth method. This
method would explicitly value the entrepreneurial contributions
of both buyer and seller.

The Entrepreneur

The concept behind this method, the entrepreneurial method,
is that entrepreneurial, or at least innovative, talent is
demonstrated by the introduction of new or improved products and
services or by the radical restructuring of an existing
organization so that it is more cost effective. Although the
dividing line is very difficult to draw, entrepreneurs differ
from managers in that the latter function is that of building
and maintaining bureaucracies that ensure the status quo rather
than providing significant innovation.

Harvard Business School's Howard Stevenson (www.hbs.edu)
has characterized the entrepreneurial context as one of "high
uncertainty, rapid growth, radical change, and limited
resources." He notes that:
• Entrepreneurs are opportunity driven.

• Entrepreneurs are tremendously focused on cash and the need to conserve resources.

• Entrepreneurs have a tremendous sense of urgency.

• Entrepreneurs have a singular focus and tremendous sense of ownership

• Entrepreneurs use flexible organization structures and approaches.

Of course, a given person can be now an entrepreneur and later a manager, so that it is the function, not the person, who differs. At the same time, many entrepreneurs function poorly as managers and vice-versa.

The Formula

The first premise of this method for the valuation of products and businesses is that the seller's entrepreneurial talent should be compensated to the extent of its contribution, but no more. The second is that the land, labor (including management), capital, and technology should be valued appropriately. It follows that a product, product line, or company should have an equity value which is the sum of:

1. The free cash flows to equity from the organization's existing products or services throughout their marketable lives, discounted to the present. This implies a product life cycle.
2. The replacement or market value of the land, capital, and technology used to produce the existing products, measured at the end of the life cycle of the existing products, discounted to the present.

3. The replacement or market value, if any, of other intangibles (trade secrets, patents, trade / service marks, and employee know-how) used to produce and sell the existing products, measured at the end of the life cycle of the existing products and not accounted for in 2 above. This value would be discounted to the present.

4. The current market value of existing research and development activities and intangibles which may have current or future value to the acquiring organization in pursuing work not directly associated with existing products and services.

5. The value of excess capacity which could be sold or used by an acquiring firm or individual to produce other goods and services.

Applying the Formula

The thrust of the three methods of valuation currently in use suggests that a product, product line, and especially a business be viewed as an ongoing venture. Past trends may be forecast into the future. However, lacking entrepreneurial direction, any business will eventually wind down. The entrepreneurial method explicitly recognizes this point.
At some period of time, each product in a company's business will no longer be a worthwhile investment. Additional capital investment will yield a net present value below zero, thus not accounting adequately for the risk, potential inflation, and the preference for liquidity of the investors. The analyst estimates the time period for each product or product line, and discounts and sums the free cash flows to equity over the period.

Next, the analyst estimates the tangible and intangible values of the existing product in two ways, and the larger of the two results are added to the free cash flows to equity. The first way is to divide the forecast earnings before interest after taxes in the last time period by an appropriate discount rate to obtain a terminal value in perpetuity. The second is to calculate the liquidated value of each tangible and intangible asset mentioned in 2 and 3 above and discount them to the present.

The current value of existing research and development and other intangibles useful in developing new products and services are calculated using the market or income method. Alternatively, the buying organization negotiates a royalty payment for valued research and development and other intangibles. The analyst values excess capacity using existing replacement or market cost methods.
The extent to which this method produces results different from the three approaches currently in use is a subject for further field research. However, it seems reasonable to expect some differences. And since the major determinants of future value are land, labor, capital, technology, and entrepreneurship, it seems reasonable to take them all into account in valuation.
References


http://www.hbs.edu/units/em/Pages/temdescription.html

Harvard Business School Case #291051, Pinkerton's (A), 1991. Case prepared by Adam S. Burger under the supervision of Professor Scott P. Mason.


Valuation Method

20
ACCOUNTING PROGRAM REQUIREMENTS FOR GEORGIA SCHOOLS

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ABSTRACT

Conscientious accounting program faculty and administrators perform periodic curricula reviews and/or revisions to meet stakeholders’ desires. Changes are sometimes needed or encouraged. Before changes are made, however, decision makers should be aware of the requirements of others, especially those institutions in close proximity. This study summarizes the accounting program requirements for the fourteen Georgia state universities that offer accounting degrees. The requirements vary from eighteen credit hours to thirty hours and six courses form the nucleus of most programs. Even though the investigation encompasses only one state, the results provide a starting point for all program reviews, regardless of the region.

INTRODUCTION

The American Institute of Certified Public Accountants (AICPA) five-year education plan combined with most states’ legislation became a reality a few years ago after more and 30 years of proposals. The incorporation of the 150-hour rule by the year 2000 provided colleges and universities with a golden opportunity to review and revise accounting curricula. Some schools added a fifth year of study while others added various options so that students desiring to enter public accounting might meet the 150-hour requirement.

Many students do not desire to enter the public accounting sector and are happy to receive a four-year degree. Regardless, administrators of accounting programs are mandated by various accreditation agencies to take steps to periodically review and revise curricula to meet stakeholders’ desires. Remembering to heed the Accounting Education Change Commission’s (1990) call over ten years ago for focus on skills and attitudes that will allow our graduates to function better within the profession, as well as the early public accountants’ (see, for example, Henry and Razzouk (1990) and management accountants’ [see, for example, Leinicke et al. (1992)] desires, changes are on-going and inevitable. Assessment is a priority today just as it was prior to the year 2000 changes [see, for example Gaien and Locatelli (1995)] and must remain a focus in today’s environment of student accountability.

Before changes are suggested or made, however, decision makers must consider what other programs require. The purpose of this paper is to provide these data. Specifically, this paper presents a summation and analysis of the curricula for the fourteen state, regional, and research universities of Georgia with accounting programs. Although the scope of the investigation encompasses only one state, the results provide a starting point for any program review or possible revision, regardless of the region.

METHODOLOGY

Program requirements for the fourteen Georgia schools were taken from respective websites. When data were not available from the specific departments’ website areas, then catalogs were downloaded and used to get the data. Although eighteen state, regional, and research universities are part of the
University System of Georgia, only fourteen have accounting programs. The sample includes schools accredited by the American Assembly of Collegiate Schools of Business (AACSB) and those choosing no accreditation. Since all fourteen schools require two courses of Accounting Principles for every student with a business-related major including accounting, only those courses "beyond principles" were considered in this study.

The courses had various numerical designations and titles. Since the data were taken from respective websites (catalogs) and not from surveys directed to knowledgeable faculty at particular colleges, examination of the description of each course was essential. The data were excerpted and brief summaries of the requirements for each of the fourteen programs are available by contacting this author.

**ANALYSIS**

Table 1 summarizes the requirements for the fourteen Georgia sample schools. All institutions require the equivalent of Intermediate Accounting 1. Twelve of the fourteen require Intermediate 2. Further analysis of school number 7 reveals that a required course, entitled Accounting Information Theory and classified in the Table as other, includes a few topics associated with normal intermediate classes which might qualify the course as Intermediate 1 and thus moving the course classified as Intermediate 1 to a second intermediate course. School number 9 requires two intermediate accounting courses; however, one is Intermediate Financial Accounting combined with Auditing and is classified as Intermediate 1. The other is Intermediate Managerial Accounting combined with Tax and it is not a financial course.

Six of the schools or 43 percent requires intermediate Accounting 3. School number 12 allows students to choose either Intermediate 3, if they plan to be CPAs, or Cost Accounting, if they plan to be managerial accountants. Therefore, the percentage could increase to 50 percent of the sample requiring Intermediate 3 depending upon a student's accounting track choice.

Separate courses in Income Tax Accounting and Auditing are required by 93 percent of the sample. The only school not requiring either, number 9, takes an innovative approach for coverage of the two topics. As mentioned earlier, school number 9 combines Tax with Managerial Accounting and Auditing with Intermediate Accounting 1. School number 4 allows students to choose either Auditing or Internal Auditing. Since the descriptions of both courses were similar, the course was included in the auditing classification.

All schools require Cost/Managerial Accounting. Some called the course Cost Accounting, some called it Managerial Accounting, and others called it Cost/Managerial Accounting. Students at school number 12 have the choice of Intermediate 3 or Cost as previously described; however, all accounting students at that school are required to take Managerial Accounting. In other words, there are separate Cost Accounting and Managerial Accounting courses at that institution, unlike the others, and the cost class described appears to be an advanced cost course.

Twelve of the fourteen schools, 86 percent, require a course in Accounting Information Systems. Therefore, the six-course nucleus of all programs appears to be Intermediate 1 and 2, Cost/Managerial, Tax, Accounting Information Systems, and Auditing.

Three institutions require International Accounting. Two institutions require Advanced Accounting and two require Not-For-Profit Accounting. Three schools have courses in the other category. School 7 has the Contemporary Accounting Information course already mentioned. They also have a regular Accounting Information Systems course. School 8 has a Contemporary Issues in Accounting course. School 13 requires two Professional Accounting seminar-type courses for 1.5 semester hours each and School 12 lists a non-credit Professional Seminar as a requirement.

The analysis further indicates that half of the schools require at least one additional accounting elective course. Four require at least two additional courses, two require at least three additional courses, and one requires four additional accounting electives. In addition, some schools have upper-level business electives that allow students to take accounting courses to fulfill the area. Since these electives are not required accounting courses, they are not included in this study.
TABLE 1
PROGRAM REQUIREMENTS

This study summarizes the accounting courses required by the fourteen state, regional, and research universities of the Georgia system. The six dominant courses are Intermediate 1, Intermediate 2, Tax Accounting, Cost/Managerial, Accounting Information Systems, and Auditing. The remaining required courses differ from school to school in both content and number.

Half of the sample schools allow students some degree of flexibility to focus on their interests with the use of required accounting electives. This flexibility provides the opportunity for some students to select up to four special interest courses.

CONCLUSION

Required Accounting Hours  30  21  18  21  24  24  18  30  24  21  24  21  24  24

Course

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<td>X</td>
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<td>X</td>
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<td>X</td>
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<td>X</td>
<td>X</td>
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<td>14</td>
<td>100%</td>
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<tr>
<td>Intermediate 2 (Financial 2)</td>
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<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<td>X</td>
<td>X</td>
<td>X</td>
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<td>X</td>
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<td>X</td>
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<td>X</td>
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<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>13</td>
<td>93%</td>
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<td>Cost (Cost/Managerial)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<td>X</td>
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<td>X</td>
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<td>X</td>
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<td>X</td>
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<td>International</td>
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<td>X</td>
<td>X</td>
<td>2</td>
<td>14% (29%)</td>
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<td>X</td>
<td>X</td>
<td>7</td>
<td>50%</td>
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<td>X</td>
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<td>14%</td>
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<td>Accounting Elective</td>
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<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td>1</td>
<td>7%</td>
</tr>
</tbody>
</table>

a Contemporary Accounting Information
b Contemporary Issues in Accounting
c Students on CPA track pick Intermediate 3; Students on Managerial track select Strategic Cost Management
d Professional Accounting 1--1.5 hours credit and Professional Accounting 2--1.5 hours credit
e Students may select Auditing or Internal Auditing, both are separate courses
Several schools refer to the AICPA 150-hour requirement and suggest that a student should confer with an advisor if public accounting is of interest so that the additional hours can be taken. Larger schools suggest graduate study and refer the student to the appropriate graduate catalog. Some of the institutions have separate schools of accounting. This study investigated only the undergraduate four-year portion of these types of programs.

REFERENCES


STUDENT VIEWS ON THE COURSE SYLLABUS: A NATIONAL SURVEY OF STUDENTS IN THE PRINCIPLES OF ACCOUNTING COURSE

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ABSTRACT

At one time, the course syllabus was a one-page document. Over time, it has evolved into a multiple-page document that addresses a number of issues and contingencies. The primary purpose of this study is to assess the relative importance that students in the Principles of Accounting course place on different items that frequently appear on a course syllabus. This paper presents the results of a national survey of 2,494 students from 60 universities in 27 states regarding the content of a typical course syllabus. The survey instrument was administered during the spring 2002 term and contained 28 items that previous research indicates are likely to appear on a course syllabus. The survey instrument used a seven-point Likert scale for the responses, with a “1” = “no attention at all” to a “7” = “great deal of attention.” The students indicated the four items of highest importance (based on the largest numerical values) to them were: the “Grading procedure and policies” (6.42), the “Examination and quiz dates” (6.27), the “Number of examinations and quizzes” (6.20), and “Instructor information (for example, name, title, office location, phone number and e-mail address)” (6.07). The four lowest ranking items were: the “Academic dishonesty policy” (4.59), the “Titles and authors of textbooks and readings” (4.65), the “Required prerequisite coursework necessary to enroll in the course” (4.67), and the “Course information (for example, course number and title, section number, credit hours)” (4.90). The results of the survey are also analyzed by a number of specific demographic characteristics (for example, gender, year in school, declared major, and age).
CONSIDERATIONS IN SMALLER-SCALE OPERATIONS

William B. Joyce, Eastern Illinois University

Many factors combine to produce the frequently encountered pattern first increasing, then decreasing returns to scale. Economies of scale, which cause long-run average costs to decline, result from both production and market-related factors. At some output level, economies of scale typically no longer hold, and average costs level out or begin to rise. Increasing average costs at high output levels are often attributed to limitations in the ability of management to coordinate an organization after it reaches a very large size.
MARKET EQUILIBRIUM AND
BEHAVIORAL ACCOUNTING

William B. Joyce, Eastern Illinois University

The efficient market hypothesis holds (1) that stocks are always in the equilibrium and (2) that it is impossible for an investor to consistently “beat the market”. While evidence shows that it is difficult to earn high returns, caution should be used in assuming that stocks are necessarily fairly priced. Puzzles and anomalies exist.
ON “POOR FITS” IN MERGERS & CAPITAL BUDGETING

William B. Joyce, Eastern Illinois University

Some projects may take on added value because they give the firm the flexibility to “bail out” if things go wrong. If a merger or acquisition proves to be a “poor fit”, a divestiture or “spin-off” can allow the management of the parent company to concentrate on its main activity. The importance of building flexibility into investment projects can be considered in terms of options. Smart firms think about alternative uses for their assets if things go wrong. The option to abandon a project is really a put option: the exercise price of the put is the value of the project’s assets if shifted to an alternative use.
FIVE DECADES OF OLD AND NEW—A CONTENT ANALYSIS OF
THE PRESENTATION AND PEDAGOGY OF KIESO ET. AL.’S
INTERMEDIATE ACCOUNTING

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ABSTRACT

In 1969, the first edition of the textbook, *Intermediate Accounting*, was published by Donald E. Kieso. Over a period of nearly fifty years, the book has remained the premier textbook in financial accounting and reporting. Over its eleven editions, the book has been changed and updated to mirror the needs of the accounting profession. The book itself acts as a window into the evolution of modern financial accounting and reporting, especially as computer technology transforms business accounting systems. Additionally, the book chronicles the changes in financial accounting pedagogy. These changes in presentation have allowed today’s students to relate more closely with actual corporate usage of financial accounting techniques and issues.

This paper outlines and tracks the changes in financial accounting presentation and pedagogy over the past five decades using Donald E. Kieso’s *Intermediate Accounting* as a basis for those changes. Through an exhaustive study of Kieso’s eleven editions, a list of 143 items was compiled that dealt with the presentation and learning pedagogy for financial accounting education used in the books. These 143 items ranged from a good subject index to providing PowerPoint presentations and websites. During the nearly fifty years covered in this study, Kieso provided new teaching innovations as they became available to enhance an already solid pedagogy. As a result of Kieso’s offering these innovations in Intermediate Accounting, instructors and students have had real-time access to the most modern accounting education pedagogy.

There have been many changes and enhancements over the five decades of Kieso’s textbook. Interestingly, only four of the original 143 Presentation and Pedagogy items identified in this study were carried through from the 1st edition to the 11th edition. Notable changes initiated in the 1970s included limited graphics for presentation and supplements for the students including specimen financial statements and a study guide. As technology evolved, students received the benefit of applied technology in real time during the 1980s with supplements including initial software applications in Lotus and Supercalc. Instructors received an ever-increasing array of pedagogical aids applied to Intermediate Accounting through Kieso, which included the introduction of a computerized test-bank in the 4th edition in 1983. The most profound changes occurred during the 1990s and early 2000s with the addition of 87 new items related to technology, culminating in the creation of a World Wide Web presence for the Kieso text. Recent changes address the needs of the accounting profession with information on the computerized uniform CPA Exam, new in 2004, and treatment of ethics and career issues.
THE INTERACTION OF INTEREST EXPENSE, DIVIDENDS, AND OPERATING EXPENSES: A MODEL FOR A NEGLECTED TOPIC

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ABSTRACT

The purpose of this paper is to provide a model of the firm that highlights the interdependency of interest expense, dividends, and operating expenses. For the most part, modern financial theory has ignored these relationships. In part, this has been due to the increased emphasis on valuation theory as the theoretical underpinning for evaluating a firm’s managerial performance. Valuation theory, for the most part has placed emphasis on operations. As a performance measure criterion, this is appropriate because operating efficiency is of primary concern for many firms: financial and dividend policies are secondary concerns. This emphasis is exemplified in many of the valuation texts in that the major emphasis is placed on the valuation of operations and those value drivers that are directly related to operations. True, interest expense figures in, but only in an oblique manner.

Our model not only directly addresses the inclusion of interest expense and dividends, but it proposes an inverse relationship between operating expenses and both interest expense and dividends. For decision making purposes model specifications imply that management views dividends akin to interest expense. In the pursuit of efficiency, operating expenses are economized in response to increases in interest expense and/or dividends. Dividend and debt policy, in our model, impact on operating efficiency because the model explicitly requires that management consider all costs, including interest expense and dividends, in the optimization process. Consequently, ceteris paribus, increases in interest expense and/or increases in the payout ratio must cause management to correspondingly reduce operating expenses if they wish to maintain total expenses at a comparable level. Thus, interest expenses and dividends serve as a form of budget constraint for the cost-conscious firm. The extent the firm can ignore the cost management discipline depends to a great extent on the market structure in which the firm finds itself. For those highly monopolistic markets, debt expense and dividend policy provide less restraint than is the case for highly competitive markets where the profit margin is small to begin with and any opportunities to increase, or control, prices are negligible. However, our model is not market structure specific.
ESTIMATING THE LOAN LOSS EXPOSURE OF COMMERCIAL BANKS: A COMPARISON OF TRADITIONAL AND MARKOV MODELS

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ABSTRACT
This paper examines the banker’s task of evaluating the bank’s portfolio of outstanding loans and determining their appropriate net or carrying value. Conventional practice includes classifying loans into risk categories and applying a probable-loss factor to each class. By summing the resulting class allowances, the banker determines the aggregate requirement for the allowance for loan losses at the evaluation date. Since the previously recorded allowance has likely been depleted by the charging-off of uncollectible loans, there is generally a need to replenish the allowance account through an income statement charge to provision for loan losses.

The paper presents a simulation of a lending enterprise that quarterly evaluates its allowance for loan losses and records provisions accordingly. The traditional approach to valuation is compared and contrasted to an alternative based on Markov chains. The Markov technology preserves information in the loan histories that is discarded under the traditional approach. The simulation result shows that the Markov model is able to significantly reduce variability in the quarterly provisions for loan losses, and hence can reduce income statement volatility.

INTRODUCTION
The valuation of loan assets is a significant challenge for bankers, auditors, and financial institution regulators. Bank managers and their accountants estimate the allowance for losses that should accompany the balance sheet presentation of loans, and both external auditors and bank examiners critically review those estimates. Regulatory examination of a struggling bank’s allowance estimates, and a subsequent determination that those allowances must be increased, is commonly catalytic in the series of events leading to regulatory sanction, forced merger, or even failure.

1 Laurin and Majnoni [2003] survey loan classification and provisioning practices in selected developed and emerging countries, and highlight the importance attached to this activity by regulatory agencies world-wide.

Typically, bankers classify loans into risk categories based upon multiple criteria including loan type, the financial strength and character of borrowers, the nature and condition of assets pledged as collateral, borrowers’ payment histories, and both general and industry specific economic conditions. Similarly classified loans are grouped and each group is assigned a probable-loss factor, often derived from the bank’s own experience or from industry guides. These loss factors are then used to extend the outstanding balances of the loan groups to determine the required loan loss allowance. Comparison of the existing allowance, adjusted for charge-offs, to this required level, determines the provisioning requirement that must be charged to income.

In this paper, we examine the loan valuation problem and consider methodologies available to banks that have risk classification schemes in place. To evaluate alternative methodologies, we simulate a series of homogeneous loans that differ only in their intermediate-term credit quality and
their ultimate collectibility. Our loans are evaluated periodically and assigned to risk categories. The first model applies historically determined probable-loss factors to the risk-classified loans and establishes a required allowance for loan losses for each quarterly balance sheet. After deducting charge-offs from the period's beginning allowance, this model computes the provision-for-loan-losses which must be charged to expense on the quarterly income statement to replenish the allowance.

The second model evaluates the same loans over the same periods, but calculates the required allowance levels differently. The methodology is a Markov chain process which captures and retains historical information about the loans which the first model ignores. For our hypothetical lender, the Markov model results in a significantly less volatile stream of provisioning requirements.

**THE LOAN VALUATION PROBLEM**

Valuing the bank’s loan portfolio is perhaps a banker’s most daunting task. While understandably hesitant to admit that even one bad loan may ever have been written, harsh realities dictate that virtually every portfolio contains credits which will never be repaid. External observers show keen interest in the quality of the bank’s loans and demand a systematic evaluation of loan collectibility. In-house estimates of the adequacy of allowances for loan losses are subjected to critical review by auditors seeking evidence supporting the financial statement valuation of net loans, while bank examiners seek corroboration for the classification of individual credits as other than troubled. The cautionary perspective of auditors and examiners is balanced by the often optimistic view of bankers who, most often, hold some pride of authorship for the loans under scrutiny. From society’s viewpoint, neither thin nor excessively large loan loss allowances are desirable. Inadequate reserves heighten the probability of bank failure and ensuing disruptions to the commerce of affected communities, while policies leading to excessive reserves can retard economic growth through diminished credit availability. The estimation of future loss levels is necessarily imprecise, but acknowledgement of the preeminence accorded those estimates by so many constituencies, prompts the quest for their efficient computation.

**HISTORICAL LOAN LOSS EXPERIENCE**

A bank’s loan portfolio generally contains a diverse array of consumer, commercial, and municipal credits including, as examples, unsecured lines of credit, amortizing consumer loans for automobiles and other durable goods, mortgages for both home ownership and the procurement or development of commercial property, and formula-based credit facilities, commonly called C&I loans, that satisfy the working capital needs of business borrowers. Typically, loan portfolios are partitioned by product and size, and the bank’s collection history for each category becomes a major determinant in the estimation of loan loss allowances. For example, prior experience with installment automobile contracts might reveal a 25 basis-point charge-off experience over time, suggesting that the bank’s $20 million file of outstanding car loans warrants an allowance of $50,000. The loans might be grouped by delinquency status, and further refinement of the allowance estimate would follow analysis of the groups. Finally, the collective experience of other lenders may also be considered. If the loss experience for bank sourced automobile paper has averaged 40 basis-points nationally, evaluators of our sample portfolio will likely favor an allowance nearer to

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2 The stance of regulators in developed countries is well known. Anecdote suggests that their focus is widely shared. Minutes of a National Bank of Moldova Administrative Council meeting [Moldova 1999] specify that “All banks are required to establish and maintain an Allowance for Loan Losses,” and, “Any credit extended by the bank shall be included in one of the following [risk] categories:”, while guidelines for loan classification and provisioning promulgated by the Reserve Bank of Fiji [Fiji 2001] require licensed banks and credit institutions, “to have in place a formal risk grading system to be able to classify credit facilities in line with the five categories. These are: Standard, Special Mention, Substandard, Doubtful or Loss.”

3 Statisticians generally favor *unbiased* estimators over *biased*, since an unbiased estimator’s expected value equals the population’s mean. Among unbiased estimators, those with minimum variance are also considered to be efficient. [Brownlee, 1965]
$80,000. The difference, of course, is a $30,000 adjustment that would have to be charged to the bank’s income statement category, provision for loan losses. This adjustment could be significant in the calculation of important measures of the bank’s financial performance.

**RISK CLASSIFICATION SYSTEMS**

Some loan products like automobile paper are homogeneous and as a consequence, are amenable to the calculus of past loan loss experience to yield relatively reliable estimates of required allowances. Other credit categories, such as commercial real estate loans and formulabased line-of-credit facilities, defy compartmentalization. The unique characteristics of each borrower and each project demand that the diligent banker maintain continuing oversight, regularly collecting and analyzing financial and operating information, and periodically reviewing the status of each outstanding loan. In these environments, bankers often employ risk-rating schemes to group loans into numerical risk categories. An 8 level scale is used by many bankers. Such a system might classify as a good or excellent risk, a fully performing loan, granted to a long-established customer for the development of a real estate project which is backed by abundant collateral and supported by sponsors’ guarantees. A risk-rating of 3 or even 2 might be assigned to this high quality loan. Alternatively, a rating of 4–moderate risk might be assigned if any of these desirable attributes are less prominent. Non-performing loans are quickly downgraded, as are loans to borrowers whose business prospects deteriorate, regardless of their payment histories. In a typical system, a missed or late payment, or evidence of weakening sales or profits, may constitute sufficient evidence to nudge the credit to a rating of 5-watch. Serious payment delinquencies, high vacancy rates for a commercial rental property, or the loss of significant customers for a C&I borrower, are sufficient reasons to quickly move credits to the rating of 6–substandard.\(^5\)

Further loan deterioration, evidenced perhaps by a C&I customer’s suspension of operations, his bankruptcy petition, or a commercial real-estate borrower’s egregious neglect of maintenance coupled with soaring rental vacancy rates, will quickly shepherd a credit to the dubious rating categories of 7–doubtful, and ultimately, 8–loss. Specific allowances are generally established on a loan-by-loan basis for credits in these dismal circumstances. While collection efforts, actions against guarantors, and initiatives to attach collateral will certainly continue until the bank’s legal remedies are exhausted, loan valuation issues migrate to another venue at this point. Typically, these credits are written down to an estimate of their net realizable value, responsibility for their administration is transferred to a special assets or workout unit, and the bank’s lenders return to loan production priorities.

Traditional valuation methodologies can be readily applied to the risk-classified commercial loan portfolio. The bank’s historical collection experience with loans classified as 1, 2, 3, 4, 5, 6, or 7; as well as rules-of-thumb such as: COMMERCIAL LOAN PORTFOLIOS SHOULD CARRY AT LEAST 150 BASIS POINTS OF VALUATION ALLOWANCE; OR: NO COMMERCIAL REAL ESTATE LOAN CAN EVER BE RISK-RATED AS BETTER THAN 4-moderate risk; can operate to produce a consistent\(^6\) valuation.

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\(^4\) Another banker, recalling the first law of commercial real estate lending: THE MOMENT YOU CLOSE A REAL ESTATE DEAL, YOU OWN IT; THE BORROWER HAS AN OPTION TO BUY THE PROPERTY BACK IF THE VALUE GOES UP., might balk at the thought that commercial real estate could ever be considered to be a good risk. He would likely rate the low LTV loan on a trophy borrower’s premier apartment complex as 4–moderate risk at the loan’s inception and offer apologies to no one. Regrettably, most veteran lenders have war stories that support this position.

\(^5\) Bank policies often also require the classification of delinquent loans as non-accrual, with the result that the recognition of interest income is suspended until cash is received. While a loan’s downgrade to 6-substandard and its placement in non-accrual status are often simultaneous events, they are usually the consequences of two separate decision processes. Determinations of accrual status are usually made mechanically by applying criteria articulated in the bank’s lending policies, while risk-classification is generally the product of a Loan Review Committee’s deliberations.

\(^6\) Statisticians define a consistent estimator as one that displays increasing stability as larger
That valuation figure’s reliability, however, is challenged by the heterogeneity of the credits, their wide-ranging and often seasonally fluctuating balances, and the necessarily subjective nature of the committee process that ascertains risk weightings.

**A PORTFOLIO VALUATION EXAMPLE**

To illustrate the valuation allowance process we’ll consider a hypothetical commercial lender who continuously originates and holds to maturity a stream of homogeneous business credits. Each $100,000 term loan has a bullet maturity of five years. The bank originates 250 such loans each quarter so that, at any point in time, 5,000 loans, or $500 million of footings, are outstanding. At maturity, individual loans are either paid-in-full or defaulted, such default resulting in either a total or partial loss to the bank. Losses are deducted from the allowance account as *charge-offs*. The ongoing valuation problems are to estimate the bank’s current exposure to loss embedded in the remaining loan portfolio and to establish the loan loss allowance at the level appropriate to reflect that exposure. Individual loans provide clues about their ultimate collectibility, and those clues prompt the classification of loans into risk categories. Experience data are then used to determine the appropriate allowance, given the risk classification statistics. Finally the period’s required income statement provision is computed to bring the allowance to its indicated level.

We assume that each credit is one of six unique loan types, which we designate as *A, B, C, D, E* and *F*. Individual loans are indistinguishable when written, but over time, display characteristics which lead to their assignment to risk categories. Nonetheless, the banker cannot know an individual loan’s ultimate character until the loan matures and is either paid-off or defaulted. The loan types and their expected frequencies for our simulation are detailed in table 1.

<table>
<thead>
<tr>
<th>Loan Type</th>
<th>Loan Performance Characteristics</th>
<th>Expected frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Watch after 1 year, substandard after 3 years, doubtful after 4 years, and defaults at maturity with 100% loss of principal.</td>
<td>1% of loans</td>
</tr>
<tr>
<td>B</td>
<td>Watch after 1 year, substandard after 3 years, doubtful after 4 years, and defaults at maturity with 30% loss of principal.</td>
<td>2% of loans</td>
</tr>
<tr>
<td>C</td>
<td>Watch after 1 year, substandard after 3 years, watch after 4 years, and defaults at maturity with 30% loss of principal.</td>
<td>1% of loans</td>
</tr>
<tr>
<td>D</td>
<td>Watch after 1 year, substandard after 3 years, watch after 4 years, and pays in full at maturity.</td>
<td>2% of loans</td>
</tr>
<tr>
<td>E</td>
<td>Watch after 1 year, good/current after 3 years, and pays in full at maturity.</td>
<td>7% of loans</td>
</tr>
<tr>
<td>F</td>
<td>Always current, always in compliance, and pays in full at maturity.</td>
<td>87% of loans</td>
</tr>
</tbody>
</table>

*Table 1 Theoretical Loan Distribution*

All loans perform acceptably for the first year and are initially classified as *current/good risk*. At the fourth quarterly loan review, however, *A, B, C, D, and E* loans display characteristics which prompt their downgrade to *5-watch*. After three years, type *E* loans recover and rejoin the *current/good risk* category; while the other *5-watch* credits,

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All loans perform acceptably for the first year and are initially classified as *current/good risk*. At the fourth quarterly loan review, however, *A, B, C, D, and E* loans display characteristics which prompt their downgrade to *5-watch*. After three years, type *E* loans recover and rejoin the *current/good risk* category; while the other *5-watch* credits, in practice, large credits are generally evaluated more frequently, while smaller loans may experience just an annual review. Typically, staff in the bank’s Credit Analysis department will spread each customer’s financials and review other pertinent data to support, in the majority of the cases, a recommendation for continuing risk status. Meeting time for the Loan Review Committee will be devoted primarily to the consideration of proposed upgrades and downgrades in the risk classifications of notable credits identified by the Credit Analysis staff.

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proportions of the population being studied are included in the sample.
types A, B, C, and D, deteriorate further and migrate to category 6-substandard.

After four years, the C and D loans recover and are moved back to 5-watch, while the A and B loans deteriorate further and are transferred to 7-doubtful. At maturity, D, E, and F loans, which represent 96% of the theoretical loan population, are paid-in-full. The B and C loans default, resulting in the loss of 30% of original principal. The type A loans also default, but each of these credits is a total loss.

A bank should provide, through periodic income statement provisions, additions to its allowance-for-loan-losses account that are sufficient to exactly offset its losses from defaulted loans. The matching principle dictates that these provisions, which represent a cost of producing loan income, be expensed in the periods of loan income recognition, and hence, requires that estimates of ultimate collectibility be employed to determine the appropriate amount to be provisioned. In our simulation, A, B and C loans result in losses. With theoretical occurrence rates of 1%, 2%, and 1%, respectively, these loans will subject the bank to an expected overall charge-off rate of 1.9%, or 190 basis-points on loan production. With $100 million of loan production each year, our banker could reasonably expect to provide $1.9 million annually for loan losses. However, he has no way of knowing the ultimate composition of his portfolio until the loans have matured, and this lack of knowledge complicates the portfolio valuation problem immensely.

THEORETICAL PORTFOLIO PERFORMANCE

The population characteristics displayed in table 1 imply an expected loss rate of 1.9%. Following a quarterly evaluation of 5,000 loans, we expect 4,620 to be classified as current/good, 290 to be classified as 5-watch, 60 to be classified as 6-substandard, and 30 to be classified as 7-doubtful. Of the 250 loans that mature each quarter, we would expect to fully collect the D's, E's and F's, totaling 240 loans. We also expect to charge-off losses on 10 A, B, and C loans and the expected amount of the charge off would be $475,000.9

TRADITIONAL MODEL FOR THE DETERMINATION OF ALLOWANCE-FOR-LOAN-LOSSES

We simulated a loan production activity generating one thousand loans per year, each for $100,000. At the origination point, each simulated loan is identified as a member of one of six groups based upon its ultimate performance characteristics. The lender does not know a loan’s group affiliation, however, until the loan matures. Loans have 5 year terms, so at any point in time, 5,000 loans of various ages are outstanding. The initial loan portfolio is fully populated at $500 million after five years, at which time, the first loans begin to mature and the lender begins to gather performance data.

For a 30 year period commencing in year 6, we evaluated the simulated loan portfolio on a quarterly basis, denoting the 120 quarter-end evaluation points as \( t=1,120 \). Each quarter, we measured the losses attributed to defaulting loans from the prior three months and charged off this amount. We also computed the required loan loss allowance for the continuing loans by first classifying the loans into risk categories based upon their observable performance characteristics and then applying allowance factors to these classes. Management provided the allowance factors which were assumed to remain constant throughout the simulation.10

\[ \text{allowance factors} \]

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9 The A’s comprise 1% of the portfolio and are a total loss. The B’s and C’s comprise 3% of the loans and experience 30% losses after the recovery of collateral. Hence, $25 million of quarterly scheduled maturities implies 1.9%, or $475,000 of expected charge-offs.

10 Management specifies allowance factors for the various risk categories based upon several criteria including industry norms, past experience, and the degree of conservatism displayed by management. Without prejudice to the actual levels selected by a lender, we only require that
necessitated $350,000 of charge-offs in the initial test period and the loan evaluation completed at that quarter end established a required level for the allowance for loan losses at $17.718 million. For convenience, we set the initial allowance at \( t=0 \) to also equal $17.718 million, so that the first quarter’s provision-for-loan-losses charged to the income statement would exactly equal the quarter’s $350,000 of charge-offs.

In each subsequent quarter, we charged off defaulted loans against the beginning allowance-for-loan-losses, added 250 new loans to replace maturing credits, and risk-classified the resulting 5,000 loan portfolio. The new allowance requirement was determined by applying management’s allowance factors to the risk classified portfolio balances, and the required provision-for-loan-losses was determined by comparing the new allowance requirement to the beginning allowance, now reduced by recognized charge-offs. Over the 120 quarterly periods, defaulted loans totaling $55.09 million were charged off and required provisions totaled $55.60 million. Allowance requirements ranged from $16.425 million to $19.389 million, and the quarterly provisions averaged $463,000. The standard deviation of the provision series was $228,000. It is this variability measure that provides our benchmark for assessing the efficiency of alternative models.

MARKOV CHAIN MODEL FOR THE DETERMINATION OF ALLOWANCE-FOR-LOAN-LOSSES

Cyert, Davidson and Thompson [1962] (CDT) provided a framework based on Markov Chains for considering the allowance for doubtful accounts requirement of a commercial creditor who ages his trade accounts receivable. The Markov model is based upon the assignment of accounts to states and the tracking of those accounts as they move from state to state over time. Typically, a Markov model of aged accounts receivable will specify two absorbing states, paid-in-full and written-off, as the ultimate possible destinations for an account. Each period, unpaid accounts are classified according to their age status, with the aging categories constituting transient states. From period to period, an account moves to either an absorbing state, or to the next transient state, and the probabilities of such movement are the system’s transition probabilities.

The state-to-state transition probabilities are arrayed in a matrix \( P \), which is then manipulated to yield an estimate of the ultimate collectible balance from a portfolio of variously aged receivables.

Our Markov formulation defines a bank’s four active risk-categories as transient states, and specifies three absorbing states corresponding to paid-in-full, total loss and 30% loss. The resultant 7x7 transition probability matrix, \( P \), is written as:

\[
P = \begin{bmatrix}
p_{11} & p_{12} & p_{13} & p_{14} & p_{15} & p_{16} & p_{17} 
p_{21} & p_{22} & p_{23} & p_{24} & p_{25} & p_{26} & p_{27} 
p_{31} & p_{32} & p_{33} & p_{34} & p_{35} & p_{36} & p_{37} 
p_{41} & p_{42} & p_{43} & p_{44} & p_{45} & p_{46} & p_{47} 
p_{51} & p_{52} & p_{53} & p_{54} & p_{55} & p_{56} & p_{57} 
p_{61} & p_{62} & p_{63} & p_{64} & p_{65} & p_{66} & p_{67} 
p_{71} & p_{72} & p_{73} & p_{74} & p_{75} & p_{76} & p_{77} 
\end{bmatrix}
\]

where \( p_{ij} \) is the probability that a loan moves from state \( i \) to state \( j \) as a consequence of its quarterly evaluation. The absorbing states are 1-paid-in-full, 2-partial loss and 3-total loss, while the transient states are 4-good, 5-watch, 6-substandard and 7-doubtful. Matrix \( P \) may be partitioned as:

\[
P = \begin{bmatrix}
I & O \\
R & Q 
\end{bmatrix}
\]

where \( I_{3x3} \) is the identity matrix reflecting the permanence of assignments to an absorbing state, \( O_{3x4} \) is the null matrix representing the impossibility of resurrection for matured loans, \( R_{4x3} \) is the matrix of transition probabilities from transient to absorbing states, and \( Q_{4x4} \) is the matrix of transition probabilities within the transient states.
matrix of transition probabilities among the four transient states.\textsuperscript{12}

Next, we form the vector $b$ which contains the dollar balances of loans in each of the four active risk categories:

$$b = \{ \text{good}, \text{watch}, \text{substandard}, \text{doubtful} \}. \quad [3]$$

Notably, the sum of the vector $b$ components is the gross value of the active loan portfolio.

Manipulating matrix $Q$, matrix $R$, and vector $b$, yields an estimate of the $' loan balance that will ultimately be collected. First, we form matrix $N$:

$$N = (I - Q)^{-1} \quad [4]$$

Then the matrix product, $NR$, contains the probabilities that a $ in transient state $i$ will ultimately find its way to absorbing state $j$, and the product $bNR$, a 1x3 vector, will contain the loan $'s expected to ultimately reach each absorbing state. The Markov model’s estimate of the losses imbedded in the loan portfolio, then, is 100% of the $bNR_3$ amount representing total loss, plus 30% of the $bNR_2$ amount which represents partial loss.

We evaluated the same stream of simulated loans over the 120 quarters of our test period using the Markov model, with transition probabilities estimated from a previous historical period. Defaulted loans again totaled $55.09 million and were charged off. The Markov model specified provisions totaling $55.80 million, or $200,000 more than the Traditional model. This larger total provision reflects the Markov model’s richer interpretation of the allowance requirement for the final period of the simulation. The Traditional model, relying only on the current risk-classifications of the loans, generated a series of provisioning requirements with a standard deviation of $228,000, but the Markov model, additionally utilizing the risk-classification transition histories of the loans, produced a series of provisioning requirements with a significantly lessened standard deviation of only $184,000. The Markov model produces a less variable income stream for the bank and hence, should be preferred. The Markov model exploits a richer data set and hence should perform at a superior level. Higher volatility observed in the provisioning specifications of the Traditional model simply reflects that model’s ignorance of readily available transition probabilities.

\textsuperscript{12} Unlike the aged accounts receivable model developed by CDT, our risk category transitions are not directionally constrained; loans may move from 4-good to 5-watch in one period, and back to 4-good in a later period.
APPENDIX

Quarterly Provision for Loan Losses ($000's)

REFERENCES


INVESTMENT ADVISORS AND THE DEVELOPMENT OF FINANCIAL INVESTMENT CRITERIA: THE EARLY 20TH CENTURY EXPERIENCE IN THE UNITED STATES

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ABSTRACT:

This paper continues the historical investigation of the development of investing practices and the related use of information in the United States. The intent is to ascertain the use of information, especially accounting information, in the development of investment decision making theory and to gauge the level of practical adoption of that theory. The method employed is to review prominent books on investing from the target period and to synthesize the findings. This study covers the period from 1907 through 1916 and included reviews of five books.

Like the works in our previous study, the reviewed books tend to focus on general investment guidelines and on educating their readers as to the nature of securities. As such, specific details on the use of information is somewhat lacking. However, there are exceptions. Most intriguing is Franklin Escher’s Practical Investing (1914) that, in addition to educating the reader, suggests somewhat specific guidelines in selecting bonds and stocks. Although numerical benchmarks are lacking, his approach is foreshadows that employed twenty years later by Graham and Dodd in their classic, Security Analysis (1934). Escher also admonishes investors to avoid companies that they do not understand. In the face of modern debacles such as Enron, this sage advice still rings true.

INTRODUCTION

This is the second in a series of papers whose purpose is to begin to understand the development of investing practices in the United States, including the types of information needed, and, more specifically, the role of financial accounting in investing practices. That is, the basic issue is how investors make decisions and how important are accounting and other types of information in those decisions. While not directly bearing on recent scandals such as Enron and WorldCom, this research in a general way addresses the basic problem of investment, the needs and expectations of investors, and the responsibility of accounting and auditing functions in the investment process.

The method employed is to review books on investing that were published in the United States. WorldCat (2002) was searched using as keywords (phrases) “investing,” “security analysis,” and “financial statement analysis” to identify books. In the previous study (Janson and Thompson, 2003), books on investing published in the United States up to 1906 were reviewed. This study examines books published in the United States from 1907 through 1916, the year before America’s entry into
World War I. Using this procedure, five first edition books published in the United States were located and reviewed: *Bond and Stocks – The Elements of Successful Investing* (1912) by Roger W. Babson; *Investing Under Expert Direction* (1914) by The Geiger-Jones Company; *Practical Investing* (1914) by Franklin Escher; *The Future Method of Investing Money* (1914) by Roger W. Babson; and *Making Money Make Money or A Primer of Investing* (1916) by H. L. Barber. In this study, we review Babson (1912) and Escher (1914) in detail and summarize all five books in the conclusion.

**BABSON (1912)**

*Bonds and Stocks – The Elements of Successful Investing.* Roger Babson’s book is a comprehensive handbook for aspiring investors. After admonishing his readers to base investment decisions on careful study and disciplined action rather than impulse and popular fancy, Babson provides a basic primer on banking relationships, the cultivation of credit, and fundamental principles of investing. He also provides a glossary of important investing terms and a valuable taxonomy of contemporary securities issuers, accompanied by liberal amounts of advice and cautions. The securities offered by specific classes of issuers are described in detail and the novice is instructed in the nuances of successfully investing in, or carefully avoiding, each class. The book is organized into 22 chapters, with the first seven addressing general investing issues and the remainder focused on the securities of specific issuer classes.

Babson establishes his tone of purposefulness, diligent study, and discipline in his preface (p.7): “…fundamentally, making money with safety must mean the serving of some one else sufficiently for the other to pay for the work rendered. …. In speculation, however, one expects to violate this fundamental principle, and with very little trouble or exertion on his part, to obtain a handsome return on his money.” He adds (p.8): “The field of investments certainly offers many attractions but, anyone who is unwilling to give this subject careful and definite study should employ his money in other lines with which he is more familiar. Investing certainly is a profession and must be prepared for accordingly.” These themes of knowledge, effort and patience are carried throughout the book.

In the first chapter, “The Young Man’s Credit – Why He Needs It and How He Can Get It”, Babson stresses the importance of establishing solid banking relationships at an early age (pp. 12-13): “The man who has not established credit before he is thirty-five is greatly handicapped.” He advises that the establishment of two bank accounts, checking at a commercial bank and savings at a savings bank, should precede the purchase of the first share of stock and first piece of real estate. Bankers are considered to be excellent sources of advice on investments, and should be cultivated for this purpose.

In Chapter II, “The Selection of a Bank with Suggestions to Bank Employees. Published Statements of Banks,” Babson stresses the need to carefully assess the safety of a candidate bank before establishing accounts with it. Writing before the advent of federal bank deposit insurance and the relative complacency that such insurance has fostered among small depositors, the author recommends the comprehensive study of the candidate bank’s Statement of Condition to ascertain whether the bank is growing, and an assessment of the ratio of the bank’s share price to its book value to gauge the company’s level of acceptance in the business community. To aid the assessment process, he advocates broader disclosures of all of a bank’s assets including details of all outstanding loans. The integrity and accomplishments of the bank’s managers are also relevant, and deemed to be of much more significance than the prominence of its board of directors.

Banks are charged with the duty to provide investment advice to their customers, but Babson laments that too few of the 30,000 U.S. banks do a credible job. Foreign banks are commended for providing a much more credible service for their small depositors.

In Chapter III, “Suggestions for Investors, Fundamental Principles,” Babson identifies four classes of investors. Pure gamblers, buying on margin and selling in a day or two (p.40) “have a sort of mania for trading in stocks … buy and sell practically with their eyes shut.” He has no advice for this group.

Intelligent “men of means” who don’t study individual properties but study and time the market
in general and buy with the intent to sell in a month or so are classed as "intelligent speculators" and are credited with providing some stabilizing influence to the markets.

The third group is composed of individuals who buy outright, rather than on margin, only the highest grade securities and hold them primarily for yield. They also avail themselves of profitable sale opportunities when they arise. Babson observes that wise members of this class have acquired large fortunes by buying low and selling high, and recommends the strategy as a path to wealth. Nonchalantly, he posits that this buy-low sell-high strategy eliminates all risk.

The fourth class of investors consists of beginners who wish to graduate to class three. Babson's recommended training regimen is to buy only the best securities, to buy them regularly, and to hold them for the long term. As wealth and experience increase, some timed sales, as practiced by the masters of class three, may be added as well. Rules for the novice class include: Buy only high quality municipal bonds and the bonds of top railroads and public service corporations, expecting a top attainable yield of approximately 4.5%. Avoid purchases on margin, and buy regularly whenever investing funds are available.

In an aside, Babson commends the French banking system for issuing bonds in much smaller denominations, better suited to the needs of small investors, than the $1000 minimum purchase which characterizes the U.S. market.

Chapter IV is an annotated vocabulary lesson for the beginning investor. Babson carefully defines bond principal, coupon and registered bonds, stock certificates, interest and its accrual, and concepts of yield and rate of income on stocks. He describes sinking funds, callable bonds, mortgages, guaranteed bonds, commercial paper, and pledged receivables.

In Chapter V, Babson describes “Different Classes of Corporations Issuing Securities.” He observes that some investors spread their risk over several classes of issuers, while others seek to identify the best class and concentrate their attention on it. Without prejudice to either strategy, he does offer a rather pointed caution against investments in traction or street railroad stocks. He does not champion the securities of any particular industry, but admonishes investors to select firms that have long records of honest management and steady growth.

Chapter VI, “What Kinds of Bonds to Buy,” provides definitions for various bond categories. Mortgages that tie a bond issue’s security to specific pledged assets are most preferred, but wide variation in the degree of safety that various mortgages provide is stressed. Babson also discusses debentures, bonds without specific assets pledged as collateral, but deems them acceptable as investments only when the issuing corporation is of the highest credit quality. He does acknowledge that bonds with a conversion feature permitting the exchange, at the option of the investor, of the bonds for the corporation’s common stock, is attractive to investors, but cautions that such a feature often also serves to dampen the upside price appreciation potential of the stock.

In Chapter VII, “Listed and Unlisted Securities,” Babson contrasts bond marketing practices in the United States and the United Kingdom. In the US, most dealers handle both types, but in London, bond merchants specialize in one class or the other. London merchants of unlisted securities may advertise, while the bankers who trade listed issues may not. Listing, or the practice of arranging for an issue to be represented and its trades reported on an organized securities exchange, is a costly and time consuming practice, but one that many issuers view as beneficial due to a market broadening consequence. New York Stock Exchange commissions for bond trades should be limited to 1/8 point, while marketing commissions for unlisted bonds may be whatever the market will bear. Babson reports that only 5% of US bond issues are listed, but assures that reputable bond dealers do significant due diligence on all issues before recommending them. Established bond dealers can place unlisted securities nearly as easily as listed issues.

Since their due diligence costs for unlisted issues is higher than for listed securities, Babson observes that bond merchants justifiably charge higher commissions for transactions in unlisted securities. The investor is cautioned to acquire unlisted securities for no purpose other than long term investment, due to the relatively higher commission costs that must be borne. Also, when unlisted securities are considered, only local
issues that can be closely and personally monitored should be considered. Babson exhorts that under no circumstances should bonds or stocks offering over 7% net returns be considered, as they are nearly always flawed in concept.

He compliments the US Post Office for aggressively pursuing fraudulent dealers in securities, citing their record of shutting down 78 swindlers who had bilked the American people for more than $100 million over a five year period. He also comments on the periodic reporting required of companies whose securities are listed on the exchanges and notes the United States Secretary of the Treasury's position that such corporate periodic reports constitute "public property".

On the value of investment advisory services, Babson favorably describes the "card system" service provided by the Official Information Bureau in New York. Any breaking news of importance to a listed company prompts the preparation of an information card which is then distributed by overnight mail to subscribing brokers who file them for the reference use of their customers. He is less enthusiastic about the services of advisory publications, noting their dubious value (p. 144): "investors should shun many of these publications as they would shun smallpox, as many are designed to lead the investor astray."

The next several chapters offer specific advice for evaluating the securities of specific industries. As the dominant issuer of securities in Babson's era, railroads command the spotlight in his tutorial. Like his contemporary writers, Babson stresses the fundamental analysis of the issuing railroad's operations, indebtedness and capitalization, and recommends investment in only quality issues. While Babson cites some popular ratios (e.g., earnings per mile), he uses a broad brush, adding little to the method of analysis developed more fully by others.

Electric railway securities are deemed risky due to their dependence on the goodwill of the voting public for the continuation of franchise value. The securities of lighting utilities are also deemed risky since the ultimate dominance of electric or gas providers had not as yet been resolved.

Telephone companies and water power producers are examined and fundamental investment issues for each are discussed. For the investor in water power securities, the author reminds that an analysis of complementary coal supplies, prices and availability is also very relevant to the assessment of the hydro company's prospects for success.

Municipal securities are discussed in chapter XV, with the investor reminded of wide variability in the quality of these issues, and again cautioned to be diligent in his study of the issuers. For completeness, Babson discusses "Defaulted Bonds" in Chapter XVII. While substantial returns are possible when defaulted issues recover, the risks are very great, and non-expert investors are cautioned to stay away.

He devotes two chapters to the glamour stocks of the mining industry. After recounting the fabulous Boston wealth created by investments in the Calumet & Hecla mine (in Michigan's Upper Peninsula) where a $10,000 investment returned $1 million and dividends were as high as 400%, Babson strongly cautioned that copper mining is so risky that (p. 310) "to invest in one or two copper mines is one of the runnest kinds of speculation and something that should be shunned by every investor." On mining stock returns, he offers (p. 312): "dividends received from mines are not real earnings as are the dividends received from a railroad or industrial corporation, but these copper dividends are simply small portions of the principal, which are gradually being returned to the shareholder."

To assure that his readers are cognizant of fundamental forces that might impact the prices of their potential investment securities, Babson addresses some basic ideas from the field of economics. Commenting on regional influences on investment prices, he categorizes money as a commodity subject to the laws of supply and demand. In developing parts of the country, demand outstrips supply and interest rates are bid up. This can cause existing issues to suffer price depreciation while new issues will tend to bear higher coupon rates than similar issues from more mature regions. On the effects of gold supplies, he observes that price inflation is a consequence of increased gold production, but the price of labor generally lags increases in commodity prices. Price inflation generally leads to a decreased standard of living for laborers, as well as higher required yields on bond issues. Further, those who are able to borrow will, in the face of inflation, generally do so for very long periods, banking on
decline in the value of the obligations they must ultimately service.

Babson’s final chapter, “Investing in New Propositions,” provides advice that is clearly pertinent for evaluating new ventures, but also succinctly summarizes his investment philosophy for all issues and issuers: Invest in only what you comfortably understand. Operationally, Babson advises to consider projects sponsored by people of good reputation, to study their venture carefully, and to understand how they are to succeed, before committing investment funds.

As with other books of his era, Babson’s work may be characterized as a general guide to investing and securities. While he urges potential investors to study the businesses in which they may invest, other than when choosing a bank for personal services and investing in railroads, he gives little specific guidance on how to use accounting and other information. Rather, he focuses more generally on types of investors, types of investments, and prudent investment advice.

ESCHER (1914)

In the preface to his Practical Investing, Franklin Escher states that he wishes to write a practical, rather than a theoretical, guide to investment. He begins the book noting that the proper investment depends upon the individual’s circumstances. He then states the investment problem as (p. 2) “What are my needs and what is the maximum amount of income I can get out of securities filling those needs?” He adds that there are three main parts of investing: knowledge of different types of securities; basic investment principles such as safety, diversification, marketability, price stability, and chance for appreciation in value; and understanding what changes security prices. Moreover, armed with this information, an investor should decide for himself which type of securities to buy rather than relying on dealers in particular types of securities to decide for him.

Escher is quite satisfied with the information that was available to make investment decisions. Writing in 1914 he states (p. 6): “Two decades ago, one decade ago, the figures were simply not to be had;” but “…today he has everything.” Moreover, (p. 6) “Individual companies make reports then as they do now, but not with anything like the same degree of honesty or fullness.” He advises (p. 7) “Take the figures and settle to your satisfaction the question as to whether it is time to buy or a time to hold off.”

He also believes that conservative investors are interested in price appreciation as well as income. In addition, he states that conservative investors are (p. 7) “…about ten times as successful as those who use their money for speculation instead of for investment.” He continues (p. 7) “No sudden fortunes, except in cases where some commitment happens to turn out particularly well, but a gradual appreciation in the value of the security purchased—that is the natural course of scientific investment.” He asks rhetorically (p. 8) “…if there is a chance for a security to increase in value, is there not the same chance for it to do down?” He responds (p. 8) “Not necessarily.” He cites cases where an “absolutely good bond” might be undervalued because “…the syndicate bringing it out has just been dissolved.” Or, as another example, a new bond does not have much of a market for it yet. However, he believes (p. 9) “Good judgment in the beginning and then patience-time will do the rest.”

In Chapter II, Escher discusses different types of bonds and their features after classifying them into the four groups of issuers: transportation (steam railway and electric interurban), public utility (street railway, gas and electric, and water), civil (government), and industrial and miscellaneous. The types of bonds discussed are: first mortgage, general and consolidated mortgage, other mortgage, debenture, receivers’ certificates (“…far and away the safest form of security” since being issued by a receiver in a bankruptcy reorganization, they have first claim on the company’s assets), collateral trust, equipment obligations, short-term notes (up to two or three years in duration), and guaranteed bonds. All these types of bonds are listed under transportation, but not so under the other areas.

Escher classifies stocks into three categories (p. 29): railroad – dividend-paying preferred, dividend-paying-common, dividend-paying shares having important equities, guaranteed shares, uncertain dividend-payers, non-dividend-paying preferred, and non-dividend-paying common; industrial and miscellaneous – seasoned dividend-paying preferred, seasoned dividend-paying common, newly created preferred and common, uncertain dividend-payers, non-dividend-paying preferred
and common, dividend-paying shares having important equities, shares in “prospects;” and public utility – seasoned dividend-payers, dividend-paying shares in newly created companies, and non-dividend payers. He then discusses each of these categories in turn. In general, Escher likes seasoned dividend paying companies with ample earnings and preferred shares over common shares.

In Chapter IV, Escher discusses the five principles to judge the value of a bond. The first principle is to understand the general character of the company and the nature of its business. He queries (p. 45): “…is it stable, established, profitable, free from the danger of ruinous competition.” In his second principle, Escher considers the “security behind the bond.” This includes evaluating the other bonds issued by the company and comparing the amount of the company’s (usually a railroad according to Escher) indebtedness to others operating under similar conditions (and calculating per mile indebtedness).

Thirdly, Escher would examine (p. 48) “…the margin by which bond interest has been earned over a series of years…” and the dividend-paying record of the company since (p. 48) “The actual payment of dividends over a series of years is a tangible and concrete proof of earning powers…” Escher suggests using ten years worth of gross and net earnings in evaluating a bond and calculating earnings per mile and comparing it to similar railroads. Fourthly, Escher urges the prospective investor to purchase bonds, especially a new issue, from a reputable investment banker who must be both honest and “capable.” However, he cautions the investor to do his own evaluation since some of the issues handled may be “business” risks with the investment banker expecting the investor to know that and make his own evaluation since the investment banker would say (p. 54) “…this is a great railroad, under government regulation, and concerning which you can go and get information first hand just the same as we can.”

Lastly, Escher’s fifth principle is to consider the interest rate paid by the bond and the marketability of the bond. The latter is important in the event the holder wishes to sell quickly, so a less desirable bond that is marketable may sell at a higher amount than a better quality bond. He also considers the length of time to maturity of a bond since the bond of a “solvent” corporation as it nears maturity (p. 57) “…will sell on a basis as almost as low as the rate for time-money.”

In Chapter V, Escher gives his four principles for valuing a common stock. As with bonds, the first principle is learning the character of the business. This includes whether it is stable and established, growth and competition, production methods, as well as (p. 60) “…is it a good, safe, conservative kind of enterprise and run by people who know how to run it?” and (p. 60) “…is there room for expansion, greater profits and greater dividends to shareholders.” The second principle is to ascertain the amount of its bonds (p. 61): “However small the stock issue may be, if the amount of the bonds outstanding is large, the shares are not a desirable investment.” Escher is concerned with the amount of fixed charges and the amounts due bondholders in the event of liquidation. Escher suggests comparing the bond indebtedness of a company to those in similar circumstances to determine whether a company has too much debt.

His third principle is to look at the amount of earnings available to common shareholders in each of the last five years. Escher is concerned with the amount of depreciation taken by companies and suggests comparing one company’s depreciation to others in similar circumstances to ascertain that the first company has written off a reasonable amount. Escher points out earnings should be compared to the value of its common stock to determine the percentage earned. For a new issue, an investor should examine earnings for the previous five years. He notes that while past earnings may not reflect future earnings, nevertheless (p. 66) “Fundamental conditions remaining unchanged, however, there is no better way of estimating what a company’s earnings are going to be than by what they have actually been.”

His fourth principle is to consider the dividend record of the company and the marketability of the shares. He cautions against only considering a company’s dividend record and other measures should be investigated (unspecified). With respect to marketability, similar considerations apply as discussed with bonds. He adds (p. 68), “For investment purposes, stocks whose past records show that they do not move through too wide a range are decidedly preferable.”
In Chapter VI, Escher claims that (pp. 70-71) “The ideal investment would be perfectly safe, perfectly marketable, would yield a high rate of income, would be free from large fluctuation in price, and yet would have a good chance for appreciating in value.” He notes that a like a person, a security is unlikely to be good at everything. Escher considers safety the most important attribute when make an investment, but notes that this is often overdone. Similarly, investors often pay too much for marketability, especially in those cases where an investor fully intends to keep the investment for several years. While marketability can be important for a business man who invests his surplus cash for a short time, for an average investor marketability is not as important and he should not pay for an excessive amount of it.

With respect to income, Escher points out that the real interest earned depends on the price at which the bond sells which, in turn, depends on the other attributes like safety and marketability. Price stability is important if an investor may need to sell the security. Hence, a desirable security is one whose price will not fall too much from the amount paid to purchase it. Escher also believes that there exist securities that exhibit price stability as well as the chance of price appreciation. Yet (p. 77) “Chance of price appreciation is, however, a quality to be sought only with full realization of the fact that where it exists it is generally at the expense of other important investment qualities.” This quality involves “the greatest amount of risk” and (p. 78) “Before seeking it the investor will do well to pause and ask himself whether he is in a position to forgo these other qualities which the presence of this one usually proves are lacking.”

Escher discusses different ways of diversifying an investment fund in Chapter VII. He notes (p. 80) “However good any one particular security may be, it cannot satisfy all the legitimate needs of the average investment fund.” Hence, he first relates diversity to the five principles of ideal investment of the previous chapter. That is, part of the investment fund should be invested for safety, part for marketability, part for income, etc. Diversity can be accomplished by spreading the annual amount available for investment among different securities or, if only a small amount is available each year, buying different types of investments each year so that in a few years a diversified fund is obtained.

Escher considers other aspects of diversification. He notes that it is not necessary to initially “salt away” part of the investment fund since safety can be obtained through a proper selection of securities. Escher also thinks that diversification can be overdone. He suggests that it would be sufficient to invest (p. 86) “…in three or four different classes of securities with, say, three different issues in each class.” This, he maintains, is preferable to investing in 50 companies (p. 86): “At least general track can be kept of the affairs and earnings of a dozen companies by the man who is willing to give time and attention to it, whereas with fifty companies that is out of the question.” Information is also a concern. He maintains (p. 86) “…it is important, too, that securities in companies whose earnings statements are not readily accessible should be avoided” and that each company (p.87) “…be of such a nature that its affairs can be kept track of without trouble or expense.”

Escher also believes that one should diversify in such a manner that the interest and dividends received are spread out throughout the year. When diversifying, the investor should not go (p. 88) “…outside of those classes of securities with which you are thoroughly familiar.” That is, an investor (p. 88) “…must not be lead to follow after strange gods.” He adds (p. 88), “To do so is, indeed, generally to open the door to an element of uneasiness and uncertainty.”

In the next two chapters, Escher discusses convertible bonds and compares bonds and mortgages as investments. After explaining convertibles, he notes that a good quality convertible debenture is one (p. 96) “…backed up by demonstrated earning-power dividends paid on the stock over a long series of years.” For a mortgage convertible, the buyer needs to be assured that the mortgaged property is valuable enough to cover the amount of the bond. Escher cautions that a large convertible issue can create a (p. 99) “…a drag on the price of the stock,” since with the potentially large increase in the shares outstanding (p. 99) “…not only is everyone who might want to put the stock up in price scared off, but the intrinsic value of each share made appreciable less.” He concludes that convertibles (p. 101) “…like firearms and whiskey and lots of other things, suitable only for those who fully understand their use.” In Chapter IX, Escher
compares bonds and mortgages as investments, concluding that the choice between the two types of investments is up to the individual investor, because bonds have (p. 110) “…the profit-possibilities and the ready convertibility into cash…,” they are “…more likely to appeal to the active man of business…”

Escher next addresses “business barometers” which allow an investor to keep track of general business conditions. The first of six barometers is commodity prices, allowing an investor to determine whether prices are rising or falling and the resulting impact on available capital. The second barometer is the weekly report of check bank clearings which give an indication of the amount of business being transacted. Escher cautions that both the change in commodity prices as well as the location of bank clearings must be taken into account in judging the level of business activities. Although somewhat late in the business cycle, Escher’s third barometer is railroad earnings from which an investor can get an indication of business activity. Escher would compare railroad earnings over time (month to month and to corresponding periods of the previous year), taking into account the change in capitalization of the railroad. Next Escher considers foreign trade and the balance of exports over imports, with the higher the balance generally signifying good business conditions. Here he cautions to take into account the magnitudes of exports and imports separately as well as taking into account other possible conditions and commodity prices. The fifth business barometer is monthly iron production reports since (p. 127) “…the steel industry is, after all, the basic industry, and representative of conditions as a whole.” The final barometer is the bank statements issued by the Comptroller of the Currency. Here, Escher looks at the amount of bank loans and the ratio of bank reserves to deposits. With respect to the later, Escher states that a high ratio means “easy conditions” while a low ration means “strain.” These barometers, Escher concludes (p. 129) “…are the fundamentals on which the intelligent business man or investor bases his estimate of future conditions.”

Chapter XI is entitled “Europe’s Influence on the American Market.” Here, Escher discusses the importance of foreign investment, especially that in London, on American securities. Chapter XII is entitled “The Influence of Gold Production on Security Values.” Here, examines the impact on security prices due to an increase in gold production. However, Escher does not believe that increased gold production will have a significant impact on security prices because of the increased demand for gold due to the increase in population, the increase in business activity increasing the need of banks to hold more gold, and the increase in the use of gold for non-monetary purposes in the arts and sciences.

In his penultimate chapter, Escher identifies the factors for the broad movement of stock prices. These are business and money conditions. In turn, business conditions depend upon dividend (and earnings) prospects and economic developments. Escher claims that dividend prospects depend upon such factors as seasonality (e.g., crops), conditions affecting particular industries (especially railroads), labor, and government regulation. Economic factors include laws, tariffs, and the currency system. He divides money conditions into speculative operations (by the public, operators, and pools) and investing operations using borrowed money.

Interestingly, Escher states that the market anticipates business conditions (p. 152): “Far in advance of the time when good or bad conditions actually prevail, the market ‘discounts’ their arrival.” He claims that businessmen cause this to happen based on their judgment and use of business barometers like those that he discussed previously. With respect to money conditions, both speculators and investors are influenced by interest rates – low interest rates encourage borrowing and the purchase of stocks while high rates encourage the selling of stocks and paying off the loans. Investors, he says, will hold stock when dividend payments exceed interest charges, but will sell them when the reverse is true.

In his last chapter, Escher discusses the price movement of bonds. After explaining that as interest rates rise, bond prices fall, and vice versa, Escher describes the three main groups of high-grade bond buyers. These are banks, businesses, and individuals who buy bonds with borrowed money whenever the bond interest rates exceed the interest rates on the loans. For bonds of lower grade, Escher states that their price depends more on their individual situation rather than money rates which have less importance. Influencing factors on the price of the bond include earnings
and the supply of the bonds. He concludes (p. 177): “Each individual bond of this sort on its own merits…”

Escher uses some accounting information in his evaluation of securities. For bonds, this includes earnings, the amount of the debt, and the margin of earnings over interest. He would compare both earnings and the amount of the debt to similar enterprises. For stocks, he compares the amount of bonds to common stock and the amount of debt to similar companies. He also looks at earnings (over five years), making sure of an adequate depreciation amount, and comparing earnings to the value of common stock and to similar companies. Other information used by Escher includes general knowledge of the business, its dividend record, business “barometers,” and interest rates. He notes that accounting information is generally available and useable and he would avoid any company that did not furnish regular accounting reports. He also relates stock prices to business conditions and both stock and bond prices to money conditions. Thus, Escher uses accounting, other company information, and macroeconomic information in making investment decisions. While he is not particularly specific on information usage, he at least gives general indications on how to use it such as making comparisons to other similarly situated companies. He also cautions against purchasing securities that are too much trouble to keep track of or those that are unfamiliar to the security buyer. Such cautions are likely to be applicable today.

**SUMMARY**

As with most of the earlier books on investing, several of these books can be characterized as providing general advice on investing and educating the public. This is certainly true for the books authored by Babson (1912), Geiger-Jones (1914), and Escher (1914). With respect to the use of accounting information in investment decisions, most of the books give little indication of how to use it beyond the notion of investing in “profitable” corporations. This would apply to more or less of an extent to both Babson books (1912, 1914) as well as to the books by Geiger-Jones (1914) and Barber (1916). Of note, unlike earlier books, both Escher (1914) and Babson (1912, 1914) make explicit reference to economic variables in making investment decisions. In fact, this is the primary theme of Babson’s later book (1914), focusing on business cycles as a way to time security purchases.

Some of the other books also suggested specific investment strategies. Geiger-Jones (1914) suggested that they, serving as investment bankers, could find lucrative investments for the small investor. Barber (1916) suggested that individual’s should speculate in the common stocks of new corporations, thereby bringing wealth to all people instead of the few. He believed that the benefits of socialism were possible through private ownership of common stock.

Perhaps the most intriguing book in this study, at least as far as the practice of financial statement analysis is concerned, is that of Escher (1914). After describing the basic features of securities, Escher gave guidelines for selecting bonds and stocks that individuals could employ on their own. The guidelines include the margin by which interest has been earned, the amount of debt, the dividend-paying record of the company, and even the ratio of earnings to the value of common stock, essentially the inverse of the price-earnings ratio. While Escher did not give numerical benchmarks, he did suggest comparing such numbers to other companies in similar circumstances. His approach is not unlike that of the more fully developed later treatment of Graham and Dodd (1934). Escher even included the notions that the market “discounts” information far in advance of actual events and that companies’ have an “intrinsic” value, popularized by Graham and Dodd. He also added that investors shouldn’t invest in companies that are hard to follow or difficult to understand. Advice that investors in Enron might have wisely heeded!

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A TRANSFER FUNCTION AND NOISE MODEL OF AGGREGATE STOCK RETURNS

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ABSTRACT

In this study, we combine a univariate regression model and a time series model of the regression residuals to build a transfer function and noise model, with dividend yield as the input variable and real stock returns as the output variable. Comparing to pure regression and time series analysis, the predictability of aggregate stock returns is improved significantly by the transfer function and noise model. For the real returns on SP500 index over the period of 1871 to 2002, the predictive power of the lagged dividend yield increases from 15% to 32% on annual returns, from 4% to 10% on quarterly returns, and from less than 2% to 8% in monthly returns. The results demonstrate the effectiveness of the transfer function and noise modeling technique in forecasting aggregate stock returns. While only univariate regression is used in this study, the transfer function and noise model can be easily expanded to incorporate multivariate regression analysis.

I. INTRODUCTION

Despite the mounting evidence that stock market returns are predictable, the predictive power of the documented forecasting variables is generally too low to have any meaningful practical implications. This is especially true when the market returns are measured over relatively short intervals such as monthly, quarterly, semianually or even annually. Significant improvements of the explaining and predictive power can only be achieved when the return horizons are longer than two or three years. But the estimated predictive power in these situations is less reliable since overlapping data points must be used to maintain reasonable degree of freedom. For example, using dividend yield as the forecasting variable, Fama and French (1988) find that the predictable component of monthly aggregate stock returns never exceeds 3% of the total return variation in various sample periods. When stock returns are measured in quarterly and annual intervals, the average fraction of the total return variations predicted by dividend yield over four different sample periods increases to the highest levels of 6% and 15%, respectively. Significantly higher proportions of total return variations can be explained only when the return periods are measured in much longer horizons such as two, three or four years. Lee, Myers, and Swaminathan (1997) construct various value-to-price ratios (V/Ps) from the discounted residual income formula and use them to explain and predict aggregate returns on stocks included in Dow Jones.
To achieve this goal, the dependent variable is with the use of either of these techniques alone. produce a better forecast than would be possible analysis and time series analysis together to modeling technique is to combine regression and Pankratz (1991). The basic idea of this originally developed by Box and Jenkins (1976) with a transfer function and noise model, predictive power of the forecasting variables is very low for short holding period returns and increases with the return horizons. The best forecasting results are provided by the 12-month value-to-price ratio constructed using 1-month Treasury bill rates. But these best results explain only 3.1% of variations in monthly returns, 7.05% and 19.34% of variations in quarterly and annual returns, respectively. 24.48% of variations in total returns is explained when the returns are measured over 18-month intervals. Given the fact that these two variables are the most successful forecasting variables in US data, the low predictive power of the identified forecasting variables for relatively short return horizons offers little help in making investment decisions. One way to improve the predictability of stock returns is to incorporating more than one forecasting variables in a single regression analysis. Unfortunately, the improvement can be achieved in this way is very limited due to the high correlations among the forecasting variables documented in previous studies. Partly because the poor performance of these documented forecasting variables and the need for better forecasting of stock returns over relatively short return periods such as monthly, quarterly and annual returns, the effort in searching for new forecasting variables has been greatly increased in recent years. An incomplete list of forecasting variables in existing literature may include dividend yield (Fama and French, 1988), price to earnings ratio (Campbell and Shiller, 1989), term spread (Keim and Stambaugh, 1986), default spread (Fama and French, 1989), the government bond to equity yield ratio (Clare, Thomas and Wickens, 1994) and value-to-price ratio (Lee, Myers, and Swaminathan 1997).

This study attempts to enhance explaining and predictive power of popular forecasting variables with a transfer function and noise model, originally developed by Box and Jenkins (1976) and later extended by Liu and Hanssens (1982) and Pankratz (1991). The basic idea of this modeling technique is to combine regression analysis and time series analysis together to produce a better forecast than would be possible with the use of either of these techniques alone. To achieve this goal, the dependent variable is first regressed on one or several independent variables to obtain the residual series. The time series analysis is then performed to construct an ARIMA model for the regression residuals. The identified ARIMA model is then used to substitute for the implicit error term in the original regression equation. Finally the coefficient parameters for both the regression part and ARIMA part of the model are estimated simultaneously. The regression part of the model is designed to explain the variance of the dependent variable that is caused by structural factors, while the time series part of the model is designed to explain the variance of the dependent variable that cannot be explained structurally. In many cases a significant enhancement of forecasting can be achieved by an effective application of transfer function and noise model. But surprisingly, this valuable modeling approach has been rarely employed in analyzing financial time series. The only exception that comes to our attention is the study by Umstead (1977). He uses the National Bureau of Economic Research (NBER)’s leading composite index to predict aggregate returns on SP500 index in a transfer function and noise model. For the quarterly data over the sample period of 1948Q1 to 1974Q4, he obtains a remarkable R-squared statistic of 62%. Although the results of Umstead (1977) is criticized by some because the stock return is included in the NBER’s leading composite index, the forecasting variable employed in the study, and because some procedure shortcomings (for example, the model is identified using the full sample but estimated using only the first half of the sample), the effect of transfer function and noise model in improving forecasting power is rather revealing.

We apply transfer function and noise model to dividend yield, the most successful forecasting variable documented in previous studies. The results are remarkable comparing to those obtained from pure regression models or pure time series models. A pure time series model of the total returns on SP500 stock index can explain only about 3% of the total variations in monthly returns, 5% of the total variations in quarterly returns, and 10% of total variations in annual returns over 1871 to 2002 period. The pure regression model where dividend yield is used as the forecasting variable explains only 2%, 4%, and 15% of total variations in monthly, quarterly, and annual returns, respectively. Once we combine regression and time series models together and analyze variations of the stock returns in the resulting transfer function and noise model, the
The fraction of total variations in monthly returns explained by the model increased dramatically to 8%. The fraction of total variations in quarterly and annual returns increased to 10% and a remarkable 32%, respectively. Our analytical procedure also highlights the importance of estimation method. If the parameters in the regression part of the model and the time series part of the model are estimated separately, less desirable results are obtained in all cases. While the simultaneous estimation of all the parameters is sometimes computationally expensive or even difficult, it should be done whenever it is possible. With the advance in computing techniques, this should not be a major concern in performing transfer function and noise model analysis.

The remaining of the paper proceeds as follows. In the next section, we outline the economic intuition of the transfer function and noise model and the procedures in identifying and estimating the model. Section III describes our data set and some descriptive statistics on the data. We build a transfer function and noise model using dividend yield as the forecasting variables and interpret the results in Section IV. Section V concludes the paper.

II. A GENERAL DESCRIPTION OF TRANSFER FUNCTION AND NOISE MODEL

Let \( X \) be a vector of input variables to a system and \( Y \) be the output variable of the system. \( X \) varies stochastically and independently while the level of \( Y \) is determined by the level of \( X \). Because the inertia of the system, it is usually possible that a change in \( X \) from one level to another will have no immediate effect on the output \( Y \), but instead, it will produce delayed response with \( Y \) eventually coming to equilibrium at a new level; also, the response of \( Y \) to a particular change in \( X \) may spread over several periods rather than limited to a single period. The equilibrium relationship of the system is thus expressed as

\[
Y_t = \alpha + v_0 X_{t-b} + v_1 X_{t-b-1} + v_2 X_{t-b-2} + \Lambda + v_k X_{t-b-k} \quad k = 3, 4 \ldots \tag{1}
\]

where both \( Y \) and \( X \) are stationary variables, subscript \( b \) is the number of lagged periods between changes in the input variable \( X \) and the initial response from the output variable \( Y \). \( \alpha \) is the constant mean of \( Y \), which can be dropped from the equation if we work with demeaned data series. Then equation (1) becomes

\[
Y_t = v_0 X_{t-b} + v_1 X_{t-b-1} + v_2 X_{t-b-2} + \Lambda + v_k X_{t-b-k} \quad \tag{2}
\]

and \( X_t \) and \( Y_t \) in this representation can be interpreted as deviations from their respective equilibrium values. It can be seen from equation (2) that

\[
v_0 X_{t-b-1} + v_1 X_{t-b-2} + v_2 X_{t-b-3} + \Lambda + v_k X_{t-b-k-1} = Y_{t-1}, \tag{3}
\]

\[
v_0 X_{t-b-2} + v_1 X_{t-b-3} + v_2 X_{t-b-4} + \Lambda + v_k X_{t-b-k-2} = Y_{t-2}, \tag{4}
\]

\[
v_0 X_{t-b-r} + v_1 X_{t-b-r-1} + v_2 X_{t-b-r-2} + \Lambda + v_k X_{t-b-k-r} = Y_{t-r}, \tag{5}
\]

A parsimonious expression of equation (2) can be obtained by successive substitution.

\[
Y_t = \sum_{i=1}^{r} \delta_i Y_{t-i} + \sum_{j=0}^{s} \omega_j X_{t-b-j}, \quad \text{or} \quad \tag{6}
\]

\[
\delta(B)Y_t = \omega(B)X_{t-b}, \tag{7}
\]

\[
Y_t = \delta^{-1}(B)\omega(B)X_{t-b}, \quad \tag{8}
\]

where \( B \) is lag operator, \( \delta(B) = (1 - B - B^2 - \Lambda - B^r) \), and \( \omega(B) = (B + B^2 + \Lambda + B^r) \). Equation (4) is called transfer function of \( X \) into \( Y \). In practice, the output \( Y \) could not be expected to follow exactly the pattern determined by the transfer model, even if that model were entirely adequate. Disturbances of various kinds other than \( X \) normally corrupt the system. A disturbance might originate at any point in the system, but it is often convenient to consider it in terms of its net effect on the output \( Y \). If we assume that the disturbance, or noise \( N_t \), is independent of the level of \( X \) and is additive with respect to the influence of \( X \), we can add the noise term \( N_t \) to the above transfer function to obtain a complete description of output \( Y \).
\[ Y_t = \delta^{-1} (B) \omega(B) X_{t-b} + N_t \] (9)

If the noise term \( N_t \) can be represented by an ARIMA \((p, d, q)\) process
\[ \phi(B) N_t = \theta(B) \epsilon_t, \quad \text{or} \] (10)
\[ N_t = \phi^{-1}(B) \theta(B) \epsilon_t, \] (11)

where \( \epsilon_t \) is white noise, then equation (5) can be written finally as
\[ Y_t = \delta^{-1}(B) \omega(B) X_{t-b} + \phi^{-1}(B) \theta(B) \epsilon_t, \] (12)

The combining regression and time series model of equation (12) is called transfer function and noise model. Construction an ARIMA model for the regression residuals \( N_t \) is an important part of modeling process. Once the ARIMA model for the regression residuals is identified, it can be substituted for the implicit error term in the original regression equation. In using the equation to forecast \( Y_t \), we would also be able to make a forecast of the error term \( \epsilon_t \) using the ARIMA model. The ARIMA model provides some information about what future values of \( \epsilon_t \) are likely to be; i.e., it helps “explain” the unexplained variance of \( Y_t \) in the regression equation. This is the why an effective application of transfer function and noise model can improve forecasting.

The procedure of transfer function and noise modeling is briefly outlined as following steps. A more detailed treatment of this technique is provided in Box, Jenkins, and Reinsel (1994) and Harvey (1990). First, the original input series \( X_t \) and output series \( Y_t \) should be examined for stationarity. This can be done by visually examining the autocorrelation and the partial autocorrelation functions of the series, or by constructing formal unit root tests on the original series. If the series are found to be nonstationary, they should be differenced for appropriate times \((d \ \text{times for an integrated series of order } d)\) to introduce stationarity. Second, decide whether to work with demeaned data or non-demeaned data. If non-demeaned data are used in the analysis, a constant term should be included in the model. Third, the input series \( X_t \) is prewhitened by the usual ARIMA modeling technique to obtain a white noise residual series \( \xi_t \), the same model that reduces \( X_t \) into white noise is then used to transform output series \( Y_t \) to obtain a white noise residual series \( \zeta_t \). Cross correlation function \( r(\xi_t, \zeta_{t+k}) \) is calculated. Fourth, based on the cross correlation function, parameters in the transfer function part of the model are identified. The parameters in the noise part of the model can be identified by the usual ARIMA modeling procedure. Finally, once parameters in both parts of the model are identified, they are estimated simultaneously.

In Section IV, We will follow the above procedure to build a transfer function and noise model with the aggregate returns on SP500 stock index as the output series and the dividend yield of the index as the input series. But before that a brief descriptive analysis of our data set is offered next.

III. DATA

We use SP500 index as a proxy for stock market price. Available data on the index extends back to 1871, the longest data set available for any major market index. This helps us to address the low power problem of the standard unit root tests in small samples. The nominal index level and the dividend paid to the index are first converted to values in real terms through the following conversion formula:
\[ RP_t = NP_t \times CPI_t / CPI_b, \]
\[ RD_t = ND_t \times CPI_t / CPI_b, \]

where \( RP_t \) is the level of SP500 index at time \( t \) expressed in real terms, \( RD_t \) is the total dividend paid during the period ending at \( t \) expressed in real terms. \( CPI \) stands for Consumer Price Index. The subscription \( b \) denotes base period, which in this study is the year 2002. After the nominal index level and dividend paid to the index are first converted to values in real terms, the real stock return and real dividend yield are calculated as:
\[ RSR_t = (RP_t - RP_{t-1} + RD_t) / RP_{t-1}, \]
\[ RDP_t = RD_{t-1} / RP_{t-1}, \]
The total annual dividend payments used in calculating dividend yield for time \( t \) are lagged one year behind because they are unknown to investors at the end of the current year.

The autocorrelations and the partial autocorrelations over 20 lags are presented in Table 1 and plotted in Figure 1. These statistics show that both the return series and the dividend yield series seem to be stationary. This is further confirmed by formal unit root tests. The test models and results are presented in Table 2. Since the series are stationary and we decide to work with non-demeaned data, the following analyses are based on the original real stock return and dividend yield series.

**TABLE 1: Autocorrelation and Partial Autocorrelations**

<table>
<thead>
<tr>
<th>Panel A: Autocorrelation Functions</th>
</tr>
</thead>
<tbody>
<tr>
<td>lag</td>
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<tr>
<td>-----</td>
</tr>
<tr>
<td>return</td>
</tr>
<tr>
<td>D/P</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Panel A: Partial Autocorrelation Functions</th>
</tr>
</thead>
<tbody>
<tr>
<td>lag</td>
</tr>
<tr>
<td>-----</td>
</tr>
<tr>
<td>Return</td>
</tr>
<tr>
<td>D/P</td>
</tr>
</tbody>
</table>

**TABLE 2: Results of Unit Root Tests**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Lag order</th>
<th>P-value(without trend)</th>
<th>P-value (with trend)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Return</td>
<td>3</td>
<td>0.01</td>
<td>0.01</td>
</tr>
<tr>
<td>D/P Ratio</td>
<td>4</td>
<td>0.04</td>
<td>0.05</td>
</tr>
</tbody>
</table>

**IV. A TRANSFER FUNCTION AND NOISE MODEL OF REAL STOCK RETURNS**

To provide a benchmark for comparison, we first model the real stock return series in pure regression approach and time series approach. The estimated regression equation is reported below:

\[
\hat{R}_t = -0.085 + 3.849 \, RDP_{t-1}
\]

\[
(0.122) \quad (2.68)
\]

\[
-5.43 \, RDP_{t-2} + 5.16 \, RDP_{t-3}
\]

\[
(-3.04) \quad (3.55)
\]

\[
R^2 = 0.15, \quad \bar{R}^2 = 0.12.
\]

The values in parentheses below the estimated parameters are \( t \)-statistics corresponding to each of the estimated parameter. The results are consistent with theory as well as documented empirical evidence. Based on theory, an increase in discount rate or expected return will lower current stock price and result in a higher dividend yield. If the market is efficient, a high current dividend yield signals an increase in future stock prices and the realized rate of return will be higher as the market rationally expected. If the market is not efficient, an undervalued (overvalued) current stock price will result in an unjustifiable high (low) dividend yield. Adjustments of stock prices in late periods toward their fundamental values will result in high (low) realized returns. Therefore dividend yields predict stock returns no matter the market is efficient or inefficient and the current dividend yield should be positively correlated with stock returns in the subsequent periods. The estimated slope coefficients in above regression confirm this line of reasoning.

Although the estimated coefficient for the second lag of dividend yield is negative and statistically significant, the sum of the significant slope coefficients is reliably positive. The estimated \( R^2 \) of
TABLE 1: Time Series Property of Stock Return and D/P Ratio

Annual Returns on SP500 Index: 1871-2002

Autocorrelation of Returns

Partial Autocorrelation of Returns

D/P Ratio on SP500 Index: 1871-2002

Autocorrelation of D/P Ratio

Partial Autocorrelation of D/P Ratio
15\% is largely in line with those reported in previous studies for annual stock returns.

Much evidence has been found that aggregate stock returns exhibit positive autocorrelations if returns are measured in high frequencies such as daily or weekly. This positive autocorrelations tend to decrease as the returns are measured in longer intervals and finally turn into negative autocorrelations when the return horizons are beyond two or three years. This “U-shape” autocorrelation function of stock returns in respect to the length of measurement intervals indicates the possibility that aggregate stock returns at some measurement intervals are at least close to random walk. A visual inspect of the autocorrelation and partial autocorrelation functions presented in the previous section indicates that the stock returns measured in annual intervals appear to be very close to a white noise process. But, with a few experimentation, we find that the annual real return series on SP500 index over our sample period can be best described as a low order AMIMA (2, 0, 2) process. The following fitted equation is obtained by Box-Jenkins procedure:

\[
(1 - 0.69B + 1.55B^2 - 0.37B^3 + 0.47B^4)\]

\[N_{t-1} = 0.01 + (1 + 0.60B - 1.45B^2 + 0.27B^3 - 0.46B^4)\eta_t,\]

\[R^2 = 0.06, \quad R^2 = 0.02.\]

The fitted value of the residual series from the original regression \( \hat{N}_t \) is then added to the original regression equation as the noise part of the transfer function and noise model. Re-estimation of the expanded regression equation yields:

\[
\hat{R}_t = -0.09 + 3.47RDP_{t-1} - 6.30RDP_{t-2}
\]

\[
(1.55) \quad (4.48) \quad (3.57)
\]

\[+ 6.32RDP_{t-3} + 1.47\hat{N}_t,\]

\[
(4.30) \quad (2.86)
\]

\[R^2 = 0.20, \quad R^2 = 0.17.\]

The equation shows that almost 10\% of total variations in aggregate stock returns can be explained by the lagged returns. But as in the case of regression analysis, the empirical predictability of stock returns cannot be used to settle the disputes over market efficiency. Those who do not believe in market efficiency may cite this as the evidence that the market fails to incorporate even the historic price information in setting current stock prices. The proponents of the market efficiency, on the other hand, may argue that the market returns are predictable because expected returns are time varying and positively correlated, rather than arise from market inefficiency. We will not be distracted by the dispute over market efficiency and focus on the main objective of this study, that is, to investigate whether the predictive power of dividend yield can be improved by combining regression and time series analysis in a single forecasting model. For this purpose, we take the residual series \( \hat{N}_t \) from the above regression and fit the following ARIMA model for the series using Box-Jenkins methodology:

\[
(1 - 0.13B - 0.63B^2)R_t
\]

\[= 0.02 + (1 - 0.08B - 0.89B^2)\eta_t,\]

\[R^2 = 0.10, \quad R^2 = 0.07.\]

Note first that adding the fitted noise series has little impact on the estimated coefficients of the lagged input variable, the dividend yield. As before, the coefficients for the first and third lag of the dividend yield are significantly positive, while the second lag remains positively negative. The over impact of lagged dividend on current stock return is positive because the sum of the coefficients is positive. Secondly, estimated coefficient for the fitted noise is statistically significant at better than 1\% level, implying that the fitted noise series is helpful in explaining the part of total variations in aggregate stock returns that is not explained by the input variable dividend yield. This is confirmed by the estimated coefficient of determination, which is 20\%, 5\% higher than that obtained in the pure regression model and more than 10\% higher than that obtained in the pure time series model.

While it is obvious that the predictability of the aggregate stock returns has been significantly improved when we combine regression and time series analysis together to build a transfer function and noise model, the model is not estimated efficiently because the parameters in the noise model are estimated separately. A more efficient estimation approach is to estimate parameters in the
regression part and the noise part of the model simultaneously. To do this, we simply identify without estimating the time series model for the residual series obtained from the original regression. Instead of adding the fitted value of the residuals as the noise part of the full model, we incorporate the identified time series model of the residual series into the regression and use the nonlinear approach as outlined above to estimate the parameters in both parts of the model simultaneously. The final estimated model is given as:

\[
\hat{R}_t = -0.06 + 2.23 RDP_{t-1} - 5.69 RDP_{t-2} \\
+ 6.23 RDP_{t-3} + (1 + 0.18 B - 0.88 B^2) \\
+ 0.21 B^3 + 0.88 B^4) / (1 - 0.19 B) \\
+ 0.80 B^2 + 0.11 B^3 + 0.60 B^4) \epsilon_t \\
(1.13) (4.63) (-0.87) \\
(3.83) (0.59) (3.43)
\]

\[
R^2 = 0.32, \quad \bar{R}^2 = 0.25.
\]

The improvement in the model’s predictive power is remarkable. The value of \( R^2 \) increased from 20% to 32% and the adjusted \( \bar{R}^2 \) increased from 17% to 25%. This demonstrates the importance of estimation method in transfer function and noise models. A sub-optimal result will be obtained if the parameters in the two parts of the model are estimated separately.

We also apply the above modeling procedure to monthly and quarterly real returns on SP500 index over the same sample period and similar results are obtained (the full results for monthly and quarterly returns are not reported here but they are available from the author upon request). In the case of monthly returns, regression of the returns to the dividend yields up to 8 lags produces a coefficient of determination of less than 2%, while in the transfer function and noise model, dividend yield can explain about 8% of the total variations of the monthly stock returns. For quarterly returns, the value of \( R^2 \) produced by the transfer function and noise model is 10%, while only 4% of the total variations of the monthly stock returns can be explained by the pure regression model. No matter whether the traditional R-squared or the adjusted R-squared is used as the measurement, the explaining power of the transfer function and noise model fitted in this study is significantly higher than the pure time series model or the pure regression model.

V. CONCLUSIONS

In this study, we apply transfer function and noise model to dividend yield, the most successful forecasting variable documented in previous studies. The results are remarkable comparing to those obtained from pure regression models or pure time series models. Compare to the pure regression analysis, for the real returns on SP500 index over the period of 1871 to 2002, the predictive power of the lagged dividend yield increases from 15% to 32% on annual returns, from 4% to 10% on quarterly returns, and from less than 2% to 8% in monthly returns. The explaining power of the transfer function and noise model fitted in this study is also significantly higher that that obtained from pure time series model. The results demonstrate the effectiveness of the transfer function and noise modeling technique in forecasting aggregate stock returns. While only univariate regression is used in this study, the transfer function and noise model can be easily expanded to incorporate multivariate regression analysis.

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The Level of Assurance Precision and Cost Demanded When Providing Continuous Online Assurance in an Environment Open to Assurance Competition

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ABSTRACT

New reporting requirements of the Sarbanes-Oxley Act of 2002 (SOX) likely cause the need for internal continuous online assurance (COA) type services. Registered companies must also disclose information on material changes in financial condition or operations on a rapid and current basis. No framework or specific guidelines exist for complying with new reporting requirements of SOX. Because the new reporting requirements are considered one of the most challenging aspects of SOX implementation, numerous CPA firms, law firms, and other groups offer assistance to companies that have a real-time need to gather, report, and certify important information. SOX also mandates substantial fines and prison time for key executives failing to properly certify financial statements and disclosures, thereby furthering increase the likely need for internal COA-type services. Because legislation does not mandate COA-type services, and guidelines for providing such services currently do not exist, an open market in which competitors offer differing services in content and quality at varying costs as an internal assurance service will likely exist.

The accounting profession has developed a number of new assurance services recently (WebTrust, ElderCare, SysTrust, Risk Assessment Assurance) that face open competition from other willing assurance providers. The first new service developed, WebTrust, was predicted to generate substantial revenue for the profession. Demand for WebTrust, as well as for other types of Internet assurance, has been disappointingly low. Most e-commerce web sites display no seal of assurance and most of the sites that have acquired some sort of seal have chosen services from competitors at much lower prices and/or some sort of money back guarantee. Research focusing on e-commerce demand reports conflicting results with actual market activity, with numerous studies reporting that any type of assurance is preferred over no assurance, and higher quality assurance is demanded most. Two factors not considered in these studies is who is paying for the service (websites) and at what cost. Based on these conflicting results between studies and actual market activity, many COA demand aspects should be studied early in its development to ensure successful implementation by the accounting profession. One important aspect is both the precision and associated cost of COA demanded.

Some prior studies report that higher quality (more precise) assurance will be demanded more than lower quality assurance when an equal economic outcome may be obtained from either option, and even when acquiring higher quality assurance provides a lower economic outcome (priced at a premium). This study uses both experimental market and laboratory
experiment methodologies to analyze demand for COA over extended multi-period timeframes in continuous decision-making environments open to assurance competition. Participants are monetarily motivated to minimize purchases of any type of assurance offered at differing prices on information that may be useful to make required periodic decisions. Results show a greater and more consistent demand for more precise assurance, including when priced at a premium. Exit survey responses validate experimental behavior captured. The accounting profession should develop COA as a higher quality assurance service to those who are both purchaser and user of the service, and even if lower quality competition exists, higher quality COA should be demanded more, even when slightly priced at a premium.
A COMPARATIVE STUDY OF PRICING OF AUDIT SERVICES IN EMERGING ECONOMIES

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and

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Abstract
This paper contributes to under researched issue of how auditors charge for their services by empirically examining audit fee determinants in three emerging economies within South Asia. Using data from 108 Bangladeshi firms, 213 Indian firms and 191 Pakistani firms for the year 1997-98, the results show that size of the reporting entity and size of the audit firms are the two most important determinants across the three countries. Among the three other variables, estimated risk index and auditee complexity variables are found to be significant only for the Indian firms. The results of this study provide useful insights into the role of contracting cost variables and auditors’ billing practices in comparative and emerging economies, in general and, South Asia, in particular.

1. INTRODUCTION
The determination of audit fee is not an uncommon problem faced by auditors and their clients. Concern has been expressed about the escalating cost and time taken to complete the audit (Taylor & Baker, 1981). Auditors react that the fees charged are inadequate in relation to their audit services provided, while clients argue that audit fees are too high. Therefore, an audit fee determinants model can be of value to both the auditor and client. The model can also provide an objective benchmark for fee-setting by highlighting the determinants of audit fees (Gist, 1992). There are various determinants that affect audit fees, for example, auditee size, loss, financial condition, auditee complexity/risk, and international linkage, etc. Johnson, Walker, & Westergaard (1995) provide a review of audit fee variables tested in prior audit fee model studies in various countries including Australia, Hong Kong, India, Malaysia, New Zealand, Singapore, United Kingdom, and the United States.

Several studies have examined the factors that affect the level of pricing of audit services (for example, (Simunic, 1980); (Francis, 1984); (Firth, 1985); (Simon, Ramanan, & Dugar, 1986); (Francis & Simon, 1987); (Low, Tan, & Koh, 1990); (Chan, Ezzamel, & Gwillium, 1993); and (Johnson, Walker, & Westergaard, 1995)). A majority of these studies use regression analysis (an ordinary least square model) on
identified variables of corporate sector firms. These studies provide evidence on the association of audit fees with auditee size, auditee complexity, loss exposure, auditee risk and audit firm size.

To our knowledge, there has been limited published work on audit fee models in emerging countries (other than, (Karim & Moizer, 1996) and (Ahmed & Hossain, 2000) for Bangladesh and (Simon, Ramanan, & Dugar, 1986) for India). The main purpose of this study is to extend previous research by examining the determinants of external audit fees charged to publicly listed companies in Bangladesh, India and Pakistan.

This study is significant in that a specific market (emerging countries) is investigated in which cultural, socio-economic, political and economical fundamentals are different than those in western developed countries but share very similar socio-economic and cultural environments. Further, the accounting profession, company regulatory provisions and the market for audit services in Bangladesh, India and Pakistan are similar, it is expected that the determinants of audit fees would be similar across the three countries. With globalization of trade, government policies emphasizing market-oriented economies and the recent growth of capital markets, a study of pricing of audit services in emerging nations has even become more relevant for international and domestic investors. This study examines this important issue by undertaking a comparative analysis on the determinants of audit fees by using a large sample of listed companies in three emerging countries in South Asia- Bangladesh, India and Pakistan.

Bangladesh, India and Pakistan, together formerly known as the Indian sub-continent, occupy an important position in the Asian region in terms of geographical location, population and economic potential. The stock markets in all three countries have been in existence for more than 80 years and have experienced rapid growth in recent times both in number of listed companies and volume of trading. Following liberalization of economic policies, overseas direct investment and participation in the securities markets in these countries have increased many folds, state ownership in the productive sector has reduced and private sector investments have been expanded. At the end of 1998, the total market capitalization of the stock exchanges in Bangladesh, India and Pakistan was about US$1,034 million, US$105,188 million and US$5,418 million, respectively ((IFC), 1999), with each achieving positive economic growth in the last decade. In 1998, there were 5,860 firms listed on the Mumbai (formerly Bombay) Stock Exchange in India, which is the second largest in the world based on the number of listed firms. The accounting professional bodies in these countries have established a regional body called the South Asian Federation of Accountants (SAFA) to harmonize accounting and reporting practices in the region within the framework of the South Asian Regional Cooperation (SARC).

The overall results of the study show that a significant association exists between audit fees and auditee size across all the three countries. Among the three other variables such as estimated risk index, loss, and auditee complexity, only estimated risk index and auditee complexity variables are found to be significantly related to audit fees for Indian firms. The Big-5 or affiliated to Big-5 audit firms were charging a premium fee in across all three countries.

This paper is organised as follows: Section 2 provides a brief regulatory accounting and auditing profession in Bangladesh, India and
Pakistan followed by model and hypothesis development, including descriptions of variables selected in the study in Section 3. Section 4 describes the research design including the sample and selection procedures. Section 5 presents and discusses the empirical results, followed by a summary of the paper, limitations and conclusions in Section 6.

2. THE LEGAL AND INSTITUTIONAL FRAMEWORK FOR CORPORATE FINANCIAL REPORTING IN SOUTH ASIA

Corporate financial accounting and reporting by public companies in Bangladesh, India and Pakistan is mainly governed by the Companies Act and professional accounting bodies, which are modelled on the British system introduced during the British colonial era. Further, financial reporting of Stock Exchange listed companies is influenced by the Securities and Exchanges Act within these countries. The professional accounting bodies are empowered to promulgate accounting standards, which are primarily based on International Financial Reporting Standards (IFRS)) issued by the International Accounting Standards Board (IASB).

The Legal Framework

Bangladesh, India and Pakistan inherited the Companies Act 1913 as the main company legislation following their independence from the British until it was replaced by The Companies Act, 1956 in India, The Companies Ordinance, 1984 in Pakistan, and The Companies Act, 1994 in Bangladesh. These Acts, however, have gone through amendments since the promulgation, particularly in India. With respect to financial reporting, these Acts require companies, among others, to keep proper books of accounts and to prepare and send financial statements to their shareholders in order to reflect a true and fair view of the state of affairs of the company. Companies are required to verify their accounts by independent qualified auditors.

For listed companies, all three countries have separate Securities and Exchange Commission in pursuance of the Securities and Exchange Act to protect investors and to monitor issue of securities, directors’ rights and responsibilities, and financial reporting with a view to promote and broaden the capital market. The detailed financial reporting disclosure requirements are contained in separate schedules. The securities authorities in all three countries require all listed companies to comply with existing regulations, in addition to complying with rules regarding keeping of accounts and verifications thereof.

Professional Accounting in South Asia

Like the company legislations, the structure of professional accounting bodies is modelled on the UK. There are two important professional accounting bodies in each country responsible for financial accounting and verification of accounts. These are the Institute of Chartered Accountants and the Institute of Cost and Management Accountants (slightly different title in India ie Institute of Cost and Works Accountants of India). Members of the Chartered Accountants Institute are eligible to practice and verify accounts prepared by both private and public limited companies. Both Institutes of each country are members of the International Accounting Standards Board (IASB) and have been given power by the government to promulgate accounting standards in order to improve corporate financial reporting. Companies are required to comply with standards and external auditors are expected to verify whether
reporting practices are consistent with existing company legislations and accounting standards. External independent auditors are appointed by the board of directors and are approved by shareholders at the Annual General Meeting of the company. Auditors are generally appointed for one year and are eligible for reappointment. Specific details regarding the appointment and termination of auditors are contained in the Companies Act. For listed companies, the Securities and Exchange Act stipulates further conditions regarding auditor’s appointment and termination and requires company directors to submit audited financial statements within a certain period, not exceeding six months to the Authority².

3. MODEL AND HYPOTHESIS DEVELOPMENT

Simunic (1980) and Taylor & Baker (1981) provide the framework for the determinants of audit fees in which audit fee as dependent variable and several firm-specific independent variables such as audittee size, complexity, risk, financial condition are used as the explanatory variables in a cross-sectional Ordinary Least Squares regression model. Subsequently, several researchers have extended and modified this model and employed it in different research settings. An extensive literature review can be found in (Yardley, Kauffman, Cairney, & Albretcht, 1992); (Anderson & Zeghal, 1994); and (Johnson, Walker, & Westergaard, 1995). Generally, proxy variables for audittee size, audit complexity, audit risk, and audit firm size are significantly associated with audit fees.

On the basis of previous studies on audit fee model, we develop the following model:

\[
\text{Log of audit fees} = \alpha + \beta_1 \text{LTASS} + \beta_2 \text{EATDUM} + \beta_3 \text{ZFCINDEX} + \beta_4 \text{INVARTTA} + \beta_5 \text{SAF} + \epsilon
\]

Where

- \( \text{LTASS} \) = size of the firm measured as the natural log of total assets;
- \( \text{EATDUM} \) = firm’s operating condition measured as a dummy variable if earnings are negative 1, otherwise zero;
- \( \text{ZFCINDEX} \) = estimated risk index also called Z-index of the financial condition of a company;
- \( \text{INVARTTA} \) = firm’s complexity measured as the proportion of inventory and receivable to total assets;
- \( \text{SAF} \) = size of audit firm, dummy variable if a big auditor 1, otherwise zero; and
- \( \epsilon \) = residual error term.

Explanations for the variables selected in this study are given below:

**Dependent variable:**

**Audit Fee (LFEE)**

Audit fee is calculated on the basis of amount spent on external audit. This fee is determined with the mutual agreement between the auditor and auditee and mostly on a yearly basis. Generally audit fee is logged. There are numerous factors that determine the fee levels. For example, (Low, Tan, & Koh, 1990) suggest that audit fees are primarily a function of audit hours, which in turn are dependent upon the extent of audit risks.

Firm specific information, including audit fees are obtained from the annual reports. Consistent with most previous audit fee research, we use the amount of expenditure on external audit as a proxy for monitoring provided by the auditors. This is denoted by AUDFEE in local currency of that particular country. A log transformation is undertaken to improve the normality of the data and to reduce any skewness. The variable is denoted by LFEE \{Log Fee\}.
Independent variables:

**Auditee Size (LTASS)**

Audit fee depends on the size of auditee firm. There are many indicators of an entity’s size and the most common are total assets, turnover and net profit before tax. Most researchers favour the value of total assets, as it is a good indicator in determining how much audit effort is involved. Researchers in last two decades have found a positive relationship between size and fees (eg. (Simunic, 1980); (Taylor & Baker, 1981); (Firth, 1985); (Simon, Ramanan, & Dugar, 1986); (Brinn, Peel, & Roberts, 1994). It is evident from previous research that client size is the most significant explanatory variable in determining audit fees. A firm with large assets or turnover will have to pay more in audit fees, as an auditor has to spend more time and resources to perform the audit of a large firm which therefore can expect higher charges. The large firms are more decentralised and therefore the problem of asymmetric information is probably more severe in large firms. The contracting constituents in large firms may demand greater monitoring and control from auditing and hence incur higher costs than small firms to resolve their agency problems. A large organisation is more complex and an auditor has to spend more time and resources to ensure that accounts are prepared in conformity with the Generally Accepted Accounting Principles (GAAP).

Auditee size is measured by the end of year book value of total assets. Simon, Ramanan, & Dugar, (1986) use log of total assets in their audit model for Indian companies. Logarithmic transformation was then undertaken to normalise the distribution of data set. This variable is labelled LTASS {Log of total assets for size}.

**Operating Condition (EATDUM)**

Operating condition is an accounting convention, which is based on the premise that a firm will continue to operate in the future. This will depend on an entity’s overall performance each year. If a company is profitable and performs better it is considered that the firm would continue to operate. Contrary to this, if a company incurs loss it may be regarded as risky. *A priori*, one would expect a higher audit risk to be associated with higher audit fees as a consequence of more audit testing or as an insurance premium (Chan et al., 1993). The riskiness of audit also increases when a firm incur losses, which in turn, increases the probability of a firm’s violation of debt covenants and eventual bankruptcy increases. The probability of bankruptcy affects an auditor’s going concern judgement. (Simunic, 1980), (Francis, 1984) and (Brinn, Peel, & Roberts, 1994).

A dummy variable for loss is used and we labelled it as EATDUM {Binary = 1, if earnings are negative, otherwise zero}. We estimate a negative association of this variable with audit fee. This is consistent with other research as whose loss making variable is positively (or negatively) associated with audit fee (Brinn, Peel, & Roberts, 1994).

**Financial Condition (ZFCINDEX)**

Financial condition of the firm is an important determinant of how an auditor would spend time during the audit process. If the financial condition is healthy, then the audit would perceive that the risk associated with audit is minimum. On the other hand, if the firm is in poor financial condition then the risk of financial distress and bankruptcy increases. In that situation, the perceived risk that auditors would fail to identify omission or mistakes within the accounting systems will increase which in turn increase the overall audit risk. Auditors in that situation tend to spend more time to minimise their own risk
of being sued for negligence or lack of professionalism.

However, it is inappropriate to measure a firm’s financial condition based on one variable. In this study, a combined index is used to reflect a firm’s financial condition following (Zmijewski, 1984) bankruptcy model. Although several bankruptcy models have been developed in the US, no such model has been developed in the context of emerging nations. However, (Jaggi & Tsui, 1999) have argued that the (Zmijewski, 1984) model is relevant for other countries such as Hong Kong. In this study also, we use (Zmijewski, 1984) model shown below:

\[
ZFC= -4.336 - 4.513 \text{(ROA)} + 5.679 \text{(FINL)} + 0.004 \text{(LIQ)}
\]

Where ZFC represents an estimated risk index of the financial condition of the company. The higher the value of the index the higher the propensity to fail and the weaker the financial condition (Jaggi & Tsui, 1999). ROA is measured as the net income divided by total assets multiplied by 100, FINL as the ratio of total debt to total assets, and LIQ as the ratio of current assets to current liabilities. A positive association between the index and audit fee is expected.

**Complexity (INVARTTA)**

Like auditee size, auditee complexity has been incorporated in most audit fees studies (see, for example, (Walker and Johnson, 1996) for a review of the literature). Accounts receivables and inventory have been introduced to measure the auditee complexity (Simunic, 1980); (Francis & Simon, 1987); and (Brinn, Peel, & Roberts, 1994). The contention is that because it is hard to audit a given amount of these items than to audit other financial statement items, firms with large amount of inventory and receivable should require more efforts by auditors in verifying these accounts and this, therefore, results in higher audit fees.

Auditee complexity is calculated as a sum total of accounts receivable and inventory as a percentage of total assets. The variable is labelled INVARTTA (Portion of inventory and accounts receivable to total assets). A positive relationship between this variable and audit fee is expected. This is consistent with other research (Johnson, Walker, & Westergaard, 1995) and (Ahmed & Hossain, 2000).

**Size of Audit Firm (SAF)**

The Big 5 audit firms (Andersen, Deloitte & Touche, Ernst & Young, KPMG, and Pricewaterhouse Coopers) are likely to pay more attention to verify the accounts of their clients. These firms have their offices in most big cities in the world. Alternatively, these firms have affiliated or linkage with the local big audit firms, for example, in Bangladesh (Ahmed & Hossain, 2000). An extensive research literature has described the importance of audit by Big firms versus small firms.

Size of audit firm has been included because previous research has shown conflicting results. Large audit firms are more likely to have complex accounting systems and geographically dispersed operations. Large accounting firms are more likely to have specialised audit skills and also numerous offices which can perform the necessary participating engagements for companies with dispersed operations (Francis, 1984).

As in (Ahmed & Nicholls, 1994), audit firms have been classified as being small or big according to the following criteria: (1) international linkages; (2) number of firms audited in the sample. This information on audit firm size and local affiliates was obtained from Institute of Chartered Accountants of India (ICAI), Institute of
Chartered Accountants of Pakistan (ICAP) and Karim and Moizer (1996) on India, Pakistan and Bangladesh. If a firm is linked with one of the Big Five accounting firms, it will be categorised as a big firm. Further, number of client companies an audit firm had during the year 1998-99 was obtained by reading the audit firm’s name from the company’s annual report. Regarding deciding on the reputation of an audit firm advice from academics and accounting professionals from these countries were sought. Based on these three criteria, a dummy variable is constructed where a 1 is assigned when a firm is considered big, otherwise a 0. The variable is labelled SAF. A positive sign is predicted between this variable and audit fees.

4. RESEARCH DESIGN

Sample Selection

The sample consists of 108 Bangladeshi firms listed on the Dhaka Stock Exchange (DSE); 213 Indian firms listed on the Mumbai (formerly named, Bombay) Stock Exchange (MSE); and 191 Pakistani firms listed on the Karachi Stock Exchange (KSE) as at December 1999 for which annual reports were available for the year ended on either 31 December 1998 or 30 June 1999. Table 1 provides full details of the number of sample companies by country used in this study. Following previous research we excluded banks, insurance and mutual funds because each operates under different regulations. The annual reports were hand collected from the DSE; MSE; and KSE libraries and, in the case of missing reports, from the head office of the Securities and Exchange Commission (SEC) and companies’ head offices located in the major cities of the concerned country. Since the sample is not random, some cautions are warranted in generalising the findings. However, such a large sample represents fairly all industries.

5. RESULTS

Descriptive statistics of the variables are presented in Table 2. It shows Indian companies are larger in size, as measured by total assets, with an average of Indian Rs 4.76 million, followed by Pakistan Rs. 2.11 million and Bangladeshi Tk. 0.640 million. The standard deviation of this variable is large across all three countries, and skewness and kurtosis reveal size measures are not normally distributed. Therefore, following prior research, the log (base 10) of this variable is taken to handle non-normal data and used in the regression model. Net income figure (not reported in table) shows Indian companies, on average, made about seven times more profit than Bangladeshi companies and about five times more profit than Pakistani companies during the period under study, which is consistent with company size. ZFCINDEX indicates that financial condition, measured on the basis of Zmijewski’s (1984) model, is similar in Bangladesh, India and Pakistan. However, the large standard deviation statistics suggest there are variations across the companies in these countries. There is not much variation in INVARTA across the three countries both in terms of average and standard deviation.

It shows that all explanatory variables are fairly normally distributed except, AUDFEE and TOTASS. Since these variables are highly skewed, logarithmic transformation was undertaken to reduce their skewness. The correlation matrix (not reported) indicates that the highest pairwise Pearson’s correlation coefficient is 0.344 between EATDUM and ZFCINDEX, followed by 0.240 between INVERTA and EATDUM. The third highest correlation coefficient is
0.216 between LTASS and EATDUM. All other possible combination of correlations is below 0.20 and not significant at the 0.10 confidence level. Therefore, it is considered that multicollinearity will not be a problem in the regression estimation.

**Multivariate Analysis**

Table 3 shows the results of the multivariate models under panel A: OLS and under panel B: Rank Regression. Panel A model shows that all independent variables (except EATDUM) are significant for the total sample. Auditee size and size of audit firm are significant in all three countries. Financial condition and complexity variables are significant for Indian companies only. Loss variable is significant only for Bangladeshi companies. This evidence is also consistent with (Karim & Moizer, 1996), who find no support for the relationship between LFEES and INVAR. As in all prior studies of audit fees, client size (LTASS) is significant at 1% and has the highest standardised beta (explanatory power of each variable) of 0.553, followed by INVARTTA (0.234) and SAF (0.118) for overall data. The overall $R^2$ is 47%. This provides additional empirical support for client size and audit fees relationship in a developing and emerging market, although, these results are not consistent among the three countries, the coefficient of each variable is LTASS (0.188), followed by SAF (0.145) and EATDUM (-0.143) for Bangladesh; LTASS (0.557), followed by INVAR (0.298) and SAF (0.232) for India; and LTASS (0.443), followed by SAF (0.172) for Pakistan. These results indicate that in Bangladesh firm size and audit firm size; in India firm size, firm’s financial condition, audit firm size and firm’s complexity; and in Pakistan firm size, and audit firm size are significant determinants of audit fees. However, to our expectation, EATDUM is negative in all countries. The model’s $R^2$ is 24%; 51% and 42% for Bangladesh, India and Pakistan respectively.

We repeat the foregoing multivariate analyses using rank regression. Lang & Lundholm (1993) have suggested the use of ranked regression as a powerful alternative estimation model for coping with data sets with skewed distribution and when there is a potential for non-linear and monotonic relations between the dependent and explanatory variables. Ranked regression requires all continuous variables to be ranked either in ascending or descending order and regression of the ranked endogenous variable on the ranked (continuous) and unranked (dichotomous) exogenous variables.

When we run rank regression model, shown under panel B, the overall size coefficient increased to 0.638 followed by SAF (0.171) and INVARTTA (0.123). The overall adjusted $R^2$ increased to 50%. The rank regression model for Bangladesh improves the marginal explanatory power (coefficient) of firm size to 0.274 followed by SAF (0.176). The model also shows the coefficient of total assets (0.683), SAF (0.188) and INVARTTA (0.125) for India, and LTASS (0.535) and SAF (0.232) for Pakistan. Overall both parametric OLS and non-parametric (ranks regression) are consistent in terms of identifying significant determinants of audit fees.

The results reveal that for both models (F statistic) are highly significant, with adjusted $R^2$s are about 49%. These are, however, lower than reported in a previous study of Bangladesh (e.g., (Karim & Moizer, 1996) $R^2 = 56$ percent) and India (e.g., (Simon, Ramanan, & Dugar, 1986).

To test whether models are properly fitted, the residuals are examined by plotting against the fitted values, and diagnostic tests such as Wald tests for normality were
undertaken for the two models. The results suggest little deviation from normality. On the whole, the empirical results suggest that auditee size and size of audit firm are the most significant determinants of audit fee variation.

6. SUMMARY, LIMITATIONS AND CONCLUSIONS

This paper examines empirically the determinants of audit fees in Bangladesh, India and Pakistan. The study complements earlier research by incorporating variables such as auditee size, auditee complexity, financial condition and size of audit firm. This study also examines the determinants of audit fees comparatively where firms are required to prepare financial statements under the provisions of the Companies Act of each country and increased auditors’ role and duties derived from liberalisation of the economies in pursuits for external funds. The empirical results obtained from cross-sectional regressions indicate that the determinants of audit fees in South Asian countries are similar to those of other developed and industrial countries; that is, audit fees are strongly related to client size, audit risk, and complexity variables. Another important finding is the existence of a premium fee paid to Big Five or affiliated to Big Five auditors consistent with prior studies.

This study contributes to the extant literature audit fee studies by focusing on comparative studies using data from three emerging and important countries within Asia-Pacific region where the market for audit services is not highly regulated and demand mainly derives from legislative requirements such as the Companies Act.

The conclusions drawn from this study are constrained by several caveats. First, the statistical analyses carried out in this study may suffer from an omitted explanatory variables problem. For example, analytical and theoretical studies (e.g., (Feltham, Hughes, & Simunic, 1991) indicate that corporate governance decisions including the use of audit services are likely to be influenced by supply side factors such as perceived audit risk and the litigation risk. Therefore, it is possible that the empirical evidence documented in this study could be affected by cross-sectional differences in omitted supply side factors that influence audit fees. The second caveat pertains to measurement errors of variables included in empirical tests. If the proxies of loss and cost of audit services induce errors in the model, the measurement error could potentially reduce the power of the test conducted in this study.

There are several issues that can be addressed in future research. For instance, the inclusion of other supply-side factors as determinants of audit fees could provide a more powerful test of the theory. Future research could also benefit by considering the interdependencies using simultaneous equations model by incorporating both demand and supply side variables. Additionally, refinements of the proxy for loss are warranted to eliminate alternative explanations of empirical findings.
References:


ICAI (2002), The Institute of Chartered Accountants of India (http://www.icai.org/).

ICAP (2002), The Institute of Chartered Accountant of Pakistan (http://www.icap.org.pk/).


Table 1

Number of Sample Companies by Country

<table>
<thead>
<tr>
<th></th>
<th>Bangladesh</th>
<th>India</th>
<th>Pakistan</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual Reports received</td>
<td>120</td>
<td>239</td>
<td>226</td>
<td>585</td>
</tr>
<tr>
<td>Missing information</td>
<td>12</td>
<td>26</td>
<td>35</td>
<td>73</td>
</tr>
<tr>
<td>Usable reports</td>
<td>108</td>
<td>213</td>
<td>191</td>
<td>512</td>
</tr>
</tbody>
</table>

Source: Annual reports from various companies operating in Bangladesh, India and Pakistan.
Table 2
Descriptive Statistics on the Variables According to Country and Total Sample

<table>
<thead>
<tr>
<th>Variable</th>
<th>Bangladesh (N=108)</th>
<th>India (n=213)</th>
<th>Pakistan (n=191)</th>
<th>Total sample (n=512)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Median</td>
<td>St. Dev</td>
<td>Range</td>
</tr>
<tr>
<td>AUDFEE</td>
<td>52449</td>
<td>75348</td>
<td>30000</td>
<td>424420</td>
</tr>
<tr>
<td>LAUDFEE</td>
<td>4.54</td>
<td>0.35</td>
<td>5.21</td>
<td>0.58</td>
</tr>
<tr>
<td></td>
<td>4.47</td>
<td>2.10</td>
<td>5.20</td>
<td>3.64</td>
</tr>
<tr>
<td>TOTASS</td>
<td>6.40E+05</td>
<td>1.02E+05</td>
<td>4.76E+06</td>
<td>1.23E+7</td>
</tr>
<tr>
<td></td>
<td>2.65E+05</td>
<td>6.32E+06</td>
<td>1.17E+06</td>
<td>8.95E+7</td>
</tr>
<tr>
<td>LTASS</td>
<td>8.44</td>
<td>0.58</td>
<td>9.11</td>
<td>0.67</td>
</tr>
<tr>
<td></td>
<td>8.42</td>
<td>2.89</td>
<td>9.06</td>
<td>3.52</td>
</tr>
<tr>
<td>EATDUM</td>
<td>0.26</td>
<td>0.44</td>
<td>0.28</td>
<td>0.45</td>
</tr>
<tr>
<td></td>
<td>0.00</td>
<td>1.00</td>
<td>0.00</td>
<td>1.00</td>
</tr>
<tr>
<td>ZCFINDEX</td>
<td>-0.48</td>
<td>6.31</td>
<td>-0.66</td>
<td>4.09</td>
</tr>
<tr>
<td></td>
<td>-1.75</td>
<td>47.14</td>
<td>-1.10</td>
<td>54.84</td>
</tr>
<tr>
<td>INVARTTA</td>
<td>0.36</td>
<td>0.23</td>
<td>0.38</td>
<td>0.19</td>
</tr>
<tr>
<td></td>
<td>0.31</td>
<td>0.97</td>
<td>0.35</td>
<td>0.87</td>
</tr>
<tr>
<td>SAF</td>
<td>0.39</td>
<td>0.49</td>
<td>0.30</td>
<td>0.45</td>
</tr>
<tr>
<td></td>
<td>0.00</td>
<td>1.00</td>
<td>0.00</td>
<td>1.00</td>
</tr>
</tbody>
</table>

Tk. = Taka, local currency of Bangladesh, exchange rate is US $1.00 = 57.00 BDT (Bangladesh Taka) [www.xe.com/ucc/convert.cgi](http://www.xe.com/ucc/convert.cgi), accessed 20 May 2002

Rs. = Rupees, local currency of India, exchange rate is US $1.00 = 48.99 INR (India Rupees). [www.xe.com/ucc/convert.cgi](http://www.xe.com/ucc/convert.cgi), accessed 20 May 2002

Rs. = Rupees, local currency of Pakistan, exchange rate is US $1.00 = 59.97 PKR (Pakistan Rupees) [www.xe.com/ucc/convert.cgi](http://www.xe.com/ucc/convert.cgi), accessed 20 May 2002

Variable description:
AUDFEE: audit fees
LAUDFEE: natural log of audit fee
TOTASS: total assets
LTASS: natural log of total assets
EATDUM: dummy variable; if earnings are negative 1, otherwise zero. This variable is a proxy for operating condition
ZCFINDEX: Z index indicating financial condition
INVARTTA: proportion of inventory and receivables to total assets
SAF: size of audit firm
Table 3
Multiple Regression Results on Reporting Lag According to Country and Overall Sample

Panel A (OLS): \( \text{LFEEs} = \alpha + \beta_1 \text{LTASS} + \beta_2 \text{EATDUM} + \beta_3 \text{ZCFINDEX} + \beta_4 \text{INVARTTA} + \beta_5 \text{SAF} + \varepsilon \)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Bangladesh</th>
<th>India</th>
<th>Pakistan</th>
<th>Total sample</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sign</td>
<td>Coeff.</td>
<td>T-value</td>
<td>Coeff.</td>
</tr>
<tr>
<td>LTASS</td>
<td>+</td>
<td>0.188</td>
<td>3.334**</td>
<td>0.557</td>
</tr>
<tr>
<td>EATDUM</td>
<td>+</td>
<td>-0.143</td>
<td>-1.671*</td>
<td>-0.093</td>
</tr>
<tr>
<td>ZCFINDEX</td>
<td>+</td>
<td>-0.265</td>
<td>-0.490</td>
<td>0.023</td>
</tr>
<tr>
<td>INVARTTA</td>
<td>+</td>
<td>0.027</td>
<td>0.183</td>
<td>0.298</td>
</tr>
<tr>
<td>SAF</td>
<td>+</td>
<td>0.145</td>
<td>2.242*</td>
<td>0.232</td>
</tr>
<tr>
<td>Intercept</td>
<td></td>
<td>2.290**</td>
<td>0.021</td>
<td></td>
</tr>
<tr>
<td>R²</td>
<td></td>
<td>23.6%</td>
<td>50.8%</td>
<td></td>
</tr>
<tr>
<td>Adjusted R²</td>
<td></td>
<td>19.9%</td>
<td>49.6%</td>
<td></td>
</tr>
<tr>
<td>Model’s F-value</td>
<td></td>
<td>6.370</td>
<td>43.00**</td>
<td></td>
</tr>
<tr>
<td>Model’s sig level</td>
<td></td>
<td>0.000</td>
<td>0.000</td>
<td></td>
</tr>
</tbody>
</table>

Panel B (Rank Regression): \( \text{LFEEs} = \alpha + \beta_1 \text{LTASS} + \beta_2 \text{EATDUM} + \beta_3 \text{ZCFINDEX} + \beta_4 \text{INVARTTA} + \beta_5 \text{SAF} + \varepsilon \)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Bangladesh</th>
<th>India</th>
<th>Pakistan</th>
<th>Total sample</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sign</td>
<td>Coeff.</td>
<td>T-value</td>
<td>Coeff.</td>
</tr>
<tr>
<td>LTASS</td>
<td>+</td>
<td>0.274</td>
<td>2.919**</td>
<td>0.683</td>
</tr>
<tr>
<td>EATDUM</td>
<td>+</td>
<td>-0.181</td>
<td>-1.553</td>
<td>0.013</td>
</tr>
<tr>
<td>ZCFINDEX</td>
<td>+</td>
<td>-0.118</td>
<td>-1.162</td>
<td>-0.044</td>
</tr>
<tr>
<td>INVARTTA</td>
<td>+</td>
<td>0.032</td>
<td>0.334</td>
<td>0.125</td>
</tr>
<tr>
<td>SAF</td>
<td>+</td>
<td>0.176</td>
<td>1.933**</td>
<td>0.188</td>
</tr>
<tr>
<td>Intercept</td>
<td></td>
<td>43.680**</td>
<td>17.253*</td>
<td></td>
</tr>
<tr>
<td>R²</td>
<td></td>
<td>23.2%</td>
<td>54.6%</td>
<td></td>
</tr>
<tr>
<td>Adjusted R²</td>
<td></td>
<td>19.5%</td>
<td>53.5%</td>
<td></td>
</tr>
<tr>
<td>Model’s F-value</td>
<td></td>
<td>6.230</td>
<td>49.975</td>
<td></td>
</tr>
<tr>
<td>Model’s sig level</td>
<td></td>
<td>0.000</td>
<td>0.000</td>
<td></td>
</tr>
</tbody>
</table>

** and * indicates the t-value of coefficients are significant at the 1% and 5% levels respectively (two tailed test).

Variable description:
AUDFEE: audit fees
LAUDFEE: natural log of audit fee
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LTASS: natural log of total assets
EATDUM: dummy variable; if earnings are negative 1, otherwise zero. This variable is a proxy for operating condition.
ZCFINDEX: Z index indicating financial condition
INVARTTA: proportion of inventory and receivables to total assets
SAF: size of audit firm

Other member countries are Sri Lanka, Nepal, Bhutan and Maldiv.

Authority means the regulatory body established by the Securities and Exchange Act within each country.

The statistic is calculated as follows: \( W = n \left[ b_1 / 6 + (b_2 - 3)^2 / 24 \right] \), where \( b_1 \) is skewness, \( b_2 \) is kurtosis and \( n \) is the number of observation. \( W \) is asymptotically distributed as chi-square with two degrees of freedom (Greene, 1991, p 329).
Accounting Information Presentation Format--Can a High “Lie Factor” Influence a User’s Prediction?

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ABSTRACT

This study investigates the use and abuse of graphs in the presentation of accounting information. Drawing on modern theories of graphical perception, a survey instrument is used to test empirically the question of whether graphs intentionally prepared with a high “Lie Factor” (Tufte 1983) can influence a user’s prediction of a revenue or expense number for the next period. The study results are not consistent with the conventional wisdom in this area.

I. INTRODUCTION

Accounting information for a firm may be disclosed in a variety of ways: financial statements, notes, management discussion and analysis, and other forms of disclosure. One of the other forms commonly found is the use of graphs. As Steinbart (1989) points out “When properly constructed, such graphs highlight and clarify significant trends in the data. Improperly constructed graphs, however, distort the trends and can mislead the reader.” Such intentionally distorted graphs are examples of what can be described as Disclosure Management or Impression Management (Arunachalam, et al. 2002). Other accounting researchers have also considered the problems associated with the presentation of financial information in graph form. Beattie and Jones (1992) outlined a theoretical framework for the study of the use and abuse of graphs. They later conducted a behavioral study (Beattie and Jones 2002) examining graph abuse as used in disclosure management. One measure of the extent of distortion present in a graph is the “Lie Factor” proposed by Tufte (1983). The purpose of this study is to conduct a behavioral experiment to investigate the degree to which graphs prepared with a high Lie Factor can influence the predictions of the users of the graphs.

II. LITERATURE REVIEW AND HYPOTHESES

One of the earliest papers in the accounting area to address the issue of misleading graphs was by Taylor and Anderson (1986). In their paper they discussed evaluation of graphs using the “Lie Factor” first proposed by Tufte (1983). The original Tufte formula for computing the factor is:

\[ \text{Lie Factor} = \frac{A}{B} \]

where

- A = percentage change depicted in the graph
- B = percentage change in the actual data

For example, the percentage change depicted in a
vertical bar graph can be calculated by measuring the height in centimeters of the shortest bar and the tallest bar and then calculating the percentage increase between the two. The numerical change in the actual data is also computed and converted into a percentage, then the two change percentages are inserted into Tufte’s formula. A graph which is consistent with the actual data would have a Lie Factor of 1.00. A data series with an actual increase of 50% which is visually depicted in a graph showing a 200% increase would have a calculated Lie Factor of 4.00. In their paper Taylor and Anderson adapt the Tufte formula to the financial reporting context and call their computed factor the Graph Inconsistency Coefficient.

Steinbart (1989) addressed the use of misleading graphs in accounting disclosure and the auditor’s responsibility in judging their degree of distortion. He examined a sample of graphical annual report disclosures by firms and found distortions to be present. He too adapts Tufte’s formula and calls his evaluative statistic the Graph Discrepancy Index. Both the Graph Inconsistency Coefficient and the Graph Discrepancy Index are computed in the same manner. Both are simply the computation of Tufte’s Lie Factor with the added step of subtracting the number one from the calculated factor. Thus, the distinction between the Coefficient or Index and the Lie Factor is the value computed when there is no distortion present. That computed value is 1.00 for the Lie Factor, indicating a one-to-one correspondence between the change in the actual data and the graphical presentation change. When using either the Coefficient or the Index, if no distortion is present, then the computed value is 0.00 indicating zero degree of distortion present. The real difference seems to be that the word “lie” as a descriptive term is much more inflammatory than the more neutral terms “inconsistency” or “discrepancy.” Also in his paper Steinbart calls for controlled experiments on graph user perception to determine how large the graph distortion must be before it begins to influence the user. Our paper answers that call by conducting a controlled behavioral experiment which tests for influence in user predictions.

Beattie and Jones (1992) outlined a theoretical framework for the study of the use and abuse of graphs. They then examined the annual report disclosures of a sample of firms and found graphical distortion to be present. The distortion present was calculated using the Graph Discrepancy Index. Ten years later they revisited the topic in a paper (Beattie and Jones 2002) which again examined a sample of firm annual reports and found graphical distortion still to be present. The paper also included a behavioral experiment where subjects were asked for a perceptual analysis of the rate of change being portrayed in a set of graphs. Subjects were found to be influenced by distortions in the graphs. The graphs in the experiment were presented with no Y axis shown and no axis labels present. The subjects were then asked to use a five point ordinal scale to indicate their judgment regarding the rate of increase portrayed, e.g., “slightly increasing” or “sharply increasing.”

The purpose of our paper is to extend the Beattie and Jones experiment by presenting subjects with graphs which do have a Y axis and do have axis labels. Thus subjects will have actual trend numbers available and can then be asked to predict what the next number in the series is most likely to be. The distortion present in the graphs will be measured using Tufte’s Lie Factor, and the influence of the Lie Factor on subject predictions can then be examined. Also of interest is the question of whether the subject predictions would be more or less conservative in predictions of Revenue trends versus Expense trends. The final question of interest in our study was whether there would be detectible differences between genders in the predictions. The formal alternate hypotheses to be tested in this experiment are:

H<sub>1</sub>: User predictions are influenced by graphs containing a high Lie Factor.

H<sub>2</sub>: There are differences in graph user revenue predictions versus expense predictions.

H<sub>3</sub>: There are differences in graph user predictions between genders.

### III. SURVEY INSTRUMENT

A survey instrument was prepared which consisted of six graphs. Each graph in the survey presented time series data for twelve weekly reporting periods in the first quarter of the year. The instrument asked the subject to use that quarterly data series to predict a value for the first week of the second quarter, i.e., the thirteenth week. The data for each of the series were presented in line graph form only. The six graph total was composed of three Revenue graphs and three Expense graphs. The issue of Order
Effect was addressed by creating multiple versions of the survey instrument in which the presentation order of the six graphs was randomly varied. The researcher who constructed the survey does not teach any of the classes which participated in the survey, thus Demand Effect was unlikely to be an issue in this study. The survey was pilot tested in a summer school course and those results were used to improve the clarity of the instructions in the survey. Those instructions were worded in a neutral manner in order to reduce the potential for a Demand Effect.

Citing Cleveland and McGill (1987), Beattie and Jones narrowed the focus of their experiment to graphs with increasing trends. Our study follows that Beattie and Jones approach. The construction of our survey graphs began with a twelve week series containing a linear trend. This base series begins at one hundred and increases in linear increments of five for each week during the quarter, ending at 155. A random number generator was then used to alter this initial straight line trend with weekly “noise” consisting of a total of twelve random deviations between one and five. The deviations were both plus and minus, and the mean of the twelve deviations added to each series was zero. Each of the twelve week series presented as a graph in the survey was constructed by adding the twelve noise components in random order to the original linear base series. Each of the six resulting series was then further altered by multiplication by a unique factor, e.g., 287, to produce a final group of six graphs which all appear to be numerically different from each other. In fact each graph is really the same original base series, altered with random noise, and then further altered by a unique factor. As a result, each graph appears to be an independent sequence of dollar amounts but, in fact, each is actually a variation of the same base linear trend. Since all data series are the same noisy linear trend, then ceteris paribus the predictions for each of the graphs, after being converted back into base terms, would be expected to be the same. Significant differences between the base term predictions for the individual graphs would indicate an influence due to the Lie Factor. Since each series is simply a straight line base trend with added noise, the best prediction for week thirteen is an extension of the original linear trend. This best prediction value of 160 can then used as the benchmark prediction against which the subject predictions are compared.

The Lie Factor for each chart in the survey instrument was computed. The computation began by measuring the increase between the low and high values presented on the chart, measured in centimeters. The actual increase in the data was also computed. Both these increases were then converted into percentages and inserted into Tufte’s formula to compute the Lie Factor present in each chart. Presented within each set of Revenue data or Expense data charts were three different graph types. Graph Type 1 was prepared and presented with a Lie Factor of approximately 1.00; therefore it is a graph with no distortion of the data present. Graph Type 2 was distorted by a Lie Factor of approximately 4.00, and Graph Type 3 was the most extreme case of presentation with a Lie Factor of approximately 20.00. The six graphs used in the survey instrument are presented in Figure 1. The order of the graphs in Figure 1 is in sequential Lie Factor order with Graph Type 1 at the top of each Revenue and Expense column and Graph Type 3 at the bottom. The actual survey instruments used in the experiment presented one graph per page and, importantly, presented the graphs in random order.

IV. RESULTS AND ANALYSIS

The subjects for this study were students in all four sections of the Business Law 201 course taught at an AACSB accredited university. That course was selected because, as a required course in the business core, it would contain a wide range of majors, including nonbusiness majors. A total of 121 complete survey instruments were obtained in the experiment and used in the analysis. Table 1 presents descriptive statistics on the experimental subjects.

Analysis began with the conversion of all survey instrument predictions back into common dollars, i.e., in terms of the original base series starting at 100 and ending at 155. Thus the responses to a graph showing a series that had been originally multiplied by 287 were first divided by 287 to convert the responses back into base series terms. The SAS statistical software program was then used to perform ANOVA calculations on the mean predictions for each of the six graphs. The ANOVA model was significant with an F-Value of 4.83 and a P-Value of 0.0002. Surprisingly, when expressed in base series terms the means of the six graphs were relatively close to one another. Figure 2 presents the prediction means for each of the three Revenue graphs and the three Expense graphs. Multiple comparisons using the Tukey Studentized Range
Test SAS procedure were also performed. The Minimum Significant Difference was calculated to be 3.9522. The Tukey Test found no significant difference between the subject predictions for all three chart types in the Expense set.

In the Revenue set Graph Type 1 was significantly different from Graph Type 2 but not from Graph Type 3. Comparisons between all six graphs found Revenue Graph Type 1 to be significantly different from Expense Graph Types 1 and 2. The results for Revenue Graph Type 1 appear to be an anomaly. Although the graph was presented with a Lie Factor of 1.00 and thus presented no intentional distortion, it is the graph which produced the prediction farthest from the most likely value and is also the one graph which yielded a prediction which was significantly different from the others. A closer examination of the series in Graph Type 1 reveals that the random noise added to that series resulted in a graph line which appears to be angled slightly downward in week twelve. As a result, there may have been some “anchoring and adjustment” (Tversky and Kahneman 1974) from the week twelve value on the part of the subjects which resulted in the lower prediction value for that particular graph.

The comparisons among the three Expense graphs produced an interesting result. Although the Lie Factor is increasing through each of the three graphs, the subject predictions remain quite close to each other and quite close to a value of 160 (i.e., the best prediction for the Week Thirteen value). Graph Type 3 for both Revenue and Expense produced an interesting prediction. Although the Lie Factor was approximately 20, the subjects as a whole were not deceived and actually predicted a value slightly less that 160 in both cases.

To test for the existence of any gender difference in the perception of graphical data ANOVA was also performed on the means of the six graph types after sorting the male and female predictions into separate groups. The ANOVA model was significant with an F-Value of 2.57 and a P-Value of 0.0033. Statistically significant differences at the 0.05 level were detected between the male Revenue Graph Type 1 predictions and the female Graph Type 2 predictions for both Revenue and Expense. Figure 3 presents the prediction means for the three Revenue graphs, by gender, and Figure 4 does the same for the Expense graphs. The females as a group were influenced when there was some degree of distortion present, i.e., a Lie Factor of 4.00, while the males were not. Neither gender was influenced by the more extreme Lie Factor of 20.00.

V. CONCLUSIONS

Returning to the three research hypotheses listed earlier, the study results provide the following:

H₃₁: User predictions are influenced by graphs containing a high Lie Factor.

Overall, graphs prepared with a high Lie Factor did not influence the subject predictions in this study. The one prediction which was significantly different from the others was a low prediction for Revenue Graph Type 1, a graph with a Lie Factor of 1.00, i.e., no distortion present. Even the graphs with the highest Lie Factor of 20.00 did not produce predictions significantly different from the best prediction value.

H₃₂: There are differences in graph user revenue predictions versus expense predictions.

The differences between Revenue and Expense predictions were generally not significant. Although a significant difference did result between some graph types, it was due to the low prediction for Revenue Graph Type 1, an anomalous result. The predictions for Graph Type 2 and Graph Type 3 (the graphs with visual distortion present) were not significantly different from each other and were not significantly different from the best prediction value.

H₃₃: There are differences in graph user predictions between genders.

A gender difference was detected, therefore the null was rejected for this hypothesis. Statistically significant differences at the 0.05 level were detected between the male Revenue Graph Type 1 prediction and the female Graph Type 2 prediction for both Revenue and Expense. The Female Graph Type 2 is higher for both Revenue and Expense predictions. This result suggests that the overall difference found in the Revenue Graph Type 1 prediction, discussed in Hypothesis 1 above, is being driven by the difference generated by the Female subjects. For both Revenue and Expense the Graph Type 2 Female predictions were higher than those of the Males. Thus, the Female subject predictions were more influenced than the Male subject predictions when the Lie Factor was 4.00. When the Lie Factor was the extreme value of 20.00 neither gender was
influenced and, in fact, both made predictions that were slightly under the most likely value of 160, indicating a resistance by both groups to being misled by the deceptive presentation.

The subjects in this study did not appear to be deceived by a significant Lie Factor presented in the graphs used in this study. The subjects as a whole did not produce predictions that were significantly distorted from the most likely prediction. The subjects were resistant to being misled even when significant distortion was present in the graphs. The results of our experiment suggest that concern relative to the degree of Lie Factor present in graphical presentation is less warranted when the graph provides a numerical scale for the trend.

Table 1
Subjects

<table>
<thead>
<tr>
<th>Major</th>
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</thead>
<tbody>
<tr>
<td>Accounting</td>
<td>23</td>
</tr>
<tr>
<td>Business</td>
<td>15</td>
</tr>
<tr>
<td>Management</td>
<td>11</td>
</tr>
<tr>
<td>Economics</td>
<td>4</td>
</tr>
<tr>
<td>Finance</td>
<td>4</td>
</tr>
<tr>
<td>MIS/CIS</td>
<td>15</td>
</tr>
<tr>
<td>Marketing</td>
<td>14</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Major</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>AgriBusiness</td>
<td>6</td>
</tr>
<tr>
<td>PreLaw/PolySci</td>
<td>6</td>
</tr>
<tr>
<td>Biology</td>
<td>3</td>
</tr>
<tr>
<td>History</td>
<td>4</td>
</tr>
<tr>
<td>Sports Management</td>
<td>2</td>
</tr>
<tr>
<td>Communications</td>
<td>2</td>
</tr>
<tr>
<td>Other</td>
<td>12</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
</tr>
<tr>
<td>Female</td>
</tr>
</tbody>
</table>

| Mean Hours Completed | 48.08 |
| Mean GPA            | 2.94  |
Figure 1–Survey Graphs

Weekly Revenue

Weekly Expense

Weekly Revenue

Weekly Expense

Weekly Revenue

Weekly Expense

Weekly Revenue
Figure 2-Base Series Predictions

Dollars

Chart Type

Revenue

Expense
Figure 3--Revenue Predictions By Gender

[Chart showing revenue predictions by gender with base dollars on the y-axis and chart type on the x-axis.]
Figure 4-Expense Predictions By Gender

Base Dollars

Chart Type

165

160

155

1

2

3

Male
Female
REFERENCES


Social Security Retirement Planning
Considerations for Married Couples in Family Owned Businesses

Clarence C. Rose, Radford University

Abstract

Married couples working together in a family owned business have the opportunity to distribute the business net income between the spouses and as a result influence the Federal Income taxes, State Income taxes and Social Security taxes paid by each. How the family business net income is distributed will influence the retirement benefits available from Social Security for the husband and the wife. This provides some planning opportunities which can be used to increase the family’s overall benefits in retirement from Social Security.

Introduction

The amount an individual receives in Social Security retirement benefits is based upon the average indexed monthly earnings of the individual over his or her working years. The Social Security Administration averages each individual’s 35 highest years of earnings in determining retirement benefits. For most individuals, there are few planning opportunities which will affect Social Security retirement benefits. One exception is the important decision pertaining to when to have the retirement benefits begin. Early retirement, starting at age 62, will permanently reduce Social Security retirement income, while delaying retirement, even past full retirement age will increase benefits. However, married couples working together in a family owned business have the opportunity to distribute net business income between the spouses and thus influence the retirement benefits available from Social Security for each.

This article explores Social Security retirement planning considerations for family owned business owners and presents income distribution strategies on how to maximize Social Security retirement benefits.

The Importance of Social Security Benefits

Social Security is a major source of retirement income for an overwhelming majority of Americans. According to the Social Security Administration, 91% of persons in the United States age 65 or older receive Social Security benefits. In the year 2003, the average monthly retirement benefit for an individual retiring at age 62, the earliest age for retirement benefits, was $943. The average monthly benefit for an individual retiring at
age 65 and 8 months, full retirement age for 2003, was $1,158. In the year 2003, the maximum monthly benefit for someone starting benefits at age 62 was $1,404; the maximum at full retirement age was $1,721. As a source of retirement income, Social Security benefits provide the only source of income for 20% of retirees in America, at least 90% of retirement income for 30% of retirees, and at least 50% of the total retirement income for 65% of retirees. It is the core foundation of retirement income for most Americans and the major source of retirement income.

Of the total aggregate income received by retired Americans, Social Security benefits provide 42.5% of the total retirement income, individual savings and investments generate 36%, and employer/employee retirement accounts make up 21.5%. Social Security retirement benefits are expected to remain the major source of retirement income for most Americans for many years in the future. Social Security Administration projections indicate that by the year 2030, Social Security retirement benefits are still expected to be approximately 40% of the total aggregate retirement income received by Americans.

Since Social Security retirement income is such a major portion of the total income available in retirement for individuals, any decisions affecting benefits can be extremely important. Also once made, most decisions affecting Social Security retirement income are irrevocable. As a result, proper planning is critical.

**Determining Social Security Benefits**

For employees, all annual earned income up to the maximum amount subject to Social Security taxes, $87,000 in 2003, is taxed at the rate of 7.65%. This tax is matched by the employer. For self employed individuals, the tax rate is 15.3% of all earned income up to the maximum amount. Above the maximum amount employees pay 1.45% of all additional wages and self employed persons pay 2.9%. The maximum amount of an individual’s income subject to Social Security taxes is adjusted annually for inflation and is $87,900 in 2004. A person’s average annual earning over their working years determines the benefits he or she will receive in retirement from Social Security. A person must have worked and paid taxes into the Social Security system for a minimum of 10 years or 40 quarters to be eligible for retirement benefits.

Working spouses have the option of receiving Social Security retirement benefits based upon their own work history of paying into the Social Security system or of receiving benefits based upon a specified percentage, ranging from 37.5% of their covered spouse’s Social Security benefits at age 62 to 50% at full retirement age at the time of retirement. A spouse may receive Social Security retirement benefits based upon the greater of his or her own employment record or the spousal benefit. In 2002, 28% of married women in America had dual entitlement as an employee and as a covered spouse. This percentage has been increasing over the years, as more women continue to enter the workforce and continue employment for enough years to qualify for benefits.
Social Security as a Source of Income Replacement

Financial planners generally suggest 70% to 80% income replacement in retirement with provisions for annual adjustments for inflation. Some financial planners even recommend 100% income replacement in retirement in order to maintain a comfortable standard of living. According to the Social Security Administration, for an individual with average annual income, Social Security retirement benefits will replace approximately 40% of an individual's income.

As a source of income replacement, Social Security is structured to provide a greater portion of income replacement to lower income wage earnings. Social Security retirement benefits as a percentage of an individual’s earnings are higher at the lower income levels. For higher income wage earnings, Social Security provides a much smaller percentage of income replacement in retirement. Table 1 illustrates Social Security retirement benefits as a percentage of earnings at different income levels.

Table 1

<table>
<thead>
<tr>
<th>Employees’ Average Annual Income</th>
<th>$28,000</th>
<th>$48,000</th>
<th>$78,000</th>
<th>$90,000</th>
<th>$128,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimated Social Security Annual Retirement Benefits</td>
<td>$14,945</td>
<td>$18,904</td>
<td>$21,589</td>
<td>$22,344</td>
<td>$22,344</td>
</tr>
<tr>
<td>Social Security as a Percentage of Earnings</td>
<td>53.4%</td>
<td>39.4%</td>
<td>27.7%</td>
<td>24.8%</td>
<td>17.5%</td>
</tr>
</tbody>
</table>

* For early retirement at age 62 in 2004 the Social Security benefit is 75.884% of the full retirement benefit.

** Source: Social Security Administration
Table 2 illustrates the scheduled Social Security early retirement reductions. Electing to begin benefits before eligibility for full retirement benefits will permanently reduce Social Security retirement income by the reduction percentage.

Table 2

<table>
<thead>
<tr>
<th>Year of Birth</th>
<th>Early Retirement Year</th>
<th>Reduction Percentage of Full Benefits (If Retirement is Age 62)</th>
<th>Age Needed For Full Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>1938</td>
<td>2000</td>
<td>20.833%</td>
<td>65 and 2 mo.</td>
</tr>
<tr>
<td>1939</td>
<td>2001</td>
<td>21.666%</td>
<td>65 and 4 mo.</td>
</tr>
<tr>
<td>1940</td>
<td>2002</td>
<td>22.500%</td>
<td>65 and 6 mo.</td>
</tr>
<tr>
<td>1941</td>
<td>2003</td>
<td>23.333%</td>
<td>65 and 8 mo.</td>
</tr>
<tr>
<td>1942</td>
<td>2004</td>
<td>24.166%</td>
<td>65 and 10 mo.</td>
</tr>
<tr>
<td>1943-54</td>
<td>2005-16</td>
<td>25.000%</td>
<td>66</td>
</tr>
<tr>
<td>1955</td>
<td>2017</td>
<td>25.883%</td>
<td>66 and 2 mo.</td>
</tr>
<tr>
<td>1956</td>
<td>2018</td>
<td>26.666%</td>
<td>66 and 4 mo.</td>
</tr>
<tr>
<td>1957</td>
<td>2019</td>
<td>27.500%</td>
<td>66 and 6 mo.</td>
</tr>
<tr>
<td>1959</td>
<td>2021</td>
<td>29.166%</td>
<td>66 and 10 mo.</td>
</tr>
<tr>
<td>1960 and later</td>
<td>2022 and after</td>
<td>30.000%</td>
<td>67</td>
</tr>
</tbody>
</table>

** Source: Social Security Administration

For most individuals, the most critical decision effecting Social Security retirement benefits is when to begin receiving benefits. The majority of Americans opt for retirement benefits prior to attaining full retirement age. For a married couple working in a family owned business, how the family business net income is distributed between the husband and the wife will influence Social Security benefits.

**Estimating Social Security Retirement Benefits in a Family Owned Business**

In order to estimate the Social Security retirement benefits for a husband and wife in a family owned business, the Social Security Benefit Online Calculator was used (http://www.ssa.gov/retire2). Total family business net incomes ranging between $30,000 up to $200,000 per year were entered into the calculator with different portions being distributed as income between the husband and wife. Both the husband and wife were assumed to be born in 1963 and expected to begin receiving Social Security retirement
benefits at the full retirement age of 67. It is also assumed that both begin working and paying Social Security taxes at age 21.

Table 3 illustrates the individual expected Social Security retirement income for the husband and the wife individually at different levels of total family business net income with different percentages of the net income being distributed between the husband and the wife. Table 3 also illustrates the total family retirement income from Social Security if the spousal benefit is selected.

**Table 3  
Expected Social Security Retirement Benefits**

<table>
<thead>
<tr>
<th>Total Family Business Net Income</th>
<th>Percentage Distribution Between Spouses</th>
<th>Total Social Security Taxes of Income</th>
<th>Individual Benefits</th>
<th>Total Family</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1) (2)</td>
<td>(3) (4) (5) (6)</td>
<td>(7)</td>
<td></td>
</tr>
<tr>
<td>30,000</td>
<td>50-50</td>
<td>4,590.00</td>
<td>815.90</td>
<td>815.90</td>
</tr>
<tr>
<td></td>
<td>65-35</td>
<td>4,590.00</td>
<td>964.60</td>
<td>667.10</td>
</tr>
<tr>
<td></td>
<td>80-20</td>
<td>4,590.00</td>
<td>1,113.00</td>
<td>518.40</td>
</tr>
<tr>
<td></td>
<td>100-0</td>
<td>4,590.00</td>
<td>1,310.70</td>
<td>0.00</td>
</tr>
<tr>
<td>40,000</td>
<td>50-50</td>
<td>6,120.00</td>
<td>981.10</td>
<td>981.10</td>
</tr>
<tr>
<td></td>
<td>65-35</td>
<td>6,120.00</td>
<td>1,179.30</td>
<td>782.70</td>
</tr>
<tr>
<td></td>
<td>80-20</td>
<td>6,120.00</td>
<td>1,373.40</td>
<td>584.40</td>
</tr>
<tr>
<td></td>
<td>100-0</td>
<td>6,120.00</td>
<td>1,487.40</td>
<td>0.00</td>
</tr>
<tr>
<td>50,000</td>
<td>50-50</td>
<td>7,650.00</td>
<td>1,146.20</td>
<td>1,146.20</td>
</tr>
<tr>
<td></td>
<td>65-35</td>
<td>7,650.00</td>
<td>1,387.30</td>
<td>898.30</td>
</tr>
<tr>
<td></td>
<td>80-20</td>
<td>7,650.00</td>
<td>1,487.40</td>
<td>650.70</td>
</tr>
<tr>
<td></td>
<td>100-0</td>
<td>7,650.00</td>
<td>1,594.60</td>
<td>0.00</td>
</tr>
<tr>
<td>Total Family Business Net Income</td>
<td>Percentage Distribution Between Spouses</td>
<td>Total Social Security Taxes of Income</td>
<td>Individual Benefits</td>
<td>Total Family</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>----------------------------------------</td>
<td>-------------------------------------</td>
<td>---------------------</td>
<td>-------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Husband</td>
<td>Wife</td>
</tr>
<tr>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>60,000</td>
<td>50-50</td>
<td>9,180.00</td>
<td>1,310.70</td>
<td>1,310.70</td>
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<td>65-35</td>
<td>9,180.00</td>
<td>1,475.10</td>
<td>1,013.90</td>
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<td>80-20</td>
<td>9,180.00</td>
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</tr>
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<td>100-0</td>
<td>9,180.00</td>
<td>1,680.60</td>
<td>0.00</td>
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<tr>
<td>70,000</td>
<td>50-50</td>
<td>10,710.00</td>
<td>1,422.30</td>
<td>1,422.30</td>
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<tr>
<td></td>
<td>65-35</td>
<td>10,710.00</td>
<td>1,549.80</td>
<td>1,129.80</td>
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<tr>
<td></td>
<td>80-20</td>
<td>10,710.00</td>
<td>1,648.80</td>
<td>782.70</td>
</tr>
<tr>
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<td>100-0</td>
<td>10,710.00</td>
<td>1,744.70</td>
<td>0.00</td>
</tr>
<tr>
<td>80,000</td>
<td>50-50</td>
<td>12,240.00</td>
<td>1,487.40</td>
<td>1,487.40</td>
</tr>
<tr>
<td></td>
<td>65-35</td>
<td>12,240.00</td>
<td>1,613.70</td>
<td>1,245.40</td>
</tr>
<tr>
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<tr>
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<td>1,544.60</td>
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<td>13,770.00</td>
<td>1,668.90</td>
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<td>1,756.90</td>
<td>915.00</td>
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<td>13,509.60</td>
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<tr>
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<td>15,300.00</td>
<td>1,594.60</td>
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<td>65-35</td>
<td>15,300.00</td>
<td>1,714.80</td>
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<tr>
<td>120,000</td>
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<td>1,798.80</td>
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<tr>
<td></td>
<td>80-20</td>
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<td>1,857.00</td>
<td>1,113.00</td>
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<tr>
<td></td>
<td>100-0</td>
<td>14,379.60</td>
<td>1,857.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>
As can be seen in Table 3, how the income is distributed between a husband and a wife in a family business has an impact on the expected retirement benefits and the total Social Security taxes paid in a given year. The greatest impact on taxes is when the net income from the family business is above the maximum base amount for Social Security taxes, $87,900 in year 2004. How the net business income is distributed between the husband and the wife has the greatest affect on the total family income in retirement from Social Security at the lower income levels. Whenever the net income from a family business is less than the maximum base amount for Social Security taxes ($87,900), the total Social Security taxes will be the same irregardless of how the income is distributed between the husband and the wife. However, the total family retirement income will vary depending upon the distribution of income. Certain income distributions can maximize total family retirement income with no additional taxes.

### Strategies for Increasing Social Security Benefits in a Family Owned Business

The course of action needed in order to maximize family retirement income from Social Security for a husband and wife in a family owned business depends on the total amount of net income generated from the family owned business. As indicated in Table 3, when the net income from a family owned business is less than $55,000, the retirement income for the husband and the wife can be maximized by distributing 100% of the net income to one spouse and having the other spouse receive the spousal benefits. The total family retirement income is highest when using this approach. A different approach is needed when the net income is greater than $55,000. At the higher income levels, the total combined retirement income for a husband and wife can be maximized by distributing the net income equally between the husband and the wife. The 50%-50% distribution produces the maximum total retirement income from Social Security when compared to other percentage distributions and the spousal benefit.

<table>
<thead>
<tr>
<th>Net Income</th>
<th>Distribution</th>
<th>Husband’s Income</th>
<th>Wife’s Income</th>
<th>Total Retirement Income</th>
</tr>
</thead>
<tbody>
<tr>
<td>160,000</td>
<td>50-50</td>
<td>24,480.00</td>
<td>1,816.10</td>
<td>3,632.20 2,724.15</td>
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<td>1,857.00</td>
<td>1,648.80</td>
<td>3,505.80 2,785.50</td>
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<tr>
<td>80-20</td>
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<td>1,373.40</td>
<td>3,230.40 2,785.50</td>
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<tr>
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<td>0.00</td>
<td>1,857.00 2,785.50</td>
</tr>
<tr>
<td>200,000</td>
<td>50-50</td>
<td>27,599.20</td>
<td>1,857.00</td>
<td>3,714.00 2,785.50</td>
</tr>
<tr>
<td>65-35</td>
<td>25,379.60</td>
<td>1,857.00</td>
<td>1,744.70</td>
<td>3,601.70 2,785.50</td>
</tr>
<tr>
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<td>1,487.40</td>
<td>3,344.40 2,785.50</td>
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<tr>
<td>100-0</td>
<td>16,699.60</td>
<td>1,857.00</td>
<td>0.00</td>
<td>1,857.00 2,785.50</td>
</tr>
</tbody>
</table>

(3) = 15.30% * income – for incomes below $87,900 or
(3) = $87,900 * 15.30% + 2.90% * (income – $87,900) – for incomes above $87,900
(6) = (4) + (5)
(7) = (4) + (4) * 50%

Source: Social Security Benefit Online Calculator (http://www.ssa.gov/retire2)
When the family owned business’ net income is above the maximum individual income subject to Social Security taxes, $87,900 in 2004, the total Social Security taxes paid by the family owned business will increase in any percentage distribution between spouses other than 100% income to one spouse and 0% income to the other. As a result, maximizing combined retirement income as indicated with the 50% to 50% distribution will result in higher Social Security taxes required by the family owned business at income levels above the maximum base. At the higher net income levels, the percentage distribution between spouses can result in differences of thousands of dollars per year in Social Security annual taxes.

Other Factors to Consider

Many factors should be considered before an income distribution strategy is selected for a family owned business. The Social Security retirement benefit is only one of the important benefits provided by Social Security. Disability income protection and survivor benefits for dependents of covered workers are also based upon the individual’s average indexed monthly earnings. The distribution of a family owned business’ net income between the husband and the wife will affect the amount of monthly benefit for each of these as well. Similar to the income replacement for retirees, disability income and survivor benefits provide a higher income replacement at the lower income levels than for individuals at higher levels of income. In order to maintain a family’s standard of living, individual life insurance, disability income insurance, and retirement planning are very important.

Conclusion

Husbands and wives working together in a family owned business have the opportunity to influence their total family retirement income received from Social Security by distributing the family business net income between the spouses in the manner most effective for their level of net income and other financial circumstances. When the business net income is below $55,000 per year, total retirement income between the husband and the wife can be maximized by distributing 100% of the net income to one spouse and having the other spouse select the spousal benefit. Above a business net income of $55,000 per year, the husband and wife can maximize retirement benefits from Social Security by distributing the taxable income 50% each between the husband and wife. However the equal distribution of income results in higher Social Security taxes when the family business net income is above the maximum base amount.

It is also important to realize that when one spouse dies, the Social Security retirement income for that person ends and the surviving spouse is left with only his or her own retirement income. This and other important factors should be considered such as other sources of income for the husband and the wife, existing life and disability insurance coverage, dependents, and net worth should be considered before selecting an income distribution strategy.

Endnotes
1 How Your Retirement Benefit is Figured SSA Publication No. 05-10070, January 2003
2 Fast Facts and Figures about Social Security Source: Social Security Administration, Office of the Chief Actuary 2003
3 Fast Facts and Figures about Social Security Source: Social Security Administration, Office of the Chief Actuary 2003
4 Retirement Benefits, SSA Publication, No. 05-10035, April 2003
5 How Your Retirement Benefit is Figured SSA Publication No. 05-10070, January 2003
7 Fast Facts and Figures about Social Security Source: Social Security Administration, Office of the Chief Actuary 2003
8 Social Security Benefit Online Calculator (http://ssa.gov/retire2)
THE IMPORTANCE OF SITUATION-SPECIFIC ASSESSMENT

Jean B. Price, Marshall University

Abstract
Throughout the country, educators in many different academic areas have worked hard to develop curricular innovations and pedagogical improvements. Educational assessment has become an important issue in many fields. Although the example of situation-specific assessment described herein was developed within an accounting curriculum, characteristics of this approach are equally applicable to other fields as well.

Implementation of major changes in accounting education became widespread during the early 1990’s. Soon thereafter, educators identified the need to assess the resulting impacts on student learning, enhancement of various student skills and graduates' preparedness for their place in the accounting profession.

Within the field of accounting education, the call for increased attention to the need for assessment of educational outcomes was quickly heeded. National organizations recognized this need and responded with the creation of various committees and task forces charged with guiding and encouraging the assessment activities of accounting educators. Books have been written. Conferences have been held. Universities have departments devoted entirely to the endeavor of assessing educational outcomes. Accounting departments have created assessment committees.

Educational assessment continues to be an important process. Accounting educators have responded to the need for educational changes in their field, but for many, assessing the impacts of these changes looms as a daunting task. Indeed, some assessment procedures have become quite complex, supporting the development of the field of assessment as a separate educational specialization.

What must be kept in mind, however, is that not all assessment procedures need to be complex to be effective. In fact, to best meet the needs faced in certain assessment situations, simplicity may be the key. One useful approach is situation-specific assessment. By its very nature, the tools used and the results achieved are familiar to academics teaching in the field—no educational background required!!
PROMOTING CHARACTER WITHIN PUBLIC HIGHER EDUCATION

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ABSTRACT

Character promotion in higher education has generally been viewed as the province of the nation’s military academies, private institutions, or faith affiliated colleges and universities. Only a few public institutions of higher learning devote resources or energy to promote positive character traits among their students. However, conversations between public higher education professionals often center on inappropriate student behavior, underachievement, and issues concerning academic integrity. Poor student attitudes and the lack of concern for consequences of what could be characterized as unrestrained selfishness or self-absorbed behavior are believed to be two drivers that exacerbate these conditions.

How might educators at public institutions of higher education combat undesirable student attributes without resorting to lists of “thou shall not …?” One way to develop positive campus attitudes is by developing and promoting the tenants of an institutional creed. Students learn from what they hear, see, and what is practiced. A creed or statement of values is a condensed positively written document concerning institutional belief, principles, and expectations. It is meant to inspire students, encourage commitment to high standards of performance and ideals, and to publicly reveal these institutional aspirations. Most students can be significantly influenced when they are in an environment that promotes high standards of honesty, perseverance, and achievement.

Our paper presents two versions of an institutional creed that promotes positive character traits. A student may be neutral to or reject such traits due to long established routines, traditions, or patterns of thinking and behavior. Or a student may choose to embrace such virtues and we believe obtain advantages in personal and professional endeavors. At some point in a person’s development, the practice of inclusion of positive or negative character traits will serve as norms in decision making and behavior which will influence how one approaches life’s decisions.
LIQUIDITY AND THE INTRADAY VARIATION IN COMPONENTS OF
THE BID-ASK SPREAD

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ABSTRACT
Using the Huang and Stoll (1997) bid-ask spread decomposition model, we investigate
the time varying costs that affect all traders. Generally, the quoted bid-ask spread and
the adverse selection component both follow a reverse-J pattern. However, in contrast
to earlier research that did not perform a complete bid-ask spread decomposition, we
find that the inventory holding cost component decreases significantly throughout the
day, with a marginal increase at the close of trading. This decline is more gradual for
higher liquidity stocks, suggesting that inventory management plays a greater role for
these stocks.

INTRODUCTION
Understanding time-varying trading processes is
important for both academic researchers and
market participants interested in increasing trading
efficiency. The components of the bid-ask spread
are particularly important since variation can
identify changes in the risks and costs of trading.
Furthermore, intraday variation in each component
can provide insight into a market maker’s
response to trade flows and their implications for
asset pricing models.

Various papers have attempted to decompose the
bid-ask spread into the three components:
adverse selection costs, inventory holding costs,
and order processing costs but until Huang and
Stoll (1997), the majority of papers have estimated
just one component, primarily the adverse
selection component, while aggregating the other
two components. This methodology is acceptable
when only one component is being examined but
with the advent of more advanced models a more
comprehensive examination is possible. Another
difficulty in applying spread decomposition models
to empirical data is adhering to assumptions about
the data structure. Using a Generalized Method of
Moments (GMM) procedure for their estimation,
Huang and Stoll (1997) do not require that the joint
distribution of variables be normal and their
estimation procedure is not compromised even if the error terms are serially correlated or show signs of heteroscedasticity. Adoption of the model and estimation procedure has not been widespread since implementing the model is very data intensive.

Intraday variation in the bid-ask spread as a whole has been examined by McInish and Wood (1992) and others. They find that the bid-ask spread on the New York Stock Exchange is widest at the open, drops sharply during the first hour of trading, and increases slightly before the market closes. Chung and Zhao (2003) find a similar pattern on NASDAQ after market reform. A number of studies have examined the intraday properties of the adverse selection component. Foster and Viswanathan (1993) observe that lower liquidity stocks tend to show more variation in this component. Lin, Sanger and Booth (1995) divide the day into three periods and find that this component declines throughout the trading day. Using a five-period day, Madhavan, Richardson, and Roomans (1997) observe that the adverse selection component declines throughout the day until the last half-hour of trading. McInish and Van Ness (2001) examine 30 stocks over 13 half-hour periods and find that the intraday variation in adverse selection and the other two aggregated components is similar to the variation in the total bid-ask spread.

We extend prior research by adapting Huang and Stoll’s (1997) comprehensive general model to decompose the aggregate bid-ask spread into all three components for use with intraday periods. There are three main areas where this paper differs from prior papers and contributes to the literature. First, we estimate all three components simultaneously in an intraday model with multiple periods, where most intraday papers have examined only one component. Second, we employ a method that results in an unbiased sample that only excludes stocks when the estimation procedure fails to converge or provides implausible estimates. This procedure results in a sample size that is comparable to that of some other models but avoids the sample selection bias inherent in the earlier papers. Third, we explicitly examine the impact of liquidity on intraday estimates of all three bid-ask spread components. The paper is organized as follows. Section 2 provides a brief review of the relevant literature. Section 3 presents our methodology. Section 4 describes the results of our intraday analyses on the entire sample. Section 5 describes our liquidity partitioned results and section 6 concludes.

ESTIMATING COMPONENTS OF THE BID-ASK SPREAD

Huang and Stoll (1997) construct a basic trade indicator model within which all previous models of the bid-ask spread’s components are reconciled. Huang and Stoll (1997) break up the spread into its three separate components and estimate these components for a sample of 20 large NYSE-listed stocks for all trading days in 1992. They find that some of their estimates for the adverse information and inventory carrying cost components are negative but this result is theoretically implausible if market makers are risk averse and private information exists. They argue that this apparent anomaly occurs because large trades are broken down into several smaller sized trades to make execution cheaper. For this reason, they bunch trades under certain circumstances such that sequential trades actually become one for the purposes of estimation. Their results after the bunching procedure are far more consistent with theoretical predictions.

Huang and Stoll (1997) report an adverse information component of the spread of 9.6%, which is also consistent with the results in George, Kaul, and Nimalendran (1991). Huang and Stoll (1997) find that the inventory carrying cost component of the spread is 28.7% with the remaining 61.7% attributed to order processing costs. These results are different than those reported by Madhavan, Richardson, and Roomans (1997) who use a model that groups the inventory holding and order processing costs together. They report that the adverse information component for their sample is in the 35-50% range, depending on the time of day. Even if we assume that the smaller average firm size used in Madhavan, Richardson, and Roomans (1997) causes a larger adverse information component, such a large disparity is disturbing.

The first papers to analyze the spread’s components on an intraday basis are Hasbrouck (1991) and Foster and Viswanathan (1993). Both papers employ the GMM technique to estimate parameters of their model (the majority of previous papers used Maximum Likelihood or OLS) and both use information asymmetry models that divide the spread into adverse selection costs and
transitory costs (representing both inventory holding and order processing costs). Hasbrouck (1991) finds that the price impact of trades on subsequent quotes tends to increase with trade size. He concludes that this increase reflects an adverse selection cost to the market maker as informed investors wish to maximize their gain by trading a large volume of shares. His results are especially significant for less liquid stocks that have a lower trading volume.

Foster and Viswanathan (1993) use the model developed by Hasbrouck (1991) to examine the components of the spread on an intraday and intraweek basis. Foster and Viswanathan (1993) not only test all firms for systematic changes in the spread components, but also divide their sample into deciles based on liquidity and analyze the components of the spread across these liquidity deciles. Although these deciles are supposed to represent a true cross section of the market, Foster and Viswanathan (1993), by their own admission, do not estimate the most liquid stocks due to computational difficulty. This problem notwithstanding, the paper still finds that liquidity does affect the components of the spread during the day. They show that the spread components for lower liquidity firms reveal more intraday variation than the same components for higher liquidity firms.

Lin, Sanger, and Booth (1995) examine the components of the spread by partitioning the day into three periods. While they also use a trade indicator model with a GMM estimation technique, they focus on trade size and how it affects both the components of the spread during the day and the order flow immediately following a trade. They choose 150 stocks that all have at least 2,500 trades during 1988. This selection technique excludes low liquidity stocks as the results of the paper represent inferences only for medium and high liquidity stocks. They find that the adverse selection component of the spread increases monotonically for all trade sizes except the largest 1% of trades. Their finding is consistent with the stealth trading hypothesis which argues that block trades should convey very little information to the market. They also find that order persistence (the probability that a buy follows a buy or a sell follows a sell) decreases with trade size, implying that market makers revise their quotes by a larger amount after larger trades in order to induce a trade reversal. They also infer that larger trades have a larger inventory cost component compared to smaller trades. This conclusion is intuitively appealing given that a market maker’s inventory level is affected more after a large trade than it is after a small one. Hence even if the trade contains very little information, the incentive to induce a trade reversal is stronger subsequent to larger trades.

The other principal intraday paper by Madhavan, Richardson, and Roomans (1997) uses a five-period day to examine the bid-ask spread components. Their sample of 274 NYSE-listed stocks represents the largest sample to date for a trade indicator study of the bid-ask spread’s components. Their sample, however, consists of stocks that are larger and more liquid than the average NYSE-listed firm and thus suffers the same data bias as Lin, Sanger, and Booth (1995). Such a bias is difficult to avoid given that the GMM estimation procedure requires a large number of observations to arrive at meaningful estimates. Since many stocks don’t trade often enough to be able to use this procedure, more liquid stocks will dominate the sample. Madhavan, Richardson, and Roomans (1997) report similar results to Lin, Sanger, and Booth (1995) for intraday changes in the spread’s components. They show that the adverse selection component of the spread decreases monotonically until the last half-hour of trading when it increases marginally. In addition, Madhavan, Richardson, and Roomans (1997) also show that the autocorrelation coefficient of the order flow follows a U-shape over the course of the day. This implies that , the probability of a trade reversal, will follow an inverted U-shape.

In sum, intraday analysis of the bid-ask spread has identified several patterns related to the spread as a whole and its individual components. Specifically, the adverse selection component decreases throughout the day as the market maker learns from the order flow while the inventory holding component rises during the day as the risk of holding inventory overnight increases. However, these earlier empirical studies use models that have since been improved and data sets that are not fully representative of the market. This study addresses these issues by using an improved model that estimates all components and including all NYSE stocks.

**METHODOLOGY**

Huang and Stoll’s (1997) model of the spread relies on , the quote midpoint and , the
transaction price. The quote midpoint is the bid quote plus the ask quote, divided by two, and is calculated just before a transaction occurs. Huang and Stoll (1997) use a trade indicator model to estimate the spread’s components, hence each trade must be signed as either buyer or seller initiated. \( Q_t \) is a dummy variable that equals +1 if the trade occurs above the midpoint, –1 if it occurs below the midpoint, and 0 if the transaction occurs at the midpoint.

If the current transactions are related to prior transactions due to the adjustment of quotes by the market maker, then Huang and Stoll (1997) show that the following relationship can be obtained:

\[
E(Q_{t-1}|Q_{t-2}) = (1 - 2\pi)Q_{t-2} \quad [1]
\]

where \( \pi \) represents the probability that \( Q_{t-1} \) is opposite in sign to \( Q_{t-2} \), that is, \( \pi \) represents the probability of a reversal in trades. Huang and Stoll (1997) model the midpoint change by relying on the quoted spreads to arrive at a model which is able to estimate the three components of the spread individually:

\[
\Delta M_t = (\alpha + \beta) \frac{S_{t-1}}{2} Q_{t-1} - \alpha \frac{S_{t-2}}{2} (1 - 2\pi) Q_{t-2} + e \quad [2]
\]

where \( \alpha \) represents the adverse selection component, \( \beta \) represents the inventory holding cost component, and \( S_{t-1} \) and \( S_{t-2} \) represent posted spreads. By estimating equations (1) and (2) simultaneously, the spread can be decomposed into its three individual components.

The general model estimates the spread’s components for the entire day. Hence, for an intraday analysis, the day must be broken up into various periods with each period being estimated separately. Since other studies have already attempted an intraday analysis with other models, intraday periods are chosen to facilitate comparison with the studies by Lin, Sanger and Booth (1995) and Madhavan, Richardson, and Roomans (1997).

We perform a bunching procedure that is more narrowly defined than the Huang and Stoll (1997) procedure. They define a sequence of trades as one large trade when they are all “at the same price on the same side of the market without any change in bid or ask quotes” (Huang and Stoll 1997, 1019). Although this method of bunching trade sequences will capture a majority of large broken-up trades, it may also bunch trades that are completely independent of each other since there is no time constraint. This is likely to produce results that are spurious, given that the model for determining the components of the spread relies heavily on the order flow and hence on the value of \( \pi \), which is directly affected when trades are bunched. Large trades that are broken up will generally be executed reasonably quickly to avoid movements in the price, hence, the trade sequences are only bunched when they are observed within a short period of time. Trades at the same price, same side of the market, and same quotes are grouped together, as in Huang and Stoll (1997), however, a two minute time constraint is also employed. Although this method may not always catch large broken-up trades, it reduces the likelihood of bunching independent transactions, thereby producing a more meaningful estimate of \( \pi \). A further advantage of this methodology is that it will highlight the impact of Huang and Stoll’s (1997) bunching procedure on both \( \pi \), and the bid-ask spread component estimates. Similar to Huang and Stoll (1997), we employ a Generalized Method of Moments (GMM) estimation procedure since it offers the most flexibility in estimation and provides consistent standard errors even when the error terms in the moment equations show signs of heteroskedasticity or serial correlation. The procedure also does not require the joint distribution of variables to be normally distributed.

We use the Trades and Quotes (TAQ) database from the NYSE for all trading days in the 1996. Since different market structures may affect the results, the analysis is limited to stocks traded on the NYSE. Data from 1996 has been chosen because it represents a period of high growth in the US economy at a time without a stock market ‘correction’. Such a period is ideal for this type of study because it demonstrates a time of normal trading behavior, hence, the results and conclusions are likely to be useful to both market participants and regulatory bodies under normal circumstances. Periods of high volatility, such as that observed in October 1997, have been purposely avoided because the paper’s primary goal is to provide an analysis of the spread’s components during the trading day, not a review of the components’ reaction to a market crisis.
Consistent with prior literature, the analysis is confined to those transactions recorded as regular trades that occur in a continuous auction subsequent to the open. Therefore, the opening trade that is conducted in a call auction based on accumulated overnight orders is excluded from the analysis because it is performed under a different market structure than regular trades on the NYSE. Similarly, trades reported in TAQ as block transactions are removed since such trades are usually prearranged and convey very little information and are, therefore, inconsistent with the remainder of the order flow. In addition, any quote with a percentage spread greater than 15% and any quotes or transactions more than 50% away from the previous quote or transaction are excluded.

In order to assign each trade as buyer or seller initiated, a set of prevailing quotes is matched with each transaction. Lee and Ready (1991) recognize that prevailing quotes are often recorded ahead of trades, creating an artificial lag between transaction time and the underlying quotes at that time. In order to eliminate this problem, the prevailing quotes identified for each transaction are those quotes that were in effect at least five seconds prior to the transaction being recorded. This set of quotes is then matched to the trade, and the quote midpoint is calculated as the average of these prevailing bid and ask offers.

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</tr>
</tbody>
</table>

**INTRADAY BID-ASK SPREAD COMPONENT ESTIMATES**

Descriptive statistics for the entire data set are provided for all NYSE-listed firms. Table 1 reports details on the market capitalization of NYSE-listed firms in 1996, trade prices across all firms, volume per trade, number/frequency of trades per day as well as several measures of the bid-ask spread. Except for market capitalization which is calculated at the beginning of each month, these measures are estimated by averaging across the 254 trading days in 1996 for each firm, and then averaging the results across all firms.

The full sample consists of all NYSE-listed stocks in 1996, which eliminates many of the data biases that have plagued recent studies of the spread. Madhavan, Richardson and Roomans (1997) for example, eliminate all stocks that do not have at least 250 observations for each intraday period being tested while Lin, Sanger, and Booth (1995) require a total of no less than 2,500 observations for the entire year. This filtering method results in the selection of more actively traded firms that, in general, will also be the larger firms listed on the NYSE.

The estimates reported in Table 1 reveal that the median market capitalization of NYSE stocks in 1996 was $1.51 billion, with a median transaction price across these stocks of $24.35. The median number of transactions per day during 1996 was 17 with a maximum of 1,367 and a minimum of just 1, while the average volume of shares traded per transaction ranged from 16 to 44,501 with a median of 1,505. It can be seen in Table 1 that the stocks exhibit a wide range in terms of size and activity, with all variables being skewed to the right.

Three bid-ask spread statistics are estimated and reported in Table 1. The median quoted spread for all stocks in 1996 was $0.19, which represents a significant difference to the average quoted spread of $0.50. This discrepancy is due to the fact that a huge proportion of the spreads on the NYSE at this time are $0.125. Once the spread becomes greater than this it tends to increase quite rapidly, with several stocks trading with spreads in excess of $100. Furthermore, the standard deviation of the quoted spread is very large which represents the high variability of spreads when they are not equal to $0.125.

The effective spread, defined as $2|P_t - M_t|$ where $P_t$ and $M_t$ are the price and midpoints, respectively, also has a mode of $0.125, but the median estimate for this spread is much smaller than that for the quoted spread due to the possibility of trades occurring inside the quotes. The variability of this spread estimate is high and
its distribution is skewed to the right. The median percentage spread for NYSE stocks in 1996 is 0.97% and less variation is observed for this spread characteristic compared to the quoted and effective spread.

There are some constraints to the estimates for each bid-ask spread component. If at least one individual has more information than the market maker, adverse selection costs must be greater than zero. Likewise, given that a market maker is risk averse and, therefore, loses utility when holding a sub-optimal level of inventory (Amihud and Mendelson 1980), he also faces a positive inventory holding cost. Furthermore, since a market maker faces other costs, such as wages to employees, annual expenses payable to the exchange, and costs associated with the actual processing of an order, an additional positive order processing cost is included in the spread. The decomposition of the spread, therefore, must provide a positive estimate for all three of these parameters.

Unfortunately, the GMM model employed for estimation, due to its problems with estimating small samples, provides invalid estimates for the parameters of many firms. An estimate is considered invalid when either (a) the adverse selection or inventory holding component of the spread exceeds one or is less than zero, or (b) the sum of these two components exceeds one (thereby making the order processing cost negative). We remove these invalid estimates from our sample so that the final sample used for analysis contains only those estimates of the spread’s components that are consistent with theory.

The number of valid estimates is 292 for the five-period sample. We require that a valid estimate be observable in each period for that stock to be included in the sample. This selection technique significantly reduces the sample size because a stock is eliminated even if it contains only one invalid estimate during the day. Unlike other studies, this elimination is done based on the parameter estimates and not on any variable such as liquidity.

The five-period final sample is similar in size to 274 NYSE-listed stocks used by Madhavan, Richardson, and Roomans (1997), but is far larger than the 60 NYSE-listed stocks employed by Foster and Viswanathan (1993). As reported in Table 2, the median market capitalization of the final sample is $1.51 billion and for the excluded firms it is $1.51 billion. This difference is negligible (p = 0.85) and, as with the one and three-period models, the market capitalization of the final sample is close to the median for all NYSE stocks.

Trading activity of our sample is representative of the market average. Table 2 reports that the median number of transactions per day for the final sample (excluded firms) is 15 (17). Similarly, the median percentage spread for the final sample is not statistically different from that for the excluded firms. The final sample, therefore, is a good representation of the average NYSE-listed firms with respect to size, costs of trading, and market activity.

### TABLE 2

#### Statistics for Five-Period Final Sample

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Std.Dev.</th>
<th>Min</th>
<th>Max</th>
<th>Median</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market Cap. ($bn.)</td>
<td>2.01</td>
<td>1.69</td>
<td>0.026</td>
<td>35.06</td>
<td>1.53</td>
</tr>
<tr>
<td>Trade Price</td>
<td>23.58*</td>
<td>13.24</td>
<td>3.72</td>
<td>87.67</td>
<td>20.82**</td>
</tr>
<tr>
<td>Transactions/Day</td>
<td>24</td>
<td>22</td>
<td>3</td>
<td>177</td>
<td>18</td>
</tr>
<tr>
<td>Volume/Transaction</td>
<td>1.592**</td>
<td>1.270</td>
<td>308</td>
<td>13,381</td>
<td>1,318**</td>
</tr>
<tr>
<td>Quoted Bid-ask Spread ($)</td>
<td>0.21*</td>
<td>0.08</td>
<td>0.13</td>
<td>0.76</td>
<td>0.19'</td>
</tr>
<tr>
<td>Percentage Bid-ask Spread (%)</td>
<td>1.21</td>
<td>1.01</td>
<td>0.34</td>
<td>9.76</td>
<td>0.98</td>
</tr>
<tr>
<td>Effective Bid-ask Spread ($)</td>
<td>0.16*</td>
<td>0.06</td>
<td>0.03</td>
<td>0.55</td>
<td>0.15'</td>
</tr>
</tbody>
</table>

#### Panel A: Final sample of 292 stocks

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Std.Dev.</th>
<th>Min</th>
<th>Max</th>
<th>Median</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market Cap. ($bn.)</td>
<td>2.24</td>
<td>2.52</td>
<td>0.009</td>
<td>176.21</td>
<td>1.51</td>
</tr>
<tr>
<td>Trade Price</td>
<td>32.56</td>
<td>80.11</td>
<td>0.23</td>
<td>3,397.67</td>
<td>24.60</td>
</tr>
<tr>
<td>Transactions/Day</td>
<td>48</td>
<td>91</td>
<td>1</td>
<td>1,367</td>
<td>17</td>
</tr>
<tr>
<td>Volume/Transaction</td>
<td>1.836</td>
<td>1.691</td>
<td>16</td>
<td>44,501</td>
<td>1,523</td>
</tr>
<tr>
<td>Quoted Bid-Ask Spread ($)</td>
<td>0.52</td>
<td>5.08</td>
<td>0.12</td>
<td>203.40</td>
<td>0.10</td>
</tr>
<tr>
<td>Percentage Bid-Ask Spread (%)</td>
<td>1.45</td>
<td>1.58</td>
<td>0.12</td>
<td>13.39</td>
<td>0.97</td>
</tr>
<tr>
<td>Effective Bid-Ask Spread ($)</td>
<td>0.35</td>
<td>3.19</td>
<td>0</td>
<td>140.93</td>
<td>0.14</td>
</tr>
</tbody>
</table>

Wilcoxon rank-sum tests: * significant at 5%  ** significant at 1%
Med. two-sample tests: * significant at 10%  *** significant at 1%

Panel A of Table 3 reports the unbunched estimates for each of the three components, while Panel B reports the bunched estimates. Since the
objective of this paper is to examine what proportion of the spread each of the components represents and how these vary throughout the day, we present results as a percentage of the spread. This is also consistent with and facilitates comparisons to Huang and Stoll (1997). The bunching procedure appears to have little effect on the estimate of $\alpha$. This implies that either the number of informed traders breaking up their transactions may be small, or that these informed traders may be executing the broken-up orders slowly.

Consistent with the argument that the specialist learns from the order flow throughout the day and the risk of trading with a more informed investor therefore decreases, the adverse selection component of the spread is far greater in the first period of the day than for any period later in the day. Indeed, the median estimate of $\alpha$ decreases by 20% after the first period and then remaining periods appear to have a U-shape. For the entire day, the pattern of $\alpha$ appears to have a reverse-J shape.

**TABLE 3**

Bid-Ask Spread Component Estimates Across Five Intraday Periods

<table>
<thead>
<tr>
<th>Panel A: Unbunched</th>
<th>9:30 – 10:00</th>
<th>10:00 – 11:30</th>
<th>11:30 – 14:00</th>
<th>14:00 – 15:30</th>
<th>15:30 – 16:00</th>
<th>$\chi^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\alpha$ Mean</td>
<td>0.1958</td>
<td>0.1481</td>
<td>0.1337</td>
<td>0.1331</td>
<td>0.1414</td>
<td>40.29</td>
</tr>
<tr>
<td>(Mean Std. Err.)</td>
<td>(0.0082)</td>
<td>(0.0067)</td>
<td>(0.0053)</td>
<td>(0.0059)</td>
<td>(0.0056)</td>
<td>($p&lt;0.001$)</td>
</tr>
<tr>
<td>Std. Dev.</td>
<td>0.1398</td>
<td>0.1140</td>
<td>0.0912</td>
<td>0.1001</td>
<td>0.0953</td>
<td></td>
</tr>
<tr>
<td>Median</td>
<td>0.1588</td>
<td>0.1238</td>
<td>0.1167</td>
<td>0.1094</td>
<td>0.1253</td>
<td></td>
</tr>
<tr>
<td>$\beta$ Mean</td>
<td>0.3092</td>
<td>0.2890</td>
<td>0.2646</td>
<td>0.2503</td>
<td>0.2403</td>
<td>40.97</td>
</tr>
<tr>
<td>(Mean Std. Err.)</td>
<td>(0.0099)</td>
<td>(0.0079)</td>
<td>(0.0070)</td>
<td>(0.0070)</td>
<td>(0.0069)</td>
<td>($p&lt;0.001$)</td>
</tr>
<tr>
<td>Std. Dev.</td>
<td>0.1607</td>
<td>0.1353</td>
<td>0.1201</td>
<td>0.1201</td>
<td>0.1186</td>
<td></td>
</tr>
<tr>
<td>Median</td>
<td>0.2946</td>
<td>0.2912</td>
<td>0.2635</td>
<td>0.2384</td>
<td>0.2303</td>
<td></td>
</tr>
<tr>
<td>$\gamma$ Mean</td>
<td>0.2760</td>
<td>0.2825</td>
<td>0.2745</td>
<td>0.2688</td>
<td>0.2719</td>
<td>5.09</td>
</tr>
<tr>
<td>(Mean Std. Err.)</td>
<td>(0.0032)</td>
<td>(0.0050)</td>
<td>(0.0049)</td>
<td>(0.0050)</td>
<td>(0.0057)</td>
<td>($p&lt;0.278$)</td>
</tr>
<tr>
<td>Std. Dev.</td>
<td>0.2986</td>
<td>0.2958</td>
<td>0.2945</td>
<td>0.2862</td>
<td>0.2968</td>
<td></td>
</tr>
<tr>
<td>Median</td>
<td>0.2887</td>
<td>0.2973</td>
<td>0.2926</td>
<td>0.2872</td>
<td>0.2895</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Panel B: Bunched</th>
<th>9:30 – 10:00</th>
<th>10:00 – 11:30</th>
<th>11:30 – 14:00</th>
<th>14:00 – 15:30</th>
<th>15:30 – 16:00</th>
<th>$\chi^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\alpha$ Mean</td>
<td>0.2102</td>
<td>0.1549</td>
<td>0.1416</td>
<td>0.1413</td>
<td>0.1525</td>
<td>27.36</td>
</tr>
<tr>
<td>(Mean Std. Err.)</td>
<td>(0.0098)</td>
<td>(0.0076)</td>
<td>(0.0059)</td>
<td>(0.0064)</td>
<td>(0.0063)</td>
<td>($p&lt;0.001$)</td>
</tr>
<tr>
<td>Std. Dev.</td>
<td>0.1668</td>
<td>0.1294</td>
<td>0.1014</td>
<td>0.1091</td>
<td>0.1073</td>
<td></td>
</tr>
<tr>
<td>Median</td>
<td>0.1599</td>
<td>0.1277</td>
<td>0.1197</td>
<td>0.1171</td>
<td>0.1369</td>
<td></td>
</tr>
<tr>
<td>$\beta$ Mean</td>
<td>0.3684***</td>
<td>0.3454***</td>
<td>0.3105***</td>
<td>0.2936***</td>
<td>0.2775***</td>
<td>54.39</td>
</tr>
<tr>
<td>(Mean Std. Err.)</td>
<td>(0.0115)</td>
<td>(0.0094)</td>
<td>(0.0081)</td>
<td>(0.0080)</td>
<td>(0.0076)</td>
<td>($p&lt;0.001$)</td>
</tr>
<tr>
<td>Std. Dev.</td>
<td>0.1972</td>
<td>0.1607</td>
<td>0.1398</td>
<td>0.1361</td>
<td>0.1325</td>
<td></td>
</tr>
<tr>
<td>Median</td>
<td>0.3608</td>
<td>0.3529</td>
<td>0.3092</td>
<td>0.2797</td>
<td>0.2768</td>
<td></td>
</tr>
<tr>
<td>$\gamma$ Mean</td>
<td>0.3691***</td>
<td>0.2927*</td>
<td>0.2801</td>
<td>0.2758</td>
<td>0.2800</td>
<td>10.82</td>
</tr>
<tr>
<td>(Mean Std. Err.)</td>
<td>(0.0050)</td>
<td>(0.0047)</td>
<td>(0.0048)</td>
<td>(0.0049)</td>
<td>(0.0055)</td>
<td>($p&lt;0.029$)</td>
</tr>
<tr>
<td>Std. Dev.</td>
<td>0.0850</td>
<td>0.0811</td>
<td>0.0827</td>
<td>0.0839</td>
<td>0.0942</td>
<td></td>
</tr>
<tr>
<td>Median</td>
<td>0.3041</td>
<td>0.3064</td>
<td>0.2944</td>
<td>0.2911</td>
<td>0.2927</td>
<td></td>
</tr>
</tbody>
</table>

Parametric test: *significant at 10%  ** significant at 5%  *** significant at 1%
Wilcoxon Rank-Sum tests: ‘‘’’ significant at 5%  ‘‘‘’ significant at 1%
Inventory holding costs decline during the day for the five-period model. This decline is shown to be highly significant for both bunched and unbunched trades. Such a finding implies that market makers face the largest inventory risks in the morning, with these risks diminishing throughout the day. This can be attributed to the learning process of market makers that may face higher risks in the morning because they are unsure of how the order flow will progress during the day. As market makers learn from the order flow, the inventory risk decreases since they are able to more accurately predict the future arrival of trades. This view is supported by the observed decrease in $\pi$, implying that because market makers are less worried about their inventory positions as the day progresses, they are less inclined to induce trade reversals.

THE EFFECT OF LIQUIDITY ON ESTIMATION OF INTRADAY BID-ASK SPREAD COMPONENTS

The earlier intraday bid-ask spread component estimation papers were influenced by the levels of liquidity of stocks included in the analysis. In the Madhavan, Richardson, and Roomans (1997) paper, their sample was much larger than the mean NYSE firm. Similarly, in Lin, Sanger, and Booth (1995) their sample was restricted to stocks that had at least 2,500 transactions. We assess the impact of liquidity by breaking our sample into three groups: high, medium, and low liquidity. The high liquidity group has an average number of transactions during 1996 of 1,728 per day, the medium liquidity group has an average of 607 and the low liquidity group has an average of 212.

In Table 4, we report the pattern of coefficient estimates across the five periods during the day for each of the liquidity groups. We report only the unbunched estimates since the pattern is qualitatively similar for the bunched group. The estimates for $\alpha$ are in Panel A while the estimates for $\beta$ are in Panel B.

For the adverse selection component ($\alpha$) there are no statistical differences across the five intraday time periods in the low liquidity stocks. The low liquidity stocks exhibit the highest adverse selection component level of any of the liquidity groups with an adverse selection component of approximately 20%. This is not surprising since these firms typically would have less analyst coverage and therefore greater informational asymmetries. This rationale and findings are consistent with those of Brennan and Subrahmanyam (1995). For the medium liquidity stocks, the adverse selection component declines steadily throughout the day from 18% to 14%. The high liquidity stocks have a lower level of the adverse selection component and this level is relatively constant throughout most of the day at about 11%. These stocks do exhibit a decline at the end of the day in the last half-hour period to 8%.

There are statistically significant differences across the liquidity groups within each of the five periods throughout the day, with the higher the level of liquidity, the lower the level of adverse selection. The difference in adverse selection across the liquidity groups is the least significant during the first half-hour of trading at a p-value = 0.012. This can be explained as being the most risky time of day to trade since information is being impounded in prices after the overnight closure. The differences across the liquidity groupings are not surprising, but it does indicate that forming a sample on the basis of liquidity could lead to a potential bias.

The differences in the inventory holding cost component ($\beta$) across the liquidity groupings are less pronounced than the adverse selection component. There are some statistical differences in the second and third periods of the day (10:00-11:30 and 11:30-14:00), but no differences at the beginning or end of the day. This suggests that inventory management may be different for stocks with different liquidity but only during the trading day. Within each of the liquidity groups, there are statistical differences across the five periods, with the low liquidity stocks having the more rapid decline in the inventory holding cost component. The high liquidity stocks (and to a lesser degree the medium liquidity stocks) exhibit a slower decline in the component. This phenomenon may be explained as being a result of the potential risks of inventory being greater for the higher liquidity stocks. Since there are a larger number of shares traded, inventory management may be more of a concern.

CONCLUSION

Our adaptation of the Huang and Stoll (1997) bid-ask spread decomposition model to an intraday analysis reveals that order flow properties may impact on the estimation. The bunching procedure, which was necessary in the Huang and
## TABLE 4
Bid-Ask Spread Component Estimates Across Liquidity Groups

<table>
<thead>
<tr>
<th>Panel A:</th>
<th>9:30 – 10:00</th>
<th>10:00 – 11:30</th>
<th>11:30 – 14:00</th>
<th>14:00 – 15:30</th>
<th>15:30 – 16:00</th>
<th>χ²</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Low Liquidity</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>0.2086</td>
<td>0.2089</td>
<td>0.2127</td>
<td>0.2025</td>
<td>0.1701</td>
<td>5.12</td>
<td>(p&lt;0.274)</td>
</tr>
<tr>
<td>(Mean Std. Err.)</td>
<td>(0.0105)</td>
<td>(0.0196)</td>
<td>(0.0196)</td>
<td>(0.0164)</td>
<td>(0.0089)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Std. Dev.</td>
<td>0.1452</td>
<td>0.1416</td>
<td>0.1193</td>
<td>0.1219</td>
<td>0.1003</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Median</td>
<td>0.1649</td>
<td>0.1832</td>
<td>0.1878</td>
<td>0.1738</td>
<td>0.1621</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Medium Liquidity</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>0.1830</td>
<td>0.1761</td>
<td>0.1483</td>
<td>0.1359</td>
<td>0.1356</td>
<td>12.49</td>
<td>(p&lt;0.014)</td>
</tr>
<tr>
<td>(Mean Std. Err.)</td>
<td>(0.0142)</td>
<td>(0.0118)</td>
<td>(0.0102)</td>
<td>(0.0090)</td>
<td>(0.0078)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Std. Dev.</td>
<td>0.1267</td>
<td>0.1165</td>
<td>0.0833</td>
<td>0.0829</td>
<td>0.0853</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Median</td>
<td>0.1503</td>
<td>0.1562</td>
<td>0.1463</td>
<td>0.1209</td>
<td>0.1285</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>High Liquidity</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>0.1194</td>
<td>0.1070</td>
<td>0.1130</td>
<td>0.1013</td>
<td>0.0779</td>
<td>13.17</td>
<td>(p&lt;0.011)</td>
</tr>
<tr>
<td>(Mean Std. Err.)</td>
<td>(0.0248)</td>
<td>(0.0068)</td>
<td>(0.0057)</td>
<td>(0.0069)</td>
<td>(0.0105)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Std. Dev.</td>
<td>0.1080</td>
<td>0.0817</td>
<td>0.0776</td>
<td>0.0788</td>
<td>0.0713</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Median</td>
<td>0.0882</td>
<td>0.0895</td>
<td>0.0984</td>
<td>0.0795</td>
<td>0.0531</td>
<td></td>
<td></td>
</tr>
<tr>
<td>χ²</td>
<td>8.906</td>
<td>39.674</td>
<td>33.597</td>
<td>40.222</td>
<td>38.783</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(p&lt;0.012)</td>
<td>(p&lt;0.001)</td>
<td>(p&lt;0.001)</td>
<td>(p&lt;0.001)</td>
<td>(p&lt;0.001)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Panel B:</th>
<th>9:30 – 10:00</th>
<th>10:00 – 11:30</th>
<th>11:30 – 14:00</th>
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<th>χ²</th>
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</tr>
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<tbody>
<tr>
<td><strong>Low Liquidity</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>0.3085</td>
<td>0.2581</td>
<td>0.2288</td>
<td>0.2564</td>
<td>0.2375</td>
<td>12.88</td>
<td>(p&lt;0.012)</td>
</tr>
<tr>
<td>(Mean Std. Err.)</td>
<td>(0.0136)</td>
<td>(0.0201)</td>
<td>(0.0226)</td>
<td>(0.0189)</td>
<td>(0.0126)</td>
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<td></td>
</tr>
<tr>
<td>Std. Dev.</td>
<td>0.2838</td>
<td>0.2724</td>
<td>0.1880</td>
<td>0.2346</td>
<td>0.2232</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Median</td>
<td>0.2938</td>
<td>0.2722</td>
<td>0.2530</td>
<td>0.2442</td>
<td>0.2451</td>
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<td></td>
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<tr>
<td><strong>Medium Liquidity</strong></td>
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</tr>
<tr>
<td>Mean</td>
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<td>0.2722</td>
<td>0.2530</td>
<td>0.2442</td>
<td>0.2451</td>
<td>12.97</td>
<td>(p&lt;0.001)</td>
</tr>
<tr>
<td>(Mean Std. Err.)</td>
<td>(0.0150)</td>
<td>(0.0156)</td>
<td>(0.0161)</td>
<td>(0.0135)</td>
<td>(0.0095)</td>
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<tr>
<td>Std. Dev.</td>
<td>0.1339</td>
<td>0.1538</td>
<td>0.1315</td>
<td>0.1397</td>
<td>0.1042</td>
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</tr>
<tr>
<td>Median</td>
<td>0.2928</td>
<td>0.2597</td>
<td>0.2340</td>
<td>0.2220</td>
<td>0.2461</td>
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<tr>
<td><strong>High Liquidity</strong></td>
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<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Mean</td>
<td>0.3202</td>
<td>0.3116</td>
<td>0.2758</td>
<td>0.2527</td>
<td>0.2351</td>
<td>34.61</td>
<td>(p&lt;0.001)</td>
</tr>
<tr>
<td>(Mean Std. Err.)</td>
<td>(0.0169)</td>
<td>(0.0095)</td>
<td>(0.0081)</td>
<td>(0.0079)</td>
<td>(0.0119)</td>
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<td></td>
</tr>
<tr>
<td>Std. Dev.</td>
<td>0.0738</td>
<td>0.1140</td>
<td>0.1108</td>
<td>0.0906</td>
<td>0.0807</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Median</td>
<td>0.3136</td>
<td>0.3117</td>
<td>0.2691</td>
<td>0.2546</td>
<td>0.2295</td>
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<td></td>
</tr>
<tr>
<td>χ²</td>
<td>0.97</td>
<td>8.70</td>
<td>7.51</td>
<td>1.35</td>
<td>1.05</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(p&lt;0.617)</td>
<td>(p&lt;0.013)</td>
<td>(p&lt;0.023)</td>
<td>(p&lt;0.508)</td>
<td>(p&lt;0.591)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Stoll (1997) sample, is found to influence the inventory holding cost component of the bid-ask spread. In contrast to earlier papers that suggested that inventory management only matters at the end of the day, our finding that this component decreases significantly during the day implies that order flow and the assumptions inherent in these decomposition models are extremely important and can bias estimates and conclusions. While these intraday patterns may appear, when partially aggregated, to be similar to the overall bid-ask spread intraday pattern, individual examination is crucial to understanding each component especially when examining stocks with different levels of liquidity.

We verify that the intraday variation of the quoted bid-ask spread and the adverse selection component both follow a reverse-J pattern, similar to that found by McInish and Wood (1992) for the spread as a whole. These patterns are not consistent across stocks with different levels of liquidity since we observe that low liquidity stocks have no difference in adverse selection throughout the day. Higher liquidity stocks, however, have much lower levels of adverse selection and this is consistent with the notion that large stocks have more of a financial analysts following.

Differences in the inventory holding cost component are present across stocks with different levels of liquidity. High liquidity stocks tend to have their levels of the inventory holding cost component decline during the day much more slowly than low liquidity stocks. This may be explained as due to the larger risks of inventory imbalances inherent in higher liquidity stocks. This also has implications for bid-ask spread component estimation since due to the nature of GMM estimation, liquidity is often a variable used in sample selection.

Our procedures imposed tight data requirements to facilitate clear comparisons across the intraday time periods. While we have verified that the firms that were successful in being included in the sample are representative of the entire universe of NYSE-listed common stocks, there is a clear need to expand the sample with new estimation techniques. Determining the reasons why estimates fail to converge and finding new methods of estimation are subjects of future research.

REFERENCES


ABSTRACT
We investigate the impact of Regulation FD on the information flow in the equities market. Our analysis indicates that information flow around earnings announcements, proxied by the abnormal return volatility around those announcements, of U.S. stocks increased in the first effective quarter of Regulation FD (the fourth quarter of 2000). The information flow of ADRs, which are exempt from Regulation FD, does not change, and this supports the inference that Regulation FD, not general market conditions, caused the increase in volatility. However, the data do not suggest that Regulation FD has a persistent impact on information flow, as measured by abnormal return volatility. Our results are robust to controls that include decimalization, which was implemented concurrently with Regulation FD and has reduced return volatility. Our comparison of return volatilities between firms of various sizes indicates that Regulation FD only temporarily had a differential impact on the information environment of small firms.

INTRODUCTION AND MOTIVATION
Corporate disclosure has long been a controversial and complicated issue. As the violations of insider trading laws over the years have shown, individuals occasionally profit from material corporate information that has not been disclosed publicly. In addition, many corporations (such as Enron and WorldCom) have not gone far enough in providing transparent data about their operations. Other corporations regularly release annual reports that are hundreds of pages in length and difficult for individual investors to assimilate. In light of this continuing controversy, it is appropriate to explore the impact of a recent change in how corporations release information to the investing community. In October 2000, the Securities and Exchange Commission (SEC) started requiring companies to comply with Regulation Fair Disclosure (FD). This rule prohibits corporations from selectively disclosing material, non-public information to investment analysts or institutional investors. Regulation FD, in theory,
should increase fairness in information access by requiring issuers to publicly release material information.

Analysts, however, argue that a level playing field may have resulted at the expense of lowering the quality and quantity of information provided to investors. Since the SEC does not provide specific guidelines on materiality, companies that are unable to classify information may tend to avoid releasing it at all rather than risk the legal liability associated with disclosing it informally or selectively. Although the SEC has incorporated certain safeguards against inappropriate liability, this could still be a concern to companies, especially before legal precedents exist.

On the other hand, the quality of company announcements may be reduced if companies react to Regulation FD by releasing all information, whether material or not. Under this scenario, individual investors may be left to decipher the information before analysts can evaluate it and quantify its relevance. Prohibiting selective disclosure may cause corporate information to arrive less frequently and result in large changes in stock prices around earnings announcements. Releasing corporate data simultaneously to all parties may cause increased volatility as investors try to determine the true value of new data.

In this paper we examine the impact of Regulation FD on information flow, as proxied by abnormal stock return volatility, and investigate its differential effect on firms of different sizes. Other researchers (Heflin, Subramanyam and Zhang, 2001b) analyze Regulation FD and return volatility. However, we offer a more methodologically sound approach to test the impact of Regulation FD on stock returns. Since Regulation FD does not apply to foreign companies, our design examines the relation between the return volatility of foreign issues, specifically American Depositary Receipts (ADRs) listed on the NYSE and NASDAQ, and U.S. issues around earnings announcements.

Our results indicate that the abnormal return volatility of firms increased in the first effective quarter of Regulation FD. However, the data are consistent with this impact being only temporary. We find that decimalization, which occurred contemporaneously for many firms with the first effective date of Regulation FD, reduced stock return volatility and mitigated the temporary increase in return volatility associated with Regulation FD. The evidence indicates that the information flow from small firms was temporarily more sensitive to the new disclosure rules. This may be a result of these firms reducing information quantity or quality until they were able to copy the disclosure practices of larger companies.

REGULATION FD

Regulation FD requires that public companies release material, non-public information through a news release or open conference call before it is discussed in a restricted-access forum with analysts or professional investors. If such information is selectively released in an unintentional manner, the company is required to disseminate the information within 24 hours by either issuing a press release or filing Form 8-K with the SEC. If the inadvertent disclosure occurs during a holiday or weekend, the official release must be made before the start of the next trading day.

Anecdotal evidence prior to the implementation of Regulation FD suggests that it may increase stock volatility. To investigate how corporations plan to react to the new regulation, the National Investor Relations Institute (NIRI) (2000) conducted a survey of 462 investor relations professionals from a broad cross section of companies. This survey showed that 42% of those professionals will probably limit communication practices and another 12% said they would limit their practices "significantly" should the SEC approve Regulation FD.

However, an NIRI survey (2001) conducted after the effective date of Regulation FD suggests that companies were not quite as apprehensive about information releases following implementation. According to that survey, 27% of the 577 respondents indicated that they are providing more information to investors as a result of Regulation FD. Nearly one-half of analysts (48%) are issuing about the same amount of information, while 24% are disseminating less information than before the new rule went into effect.

Heflin et al. (2001b) explore the impact of Regulation FD and conclude that there is no deterioration of information flow into the market since Regulation FD took effect. Information quality is measured by return volatility around earnings announcements and by analyst forecast
accuracy and dispersion. Heflin et al. (2001b) use a method of matching sample firms with a control firm both one quarter prior to Regulation FD implementation and the quarter one year prior to implementation. By looking at these two quarters, the matched-pair sample design attempts to minimize effects that may otherwise be attributable to changes in the economic environment or comparison of unlike quarters. However, Heflin et al. admit to possible empirical design limitations: “… we have attempted to control for changes in economic factors that could affect our inferences, [however] we can never completely rule out the possibility that our results are driven by some other contemporaneous economic event unrelated to Regulation FD.”

We believe that the Heflin et al. (2001b) methodology does not accurately isolate the effect of Regulation FD. One confounding factor that is not controlled for by this method is the gradual switch to decimalization by the AMEX, NASDAQ and NYSE. Decimalization refers to quoting stock prices in decimals instead of fractions, and this pricing system allows a smaller bid-ask spread and a smaller minimum price change. As decimalization was implemented across securities and exchanges between August 2000 and April 2001, volatility measures during the final quarter of 2000 would reflect the effects of both decimalization and Regulation FD for some securities.

Research on the impact of decimalization indicates that it reduces price and return volatility. Bessembinder (2002) reaches the following conclusion: “For the full sample of NYSE stocks median return volatility declined from 2.04% in the pre-decimalization sample to 1.56% post decimalization. For the full Nasdaq sample the decrease in median volatility is from 3.66% to 2.98%.”

**DATA AND SAMPLE SELECTION**

We examine the impact of Regulation FD on securities by measuring the abnormal return volatility around earnings announcements. Our sample, therefore, consists of quarterly earnings announcements subsequent to the implementation of the regulation. The First Call database provides us with earnings announcement dates for the fourth quarters of 1998-2000, and the first through third quarters of 2001. Actual and expected earnings per share data are obtained from the I/B/E/S detail history database. We obtain security returns data from the Center for Research in Security Prices (CRSP). We eliminate all observations for which the previous quarter’s earnings per share is unavailable. We also eliminate observations for which returns are not available for a security for every day in the event window and for which more than 20 observations are missing during the market model estimation period. To avoid the possibility of extreme observations unduly influencing our results, we eliminate observations for which any of the variables considered exceeds the 99th percentile of that variable’s distribution. This provides us with 2,937 earnings announcements by U.S. firms and 187 earnings announcements for ADR issuers over the four quarters.

**HYPOTHESES AND METHODOLOGY**

**Impact of Regulation FD on U.S. Issues**

In our preliminary analysis, we examine the impact of Regulation FD on abnormal return volatility focusing specifically on U.S. common stocks. Although Regulation FD applies to most securities listed on U.S. exchanges, *it does not apply to all securities*. Specifically, foreign issues are currently exempt from Regulation FD. However, these issues are still required to comply with decimalization, thus they provide a unique control sample to test the impact of Regulation FD.

Since our sample extends to the third quarter of 2001, we are able to measure the effect of the regulation over a longer period than Heflin et al. (2001a). If information flow has deteriorated post-FD, either in quality or quantity, we would expect to find greater abnormal return volatility around earnings announcements of U.S. issues subsequent to the implementation of the regulation. Our first hypothesis is as follows:

**Hypothesis 1**: Abnormal return volatility around earnings announcements by U.S. firms is insignificantly different in the pre-FD and post-FD periods.

Rejection of this hypothesis would imply that factors such as Regulation FD, decimalization, and general changes in market conditions are contributing factors to the change in abnormal
return volatility from the pre-FD period to the post-FD period.

To test this hypothesis we calculate abnormal return volatility (ARV) around quarterly earnings announcements for U.S. common stocks in each of the quarters subsequent to the implementation of Regulation FD for which data is available to us. These are the fourth quarter of 2000 to the third quarter of 2001 and represent our U.S. event samples. We only include securities listed on NYSE, NASDAQ and AMEX to construct our control samples. Our control samples are abnormal return volatility around earnings announcements by our U.S. sample firms in (a) the third quarter of 2000 which provides us with the most recent control available, (b) the fourth quarter of 1999 which will control for comparison of unlike quarters, and (c) the fourth quarter of 1998. There has been anecdotal evidence that firms, in an attempt to prepare for the implementation of Regulation FD, began reducing selective disclosure practices prior to October of 2000. By using the fourth quarter of 1998 as an additional control period, our results will be robust to these claims.

Abnormal return volatility around earnings announcements is measured as

\[
ARV_{i,q} = \sum_{t=-m}^{+m} (R_{i,q,t} - E[R_{i,q,t}])^2
\]  

where \(ARV_{i,q}\) is the abnormal return volatility for firm \(i\) in quarter \(q\), over event windows of 5 days, -2 to +2, around the announcement. \(R_{i,q,t}\) is defined as the return for firm \(i\) in quarter \(q\) on day \(t\), and the expectation \(E[R_{i,q,t}]\) is calculated using the market model over a period of 100 trading days prior to the event window. Since our results may be sensitive to differences in the normal return volatility of each stock, we deflate the abnormal return volatility, which is defined in equation (1), by dividing by each firm’s average daily market model residual volatility during the market model estimation period.

We test our hypothesis by performing a multivariate regression similar to that employed by Heflin et al. (2001b).

\[
ARV_{i,q}^{U.S.} = b_0 + b_1 PostFD_{i,q} + b_2 Loss_{i,q} + b_3 Mag_{i,q} + b_4 Trend_{i,q} + b_5 VAR_{i,q} + \epsilon_{i,q} \]  

where \(PostFD_{i,q}\) is a dummy variable taking on the value of unity if the observation is from the post-FD period and the value of zero otherwise. Related literature (Hayn 1995; Freeman and Tse 1992; Barth, Elliot and Finn 1999) has suggested that the sign of earnings, magnitude of unexpected earnings, and the earnings trend are significant determinants of the relationship between earnings and return. Thus, \(Loss_{i,q}\), which is a dummy variable with value of unity if the earnings are negative and zero otherwise, \(Mag_{i,q}\), the size of the unexpected component of earnings measured by the difference between actual earnings and mean expected earnings, and \(Trend_{i,q}\), a dummy variable with the value of unity if quarter \(q\)’s earnings are greater than that of quarter \(q\)’s earning in the previous year and zero otherwise, are included. Any cross-sectional differences in return volatility are controlled for by including \(VAR_{i,q}\) in the regression model. This variable represents the average daily variance of the market model prediction errors. We perform additional testing of H1 concurrently with our testing of H4 below where we control for decimalization.

**Impact of Regulation FD on ADRs**

As ADRs are not subject to Regulation FD, we would expect these firms to exhibit similar return volatility patterns during the pre-FD and post-FD periods. However, to ensure that our findings for the U.S. firms are robust, and not generated by market-wide changes, we examine return volatility for ADRs across the same quarters used in our analysis of U.S. issues. Our second null hypothesis, therefore, is:

**Hypothesis 2**: Abnormal return volatility around earnings announcements by ADRs is insignificantly different in the pre-FD and post-FD periods.

Rejection of the hypothesis would imply that factors such as decimalization and general changes in market conditions are contributing factors.
In a similar manner to that described for equation 2, the abnormal return volatility is deflated by dividing by each ADR's average market model residual volatility to control for differences in the normal return volatility of each security. We run a similar multivariate regression on our ADR sample.

\[
ARV_{i,q}^{ADR} = b_0 + b_1 PostFD_{i,q} + b_2 Loss_{i,q} + b_3 Mag_{i,q} + b_4 Trend_{i,q} + b_5 VAR_{i,q} + e_{i,q} \quad [3]
\]

where the independent variables are defined previously.

**Differential Impact of Regulation FD on U.S. Issues and ADRs**

In their multivariate regression model, Heflin *et al.* (2001a) find that the coefficient for \(PostFD_{i,q}\) is significant and negative, and they conclude that there is no deterioration in the information quality based on this measure. However, they do not provide an adequate control for changes in the securities markets. If Regulation FD significantly altered the information environment, we would expect a significant difference in post-FD abnormal return volatility between U.S. issues and ADRs, which are not subject to Regulation FD. This provides the basis for our next hypothesis.

**Hypothesis 3:** The abnormal return volatility around earnings announcements by U.S. firms is not significantly different from that of ADRs.

We test the hypothesis using our post-FD sample of firms (both U.S. issues and ADRs) and the following multivariate regression model:

\[
ARV_{i,q}^{all} = b_0 + b_1 Loss_{i,q} + b_2 Mag_{i,q} + b_3 Trend_{i,q} + b_4 VAR_{i,q} + b_5 ADR_{i,q} + e_{i,q} \quad [4]
\]

where \(ADR_{i,q}\) takes a value of unity if firm \(i\) is an ADR and zero otherwise and all other variables are as defined previously. Significance of the \(ADR_{i,q}\) variable would indicate that abnormal return volatility differs between U.S. firms and ADRs, and thus would lead us to reject hypothesis 3.

**Impact of Decimalization on Return Volatility**

Decimalization was implemented in stages on the NYSE, NASDAQ and AMEX. The first stage was implemented in the fourth quarter of 2000 for a limited group of stocks and the final group of firms was switched over by the end of April 2001. To determine whether introduction of decimalization played a significant role in abnormal return volatility around earnings announcements, we propose the following hypothesis.

**Hypothesis 4:** Decimalization has an insignificant effect on abnormal return volatility around earnings announcements.

To test our hypothesis, initially we employ the following multivariate regression model:

\[
ARV_{i,q}^{NYSE} = b_0 + b_1 PostFD_{i,q} + b_2 Loss_{i,q} + b_3 Mag_{i,q} + b_4 Trend_{i,q} + b_5 VAR_{i,q} + b_6 DEC_{i,q} + e_{i,q} \quad [5]
\]

where \(DEC_{i,q}\) is unity if the earnings announcement for firm \(i\) occurs subsequent to decimalization for that security and zero otherwise. Significance of the decimalization dummy variable would lead to rejection of hypothesis 4 and indicate that the concurrent implementation of decimalization was a confounding event in the measurement of ARV.

We also test hypothesis 4 by comparing the deflated ARVs of three subsamples of firms. Firms are placed in the above groups by comparing the earnings announcement dates to the dates of decimalization. The first subsample consists of firms that do not have decimalized trading in either the pre- or post-FD period. This group is used to isolate the effect of Regulation FD before decimalization. The second subsample contains firms that do not have decimalized trading in either the pre- or post-FD period but are decimalized in the post-FD period. This group combines the effects of Regulation FD and decimalization, but allows for isolation of the effect of Regulation FD when comparing two post-FD quarters. The final subsample is composed of firms that are decimalized in both the pre- and post-FD periods; the ARVs of this class reflect the effect of Regulation FD after decimalization.
**Differential Impact of Regulation FD on Small, Medium and Large Firms**

The results of the PriceWaterhouseCoopers (2001) survey indicate that large firms better understand the requirements of Regulation FD than small firms. Furthermore, we expect that firm size is an indicator of the amount of resources that a firm can allocate toward ensuring that information released is compliant with Regulation FD. Therefore, smaller firms may opt to release less information and create greater abnormal return volatility around earnings announcements.

Furthermore, small firms may have provided analysts with selective disclosure in the pre-FD period to attract their coverage. If Regulation FD reduced analysts’ incentives to cover small firms, we expect to see greater return volatility for smaller companies. Consistent with the argument that analyst coverage affects returns, Hong, Lim, and Stein (2000) document that trading strategies based on momentum are more profitable for firms with lower analyst coverage. This leads to the following null hypothesis:

**Hypothesis 5:** Abnormal return volatility does not differ among various size firms.

To test this hypothesis, we place firms in one of three categories based upon their total market capitalizations. We use the same size categories as the PriceWaterhouseCoopers (2001) survey (large firms have market capitalization above $5 billion; medium firms have market capitalizations from $1.0 billion to less than $5 billion; small firms have market capitalizations less than $1.0 billion) to classify firms by size and compare the deflated abnormal return volatility across various periods for each of the three size categories.

**TABLE 1**

<table>
<thead>
<tr>
<th>Regression Results</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
<th>Model 5</th>
<th>Model 6</th>
<th>Model 7</th>
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<tbody>
<tr>
<td>Sample</td>
<td>U.S. Pre &amp; Post</td>
<td>U.S. Pre &amp; Q4 00</td>
<td>ADRs Pre &amp; Post</td>
<td>U.S. &amp; ADRs Pre</td>
<td>U.S. &amp; ADRs Post</td>
<td>U.S. Pre &amp; Post</td>
<td>U.S. Pre &amp; Q4 2000</td>
</tr>
<tr>
<td>Period</td>
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<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Post-FD</td>
<td>-0.00372 *** (4.44)</td>
<td>0.00434 ** (2.15)</td>
<td>-0.00178 (-0.41)</td>
<td>0.00303 (1.58)</td>
<td>0.00382* (1.71)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loss</td>
<td>0.00242 ** (2.01)</td>
<td>-0.00430* (-1.76)</td>
<td>-0.01595 *** (-3.05)</td>
<td>-0.00336 (-1.40)</td>
<td>0.00014 (0.09)</td>
<td>-0.00104 (-0.81)</td>
<td>-0.00142 (-0.91)</td>
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<tr>
<td>Trend</td>
<td>-0.0012 (-1.40)</td>
<td>-0.00320 ** (-1.96)</td>
<td>-0.00334 (-0.70)</td>
<td>0.00273 (1.46)</td>
<td>-0.00104 (-0.79)</td>
<td>-0.00255 *** (-2.79)</td>
<td>-0.00390** (-2.31)</td>
</tr>
<tr>
<td>Mag</td>
<td>0.00035 (0.59)</td>
<td>0.00056 (0.81)</td>
<td>0.00058 (1.30)</td>
<td>0.00031 (0.35)</td>
<td>0.00042 (0.28)</td>
<td>0.00048 (0.76)</td>
<td>0.00053 (0.96)</td>
</tr>
<tr>
<td>Mktvar</td>
<td>0.4485 *** (22.02)</td>
<td>0.51601 *** (13.67)</td>
<td>1.14779 *** (11.10)</td>
<td>0.82550 *** (16.09)</td>
<td>0.51604 *** (15.89)</td>
<td>0.51577 *** (23.96)</td>
<td>0.57182*** (14.87)</td>
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<tr>
<td>ADR</td>
<td>0.00290 (1.09)</td>
<td>0.00128 (0.48)</td>
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<tr>
<td>Dec</td>
<td>-0.00799 *** (-4.30)</td>
<td></td>
<td></td>
<td>-0.00957** (-2.25)</td>
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<tr>
<td>Adj. R²</td>
<td>0.3099</td>
<td>0.3498</td>
<td>0.3389</td>
<td>0.2321</td>
<td>0.1117</td>
<td>0.3046</td>
<td>0.3285</td>
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<td>239</td>
<td>996</td>
<td>2384</td>
<td>3216</td>
<td>1147</td>
</tr>
</tbody>
</table>

*Significant at the 10% level.
**Significant at the 5% level.
***Significant at the 1% level.

**RESULTS**

**Regression Analysis**

Table 1 presents the results of our regression analysis. This analysis is similar to that used by Heflin et al. (2001b), but it is extended to include additional time periods and dichotomous variables for ADRs and decimalization. The models are defined as follows. Model 1 uses only U.S. common stocks and all pre-FD and post-FD quarters. Model 2 uses only U.S. common stocks and all pre-FD quarters and Q4 2000. Model 3 uses only ADRs and all pre-FD and post-FD quarters. Model 4 uses all pre-FD quarters and the entire sample and includes an ADR dummy variable. Model 5, which is estimated using all post-FD quarters and the entire sample, includes an ADR dummy variable. Model 6 uses all NYSE
and NASDAQ stocks in our sample and includes a decimalization dummy variable. Model 7 is identical to Model 6 but compares the pre-FD quarters only to Q4 2000.

The results from Model 1 for the post-FD variable indicate that ARV decreases following the effective date of Regulation FD, but the opposite sign is found in Model 2 (all pre-FD quarters versus Q4 2000). In Model 4 (U.S. firms and ADRs during all pre-FD quarters) the ADR dummy variable is insignificant, as is the case for all post-FD quarters in Model 5. This leads us to accept hypothesis 3, and conclude that whether a firm is subject to Regulation FD (U.S. firms) or not (ADRs) does not affect the firm’s ARV. This suggests that any effect of Regulation FD on return volatility is not permanent.

## TABLE 2
Deflated Abnormal Return Volatility Differences for Decimalized and non-Decimalized Firms

<table>
<thead>
<tr>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>0 / -1</td>
<td>4.877** (1.97)</td>
<td>141</td>
<td>-5.257 (-0.83)</td>
<td>15</td>
<td>-2.393* (-1.74)</td>
<td>124</td>
<td>-4.516 (-0.61)</td>
<td>9</td>
<td>-1.607</td>
<td>-0.477 (-0.41)</td>
<td>12</td>
<td>2</td>
<td></td>
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</tr>
<tr>
<td>0 / -4</td>
<td>-1.0356 (-0.88)</td>
<td>111</td>
<td>-5.183** (-1.97)</td>
<td>128</td>
<td></td>
<td></td>
<td></td>
<td>9</td>
<td>-0.5547</td>
<td>4.1575 (0.98)</td>
<td>21</td>
<td>22</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 / -8</td>
<td>4.282*** (2.86)</td>
<td>104</td>
<td>-4.682*** (-2.42)</td>
<td>180</td>
<td></td>
<td></td>
<td></td>
<td>9</td>
<td>1.59**</td>
<td>6.4778 (1.96)</td>
<td>9</td>
<td>9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 / 0</td>
<td>-5.257 (-0.83)</td>
<td>15</td>
<td></td>
<td>124</td>
<td>-2.393* (-1.74)</td>
<td>124</td>
<td>-4.516 (-0.61)</td>
<td>9</td>
<td>-1.607</td>
<td>-0.477 (-0.41)</td>
<td>12</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 / 0</td>
<td>-1.494 (-0.88)</td>
<td>21</td>
<td></td>
<td>11</td>
<td>-3.319 (-1.24)</td>
<td>110</td>
<td></td>
<td>124</td>
<td>-2.938*</td>
<td>307 (-1.93)</td>
<td>314</td>
<td>8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 / 0</td>
<td>-1.414 (-1.22)</td>
<td>0</td>
<td></td>
<td>11</td>
<td>-3.319 (-1.24)</td>
<td>110</td>
<td></td>
<td>124</td>
<td>-2.938*</td>
<td>307 (-1.93)</td>
<td>314</td>
<td>8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 / -1</td>
<td>-1.494 (-0.88)</td>
<td>21</td>
<td></td>
<td>11</td>
<td>-3.319 (-1.24)</td>
<td>110</td>
<td></td>
<td>124</td>
<td>-2.938*</td>
<td>307 (-1.93)</td>
<td>314</td>
<td>8</td>
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<td>2 / -1</td>
<td>-1.655 (-1.55)</td>
<td>0</td>
<td></td>
<td>0</td>
<td></td>
<td></td>
<td>-1.414 (-1.22)</td>
<td>418</td>
<td>-2.938*</td>
<td>307 (-1.93)</td>
<td>314</td>
<td>8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 / -1</td>
<td>-2.938* (-1.93)</td>
<td>0</td>
<td></td>
<td>0</td>
<td></td>
<td></td>
<td>-1.414 (-1.22)</td>
<td>418</td>
<td>-2.938*</td>
<td>307 (-1.93)</td>
<td>314</td>
<td>8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 / -8</td>
<td>-3.19 (-1.24)</td>
<td>11</td>
<td></td>
<td>11</td>
<td>-3.19 (-1.24)</td>
<td>110</td>
<td></td>
<td>124</td>
<td>-2.938*</td>
<td>307 (-1.93)</td>
<td>314</td>
<td>8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 / -8</td>
<td>1.652 (1.26)</td>
<td>134</td>
<td></td>
<td>124</td>
<td>-2.938* (-1.93)</td>
<td>307</td>
<td></td>
<td>124</td>
<td>-2.938*</td>
<td>307 (-1.93)</td>
<td>314</td>
<td>8</td>
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<td></td>
</tr>
<tr>
<td>3 / -8</td>
<td>1.251 (1.13)</td>
<td>169</td>
<td></td>
<td>124</td>
<td>-2.938* (-1.93)</td>
<td>307</td>
<td></td>
<td>124</td>
<td>-2.938*</td>
<td>307 (-1.93)</td>
<td>314</td>
<td>8</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Significant at the 10% level.  
**Significant at the 5% level.  
***Significant at the 1% level.

We run additional tests comparing ARVs of our U.S. firms and ADRs for each quarter in our sample. Results not reported are consistent with our regression analysis findings. We also perform robustness checks to determine whether the
economic downturn is driving our ARV results. We find that this is not the case. Also, to control for the possibility that our panel regression was influenced by country-level or firm-level differences, we perform a fixed-effects regression. We find that our results are robust to these factors.

Decimalized and Non-decimalized Subsamples

In Table 2 we present results for the three subsamples based upon decimalization. We compare pre-FD periods with post-FD periods and also compare the effective quarter of Regulation FD with the three following quarters. Column D indicates that firms decimalized in the pre- and post-FD periods have higher ARV in the quarter after Regulation FD compared to the quarter before Regulation FD, although all other quarter comparisons were insignificant. This appears to be a function of the small sample of firms trading in decimals in both periods. Fortunately there is sufficient sample size in the non-decimalized subsample to reach significant conclusions about the effect of Regulation FD by itself. Column A of Table 2 indicates that non-decimalized firms have higher ARV in the effective (0) quarter of Regulation FD when compared to one quarter before and eight quarters before Regulation FD, although the comparison to the period four quarters prior to Regulation FD is insignificant. These results indicate that Regulation FD increases ARV, leading us to reject hypothesis 1.

The results in Column B separate the Regulation FD effect from the decimalization effect (something lacking in prior research), and the analysis indicates that firms that began to trade in decimals after their announcement date (and thus after the effective date of Regulation FD in this instance) experienced ARV declines, leading us to reject hypothesis 4 in favor of its alternative. This is consistent with prior research (Bessembinder, 2002) indicating that decimalization lowered return volatility, and is consistent with our a priori belief that decimalization was a confounding event that possibly influenced the Heflin et al. (2001b) results. In fact, in Column C the comparison of quarters 1 and -1 shows that the combined effect of decimalization and FD produced a significant decline in ARV; thus it appears that the volatility-reducing decimalization effect is stronger than the competing Regulation FD effect.

### TABLE 3

**Deflated Abnormal Return Volatility Differences for U.S. Common Stocks Across Firm Size Categories**

#### Panel A: Small vs. Large firms

<table>
<thead>
<tr>
<th>Period</th>
<th>DefARV₃</th>
<th>Obs</th>
<th>DefARV₄</th>
<th>Obs</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q4 '98</td>
<td>7.456</td>
<td>131</td>
<td>7.679</td>
<td>51</td>
<td>-0.223</td>
</tr>
<tr>
<td>Q4 '99</td>
<td>12.946</td>
<td>136</td>
<td>9.568</td>
<td>57</td>
<td>3.579</td>
</tr>
<tr>
<td>Q3 '00</td>
<td>9.850</td>
<td>296</td>
<td>9.273</td>
<td>92</td>
<td>0.577</td>
</tr>
<tr>
<td>Q4 '00</td>
<td>13.547</td>
<td>151</td>
<td>9.999</td>
<td>58</td>
<td>3.548</td>
</tr>
<tr>
<td>Q1 '01</td>
<td>7.469</td>
<td>490</td>
<td>5.689</td>
<td>106</td>
<td>(1.36)</td>
</tr>
<tr>
<td>Q2 '01</td>
<td>8.079</td>
<td>393</td>
<td>8.772</td>
<td>101</td>
<td>(0.693)</td>
</tr>
<tr>
<td>Q3 '01</td>
<td>8.919</td>
<td>698</td>
<td>9.849</td>
<td>113</td>
<td>(0.930)</td>
</tr>
</tbody>
</table>

#### Panel B: Small vs. Medium-sized firms

<table>
<thead>
<tr>
<th>Period</th>
<th>DefARV₃</th>
<th>Obs</th>
<th>DefARV₄</th>
<th>Obs</th>
<th>Difference</th>
</tr>
</thead>
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<td>6.127</td>
<td>78</td>
<td>1.329</td>
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<td>1.835</td>
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<tr>
<td>Q3 '00</td>
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<td>296</td>
<td>9.322</td>
<td>153</td>
<td>(0.082)</td>
</tr>
<tr>
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<td>13.547</td>
<td>151</td>
<td>12.054</td>
<td>80</td>
<td>1.493</td>
</tr>
<tr>
<td>Q1 '01</td>
<td>7.469</td>
<td>490</td>
<td>5.814</td>
<td>215</td>
<td>1.655</td>
</tr>
<tr>
<td>Q2 '01</td>
<td>8.079</td>
<td>393</td>
<td>9.299</td>
<td>184</td>
<td>(1.220)</td>
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<tr>
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<td>8.919</td>
<td>698</td>
<td>9.944</td>
<td>250</td>
<td>(1.025)</td>
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#### Panel C: Medium-sized vs. Large firms

<table>
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<th>Period</th>
<th>DefARV₃</th>
<th>Obs</th>
<th>DefARV₄</th>
<th>Obs</th>
<th>Difference</th>
</tr>
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<tbody>
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<td>Q4 '98</td>
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<td>78</td>
<td>7.679</td>
<td>51</td>
<td>-1.552</td>
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<tr>
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<td>1.544</td>
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<tr>
<td>Q3 '00</td>
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<td>153</td>
<td>9.273</td>
<td>92</td>
<td>0.659</td>
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<tr>
<td>Q4 '00</td>
<td>12.054</td>
<td>80</td>
<td>9.999</td>
<td>58</td>
<td>2.056</td>
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<tr>
<td>Q1 '01</td>
<td>5.814</td>
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<td>5.689</td>
<td>106</td>
<td>0.125</td>
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<tr>
<td>Q2 '01</td>
<td>9.299</td>
<td>184</td>
<td>8.772</td>
<td>101</td>
<td>0.527</td>
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<tr>
<td>Q3 '01</td>
<td>9.944</td>
<td>250</td>
<td>9.849</td>
<td>113</td>
<td>0.095</td>
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</table>

**Significant at the 5% level.**
Results by Firm Size
Table 3 provides tests for volatility differences across the three size categories, which are defined earlier in the paper. As shown in Panels A and B, the return volatility of small firms is statistically greater than the return volatility of medium and large firms in the first quarter of 2001 (the second effective quarter for Regulation FD). In contrast, Panel C shows that medium and large firms do not have differing volatilities for any quarter. Our analysis leads us to reject hypothesis 5 that ARV does not differ among various size firms.

CONCLUSIONS
This paper provides a superior methodology for examining the effect of Regulation FD on information flow, as measured by abnormal return volatility around earnings announcements. Our analysis extends the work of Heflin et al. (2001b) in four ways. First, we compare the return volatility of U.S. firms to ADRs. ADRs serve as a valuable control; these securities are exempt from Regulation FD but are still affected by changing market conditions in the U.S. While disclosure practices do differ across countries, our analysis indicates that abnormal return volatilities around earnings announcements for ADRs do not differ from U.S. firms from the fourth quarter of 1998 to the third quarter of 2000. However, this may be an issue worthy of further examination in another paper. Second, our analysis includes the fourth quarter of 2000 to the third quarter of 2001, and this allows us to test the persistence of Regulation FD’s impact. Heflin et al. (2001b) only examine the fourth quarter of 2000 in their study. Third, our analysis adjusts for the effect of decimalization on return volatility. Research has shown that the switch to decimal pricing, which was concurrent with the implementation of Regulation FD, significantly lowered return volatility. Fourth, our study investigates the impact of Regulation FD on different size companies. We incorporate several robustness checks of our results.

Our analysis indicates that the abnormal return volatility around earnings announcements increased in the first effective quarter of Regulation FD (the fourth quarter of 2000). However, the data do not suggest that Regulation FD has a persistent impact on return volatility. Our multivariate regression analysis shows that our results are robust to controls that include decimalization, and to using like quarter comparisons used by Heflin et al. (2001b). Our study indicates that stock return volatility is reduced by decimalization, and this makes it difficult to discern the true impact of Regulation FD. Our comparison of return volatilities between firms of different sizes indicates that small firms had larger return volatility increases, but the difference was only temporary.

One possible explanation for our results is the limited enforcement by the SEC. Firms may have initially reduced the quantity or quality of information provided to investors, but after learning the extent of enforcement they returned to their old practices. At a SEC conference in April 2001, a SEC commissioner indicated that Regulation FD was not currently being aggressively enforced (Glasner 2001). Furthermore, the SEC also indicated that it would publish additional clarifications of what constitutes material information. Companies may be interpreting this as an indication that the regulation will not be enforced until further guidelines are made public. Additionally, Arthur Levitt, the SEC Chairman who backed the implementation of Regulation FD, left his position on February 9, 2001. He was replaced by Laura Unger, a Republican who opposed the regulation.

There is another possible reason why Regulation FD did not result in persistently higher return volatility around earnings announcements. Corporations may have made their disclosure practices less selective prior to the implementation of the regulation. A survey of senior investor relations officers that was conducted in February 2000 is consistent with this assertion (NIRI, 2000). A substantial portion of the companies were conducting conference calls, and 82% of those that did allowed access to individual investors. This was up substantially from the 29% of firms that indicated they were providing these services in a survey conducted in 1998. The survey found that 48% of companies were providing real-time access to their conference calls via webcasting while virtually none of the companies were doing this one year earlier. In addition, approximately half of the companies using webcasting for conference calls were also either broadcasting or considering broadcasting other types of meetings of investor interest.
REFERENCES


________. 2001b. Stock return volatility before and after Regulation FD. Working paper, University of Southern California.


National Investor Relations Institute. February 29, 2000. Most conference calls are now open to individual investors and the media.

National Investor Relations Institute. August 8, 2000. NIRI survey finds adoption of Regulation Fair Disclosure likely to limit amount of information disclosed to market participants.


ACCOUNTING FOR ENTREPRENEURSHIP IN COMPANY VALUATION

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Abstract

An analyst must take into account the same five factors economists say are responsible for economic growth—labor (including management; capital; technology; and entrepreneurship in arriving at a value for a company, or a range of values. The usual techniques of valuation—the asset, market and the income methods—do not explicitly account for the value of entrepreneurship. This failure may result in serious over or under valuations. This article demonstrates how this omission occurs, why it can be serious, and how the value of entrepreneurship can be estimated.

Introduction

The components of growth in an economy and in a business—land; labor; capital; technology; and entrepreneurship—all have value in a business and should be accounted for when arriving at a fair price and terms. The three traditional methods of valuation, may account for the first four factors, but may not adequately value the fifth, the contribution of the entrepreneur. The subject of this article is why this aspect may not be taken into account, the reasons the contributions of the entrepreneur are of value, and how the entrepreneurial value may be estimated.

How Value is Determined

Mr. Tom Wathen, CEO and sole owner of California Plant Protection, Inc., acquired the detective agency, Pinkerton's Inc., from American Brands, Inc. in 1987 for $95 million in cash in (HBS Case, 1991). It is difficult to arrive at anything close to this price using the three methods usually employed in valuation: asset, market, and income (West and Jones, 1999), given the data in Exhibit 1.
Exhibit 1:

Pinkerton’s: A Division of American Brands, Inc.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>$296.4</td>
<td>$307.7</td>
<td>$312.4</td>
<td>$367.7</td>
<td>$408.3</td>
</tr>
<tr>
<td>Operating Profit</td>
<td>16.4</td>
<td>15.2</td>
<td>1.2</td>
<td>0.7</td>
<td>(0.4)</td>
</tr>
<tr>
<td>Total Tangible Assets</td>
<td>63.5</td>
<td>65.0</td>
<td>71.0</td>
<td>78.5</td>
<td>87.0</td>
</tr>
<tr>
<td>Capitalization</td>
<td>33.8</td>
<td>34.9</td>
<td>43.0</td>
<td>51.2</td>
<td>56.3</td>
</tr>
<tr>
<td>Current Liabilities</td>
<td>29.7</td>
<td>30.1</td>
<td>28.0</td>
<td>27.3</td>
<td>30.7</td>
</tr>
</tbody>
</table>

Source: Harvard Business School Case #291-051

The Asset Method

The asset method involves valuing the tangible and intangible assets, and subtracting the liabilities to obtain the net worth or equity value. Tangible assets include (1) operating assets such as inventories, plant and equipment, and other valuable things which can be seen, counted and created by nature or physical work, and (2) financial assets, including cash, accounts receivable, debts owed the company by employees and others, and investments in other valuable properties (bonds, non-operating real estate, company stocks). The book value of these assets, of course, may not fairly represent their market value because of the company’s policies on such things as depreciation and inventory valuation.

Intangible assets include goodwill, patents, trade and service marks, copyrights, trade secrets, employee know-how, customer lists, and the like. Although extremely hard to value, such assets often make up many times the worth of the tangible assets when a company, division, or product line is sold.

In the case of a detective and guard agency, however, it is difficult to justify a value of intangibles at approximately $38.7 million ($95 million less $56.3 million tangible assets at book value). According to the Internal Revenue Service there must be returns in excess of industry averages to justify good will. The Pinkerton name is famous—we all remember the pursuers of Butch Cassidy and the Sundance Kid, and some of the other famous names in the Old West associated with the company. On the other hand, declining and finally negative operating profits do not indicate that the name itself is enough to support an ongoing business. The same may be said for employee know-how, customer lists, and other intangibles.

The Market Method

The market value (usually referred to as fair market value) represents what a willing buyer will pay a willing seller in a free and open market where both parties are in possession of all of the relevant information pertaining to the entity. The market value of a publicly traded company may be determined by multiplying the number of common shares outstanding times the appropriate price earnings ratio times the earnings per share. This figure is adjusted upward to account for the control and other options when large blocks of stock—or the entire company—is being purchased.

In the case of a private company or a division (such as Pinkerton), value would be estimated using the price earnings ratio of comparable public companies. Also, the price would be adjusted to account for such factors as the lack of a public market, excesses or deficiencies of assets, cost irregularities, and terms of purchase.

The only publicly traded company in Pinkerton’s industry was Wackenhut. In 1987, it enjoyed a return on book equity of 14 percent and sales of $382 million. Its price / earnings ratio was 12.25 with a
market-to-book value ratio of 1.76. Pinkerton's earnings per share, if it had shares, would be negative in 1987 since operating profits were negative. The average profit for the previous three years 1985 – 1987 was $0.5 million. That figure multiplied by Wackenhut's 12.25 gives a nonsense figure of $6.13 million. Only the market to book value ratio suggests that a company like Wackenhut might have intangible value that is 76 percent above its book value. When applied to the book value of Pinkerton, the potential asset value is nearly $100 million. On the other hand, Wackenhut was profitable and healthy while Pinkerton's was not.

Income Method

The income method to derive equity value involves (1) forecasting the dividends or net cash flow to equity over some time horizon, (2) estimating the terminal value of the entity at the end of that time using one of several alternatives such as the market method or expected cash flow in perpetuity from the horizon period, and (3) discounting both expected dividends and terminal value back to the present by a rate that takes into account risk plus the time value of money if it were invested in a riskless security.

A review of the available data suggests that, even if new plant and equipment purchases were to equal depreciation in the years after 1987, cash flow very likely would be negative. The reason for this is that operating profits would appear to be very low or negative, and working capital needs would increase as sales increased. Under any reasonable assumption, a valuation using the income method would produce a value below net worth.

Subsequent to the Acquisition

The first year after the acquisition of Pinkerton's was marked by a severe cash shortage and the need to restructure the debt. After that, however, the acquisition became a significant success, well worth the $95 million expenditure. There were several reasons for this. In a private conversation with the author in 1999, Mr. Wathen said that the acquisition was "a no-brainer." "All I had to do was superimpose a map of Pinkerton's office locations over a map of ours. The fit was almost perfect." This meant that Mr. Wathen could reduce the total number of offices and enjoy a significant savings.

In addition, Mr. Wathen took the risk of raising prices for Pinkerton work to increase profitability (although at the expense of losing some business). He also believed that better working capital management could lower cash requirements. He did believe that the Pinkerton's name would allow him to increase the margin on CPP business, but this was considered a risky proposition at the time.

This case clearly demonstrates that a significant amount of the value added to Pinkerton came because of the entrepreneurial, or at least innovative, efforts of CPP management in addition to the land, labor, capital, and technology of Pinkerton. And yet all or most of the present value added beyond the net worth of Pinkerton went to the stockholders of American Brands (Berger, 1991).

Mr. Wathen realized his dream—to own Pinkerton's. He also made an investment that could be expected to more than cover his cost of capital in the long run. Yet it took the contribution of his talents to make the difference between a losing venture and a profitable one. Clearly, this was the major intangible value that made Pinkerton's worth the $95 million. The three usual methods would not arrive at that figure using data supplied by American Brands.

At the same time, a fair value would recognize that the entrepreneurial value should be credited to Mr. Wathen and his management team, not to American Brands. An independent evaluator estimating fair market value likely would arrive at a range close to the tangible net worth based upon the market value of the assets.

---

1 The price / earnings comparison is inexact in that Pinkerton's profits are shown as operating profits (before interest and taxes) while Wackenhut's profits are after interest and taxes. Wackenhut had debt of $10.6 million at the time.
The Acquisition of McDonnell Douglas by Boeing

Valuations that appear to be mismatched because the value of entrepreneurship is insufficiently appreciated seem relatively common. For example, on July 25, 1997, The Boeing Company gave notice of a shareholders’ meeting to approve its merger with McDonnell Douglas (Notice). Boeing hired the investment banking firm of CS First Boston to value McDonnell Douglas, while the latter used J.P. Morgan for that purpose. Although information about the merger is sketchy, Exhibit 2 shows that using somewhat different variants of the market and income methods, these two investment banking firms came up with close to the same average value for McDonnell Douglas. Relevant valuation data are shown in Exhibit 2.

Exhibit 2. Per Share Valuation of McDonnell Douglas Common Stock

<table>
<thead>
<tr>
<th>Valuation of McDonnell Douglas by:</th>
<th>Stand Alone Value</th>
<th>Synergy</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS First Boston for Boeing client, December 14, 1996 Average</td>
<td>$49.18 to $65.13</td>
<td>$15.50 to $18.00</td>
<td>$64.68 to $83.13</td>
</tr>
<tr>
<td>J.P. Morgan for MD client, December 14, 1996 Average</td>
<td>$43.00 to $64.00</td>
<td>No Estimate</td>
<td>$73.905</td>
</tr>
<tr>
<td>December 13, 1996 market price of MD</td>
<td></td>
<td></td>
<td>$52.00</td>
</tr>
<tr>
<td>June 19, 1997 market price of Boeing multiplied by the conversion rate of 1.3</td>
<td></td>
<td></td>
<td>$73.45</td>
</tr>
</tbody>
</table>

Between December 13, 1996 (the day prior to the merger agreement date) and June 19, 1997 (the day prior to the proxy statement date), Boeing stock rose 17 percent from $48.375 to $56.50. A McDonnell Douglas shareholder enjoyed a 41 percent increase—from $52.00 per McDonnell Douglas share to $73.45 for 1.3 Boeing shares. (Notice, p. 17)

The book value per share of Boeing as of March 31, 1997 was $14.36; the equivalent value for McDonnell Douglas was $18.67 (Notice, pp. 13-14). If the book value represents a reasonable proxy for the market value of the land and capital less liabilities and debt, then any above market value of the labor and management know-how, and the value of technological intangibles and entrepreneurship must be represented by the difference. This is roughly $6.50 minus $14.36, or $42.14 for Boeing, and $73.45 minus $18.67, or $54.78 for McDonnell Douglas. The 30 percent difference between the two companies suggests either (1) a difference between Boeing management and their advisors and the marketplace about the value of McDonnell Douglas know-how, intangible technology, and entrepreneurship, or (2) a willingness of Boeing management to pay a premium for the option to control 100 percent of McDonnell Douglas.

In the Notice of Special Meeting of Shareholders, little mention was made of the
entrepreneurial potential of either company, per se. What was stressed in this and other publications was that McDonnell Douglas was established in the defense business, but was rapidly losing position in the commercial aircraft business, while growth in Boeing’s commercial aircraft business was upsetting the commercial/defense balance at Boeing. Furthermore, McDonnell Douglas could not afford the technological advances necessary to compete effectively in commercial aircraft. (Notice, pp. 25-26; Grimaldi, p.1).

Minimizing risk by diversification into each other’s businesses seemed to be a prime motive for the merger; but this would not be to the stockholders’ advantage since they could buy shares of both companies in the open market. The other key motive—achieving certain economies of scale and other synergies (if any)—would be the entrepreneurial work of management in both companies (Notice, pp. 29-30).

Boeing, the initiator of this merger, would appear to have an entrepreneurial edge. It was not losing business to superior competitors and was the initiator of the merger. Also, Boeing was the larger company in 1996 ($22.7 vs. $13.8 billion in sales), and size does suggest success in entrepreneurial endeavors. Yet that edge was never discussed directly in the (admittedly sketchy) public documents dealing with the merger, and possibly was never valued as such. And it was Boeing stockholders who gained the least from the merger.

Any conclusions, of course, must be speculative. However, it seems to be reasonable to maintain that a fair and explicit evaluation of the entrepreneurial capability of both firms may have changed the valuation of McDonnell Douglas. In particular, it would influence the estimate of synergy.

**A New Approach to Valuation**

The Pinkerton and Boeing examples suggest that independent valuation experts seeking a true fair value and applying the three common basic methods of valuation—asset, market, and income—could benefit from considering a fourth method. This method would explicitly value the entrepreneurial contributions of both buyer and seller.

**The Entrepreneur**

The concept behind this method, the entrepreneurial method, is that entrepreneurial, or at least innovative, talent is demonstrated by the introduction of new or improved products and services or by the radical restructuring of an existing organization so that it is more cost-effective. Although the dividing line is very difficult to draw, entrepreneurs differ from managers in that the latter function is that of building and maintaining bureaucracies that ensure the status quo rather than providing innovation.

Harvard Business School’s Howard Stevenson has characterized the entrepreneurial context as one of “high uncertainty, rapid growth, radical change, and limited resources.” He notes that:

- **Entrepreneurs are opportunity driven.** Whereas most managers are constrained by their companies’ current capabilities and the risk of cannibalizing existing products and businesses, the entrepreneur is motivated solely to pursue opportunity. For the entrepreneur, constraints are inconveniences to be overcome not reasons for restraint.

- **Entrepreneurs are tremendously focused on cash and the need to conserve resources.** Some of this characteristic is due to the way investors typically prefer to invest in smaller incremental steps. But at the same time, entrepreneurs seek to maximize their personal returns by accepting less financing in order to protect their own ownership positions. The result is an intense need to husband cash and to rent or contract for resources rather than to buy or hire them.

- **Entrepreneurs have a tremendous sense of urgency.**
Because they are opportunity driven, because they need to show tangible progress to attract funding, and because the mere passage of time consumes cash, entrepreneurs have a sense of urgency seldom experienced in established businesses.

- **Entrepreneurs have a singular focus and tremendous sense of ownership.** In an established company, any opportunity is part of a portfolio. A new, risky project is compared with investments in proven businesses and the company pursues multiple opportunities. As a result, even start-ups within large companies seldom have the same sense of focus and ownership as the efforts of independent entrepreneurs whose entire future rests on the success of their venture.

- **Entrepreneurs use flexible organization structures and approaches.** Precisely because their companies are growing rapidly and using many, disparate resources, rigid hierarchical structures are anathema to the entrepreneur. Instead flat organizations, informal relationships and networks, and frequent changes are the norm.

Of course, a given person can be now an entrepreneur and later a manager, so that it is the function, not the person, who differs. At the same time, many entrepreneurs function poorly as managers and vice-versa.

**The Formula**

The first premise of this method for the valuation of products and businesses is that the seller's entrepreneurial talent should be compensated to the extent of its contribution, but no more. The second is that the land, labor (including management), capital, and technology should be valued appropriately. It follows that a product, product line, or company should have an equity value which is the sum of:

1. The free cash flows to equity from the organization's existing products or services throughout their marketable lives, discounted to the present. This implies a product life cycle.

2. The replacement or market value of the land, capital, and technology used to produce the existing products, measured at the end of the life cycle of the existing products, discounted to the present.

3. The replacement or market value, if any, of other intangibles (trade secrets, patents, trade/service marks, and employee know-how) used to produce and sell the existing products, measured at the end of the life cycle of the existing products and not accounted for in 2 above. This value would be discounted to the present.

4. The current market value of existing research and development activities and intangibles which may have current or future value to the acquiring organization in pursuing work not directly associated with existing products and services.

5. The value of excess capacity which could be sold or used by an acquiring firm or individual to produce other goods and services.

**Applying the Formula**

The thrust of the three methods of valuation currently in use suggests that a product, product line, and especially a business be viewed as an ongoing venture. Past trends may be forecast into the future. However, lacking entrepreneurial direction, any business will eventually wind down. The entrepreneurial method explicitly recognizes this point.

At some period of time, each product in a company's business will no longer be a worthwhile investment. Additional capital investment would yield a net present value below zero, thus not accounting for the risk, potential inflation, and the preference for liquidity of the organization. That time period would be estimated for each product or product line and the free cash flows to equity over the period would be discounted and summed.
Next, the tangible and intangible values of the existing products would be estimated in two ways. The larger of the two results would be added to the free cash flows to equity. The first way is to divide the forecast earnings before interest after taxes in the last time period by an appropriate discount rate to obtain a terminal value in perpetuity. The second is to calculate the liquidated value of each tangible and intangible asset mentioned in 2 and 3 above and discount them to the present.

The current value of existing research and development and other intangibles useful in developing new products and services may be calculated using the market or income method. Alternatively, the buying organization could negotiate a royalty payment for valued research and development and other intangibles. The value of excess capacity could be estimated using existing replacement or market cost methods.

The extent to which this method would produce results different from the three approaches currently in use is a subject for further field research. However, it seems reasonable to expect some differences. And since the major determinants of future value are land, labor, capital, technology, and entrepreneurship, it seems reasonable to take them all into account in valuation.

Buyers who act as outside, uninvolved investors would rely heavily upon expectations about the market and their estimates of management's entrepreneurial skill in realizing the greatest potential given the opportunities available.

Investors who are involved in management, however, bring their own entrepreneurial skills with them. Should they expect to pay as much per share for an entity using the income method as uninvolved investors?

Entrepreneurial talent and potential is almost never mentioned in discussions of intangible assets. Yet initiative, perseverance, and risk taking—entrepreneurial qualities—in an organization's culture are major determinants of success and, ultimately, value. To exclude them is to undervalue, sometimes seriously, a firm's real value. At the same time, if the entrepreneurial talent in the firm is concentrated in senior management, and senior management will leave if a business or business unit is sold, a significant determinant of value will be lost. The firm will be overvalued if their contributions are assumed to remain.

Value of the Entrepreneur

A review of the literature on start-ups suggests that entrepreneurs have significant value apart from their purely financial contribution (assuming they invest money in the company).

In a study of 42 Fortune 1000 firms by Block and Ornati (1987), more than 30 percent compensated their venture managers differently.

We already have a built in assumption about the life cycle of the entrepreneurial effort in the discounting if growth is lower than the discount rate. Show the chart. The question is whether this fairly represents the entrepreneurial contribution. It may not. Perhaps a good standard to use is that a company with no entrepreneurial growth potential is worth its profits divided by a discount rate to reflect risk, assuming no NPV in the future.

Risk is not entrepreneurial know-how. The two do not equate in terms of value. Risk is determined by elements that have nothing to do with entrepreneurial talents. So the value of a company requiring entrepreneurial talent—and most do if they plan to exist more than a few years—depends in some large measure on the input of entrepreneurial talent—upon innovation whether in cost cutting (Pinkerton's example) or new products and services (Boeing—Boeing paid a lot for the commercial airline bsns of McDonald Douglas). Note that it is top management's job to intro or create the climate for innovation in the broad sense, not just entrepreneurship in the narrow sense, so make that distinction. The entrepreneur brings in innovation in technology as well as other initiatives.
References


http://www.hbs.edu/units/em/Pages/temdescription.html


THE NONLINEAR RELATIONSHIP BETWEEN INSIDER OWNERSHIP AND FIRM PERFORMANCE

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509-358-2215, dkiefer@ewu.edu

ABSTRACT
Studies of agency theory dating back to the early 1930’s suggest that the value of a corporation is related to the percentage of the common shares owned by insiders. However, two popular hypotheses lead one to different conclusions. The convergence of interest hypothesis of Jensen and Meckling (1976) suggests a positive relationship while the entrenchment hypothesis of Shleifer and Vishny (1989), suggests a negative one. Each hypothesis is plausible so the conflict must ultimately be resolved empirically.

Most early work treats the relationship between insider ownership and firm performance as exogenous while more recently, endogenous relationships have been examined. Previous studies have modeled the relationship using contemporaneous data in piecewise regressions, ordinary least squares, as well as both linear and nonlinear simultaneous systems. Conflicting results have ranged from no relationship to quadratic and cubic relationships and most studies appear to agree only that the relationship is nonmonotonic.

This paper examines existence and direction of nonlinear Granger causality between Tobin's $q$, a measure of firm performance, and the percentage of insider ownership using quarterly time series data for fifty IPO firms. The relationship is examined with the modified Baek and Brock test (1992) using lagged data. No extant research examines nonlinear causality directly despite numerous conclusions that a nonmonotonic relationship exists nor does other research consider a lagged relationship and time series analysis.

This study concludes that, at best, only a weak case can be made for nonlinear Granger causality between the two variables. Only seven of the fifty companies (14%) exhibited significant causality in both directions compared to twelve (24%) showing significant causality from insider ownership to Tobin’s $q$ and four firms (2%) with causality from insider ownership to Tobin's $q$. Twenty-seven firms (64%) showed no significant nonlinear causality in either direction. These results in general fail to support nonlinear causality in any direction. At best, they weakly suggest that nonlinear causality may run from insider ownership to Tobin's $q$. 

ABSTRACT

Visual depictions of financial information are common in annual reports because they highlight important information and aid readers in interpretation and understanding. This paper attempts to develop a framework for presenting the whole of the financial statements in visual form. This paper proscribes the methods and systems for reducing the financial statements to a picture, in order to prevent the abuses that have been identified in previous research of annual report graphic depictions. The next steps are to assess whether the visual schema developed in this paper does help reader perception and understanding.

INTRODUCTION

Visually depicting information is thought to help understanding and processing of the underlying information. Judging by the percentage of annual reports that contain some form of visual representation, the companies that prepare annual reports would concur. One study found that 79% of the annual reports sampled contained graphics (Frownfelter-Lohrke and Fulkerson 2001) and another study found that 91% of the annual reports reviewed displayed graphs (Burgess 2002).

While graphs are common in annual reports, they are also often faulty. Studies have found that from at least 10% (Burgess 2002) to 30% (Beattie and Jones 1992) of annual reports contained graphs that were not faithful representations of the underlying data. The most common method of manipulation was in how the axis was scaled. Some graphs did not have any axis scaling, which can hinder interpretation.

Financial statements are complicated affairs, and to analyze them takes some work. Tools and methods such as horizontal analysis, vertical analysis and ratio analysis are usually performed to facilitate understanding and interpretation. While there are many rules to be followed when preparing financial statements, there are no rules for preparing the visual depictions (see Cleveland and McGill 1984, Taylor and Anderson 1986, McNelis 2000, Frownfelter-Lohrke and Fulkerson 2001). Companies choose which items of information they will highlight in the visual depictions. If graphs, charts and similar do aid in improving understanding and inference, then it is reasonable to think that visually depicting the whole of the financial statements would be a positive step. Before this can be achieved, rules would have to be developed so that all visually prepared financial statements were prepared on the same basis. Once the rules are developed, tests can be employed to see if understanding is enhanced.

This paper develops the rules for presenting the visual depictions. The visually prepared statements are by no means a replacement of the financial statements, but are intended to be supplementary to them. Future papers will test whether the depictions aid in understanding.
LITERATURE REVIEW

Graphs can be an effective way to communicate financial information. In one study 79% of the annual reports sampled contained graphics (Frownfelter-Lohrke and Fulkerson 2001). Another study found that 91% of the annual reports reviewed displayed graphs (Burgess 2002). Visual representations of financial data are a recognized way to present information to increase and aid reader perception and understanding (Cleveland and McGill 1984, Taylor and Anderson 1986, McNelis 2000, Frownfelter-Lohrke and Fulkerson 2001). However, inclusion of graphs and charts does not come without a potential price.

Studies have found that the visual depictions were misleading in at least 10% of the cases (Burgess 2002) to 29.5% (Johnson, et al. 1980) to 30% (Beattie and Jones 1992). Problems with the depictions were described as being constructed incorrectly or constructed in a manner as to be misleading (Johnson, et al. 1980).

In order for external users to be able to utilize visually depicted financial statements, they must be free from bias and manipulation. To accomplish this, there must be prescribed methods of preparation. Just as there are rules to be followed in preparing the underlying financial statements, the visual depictions must follow a set of standards that allow reasonably learned users to interpret and infer meaning from the visualizations.

RULE DEVELOPMENT

Companies choose the element(s) to highlight with a graphic display in the annual report. In order to visually display only some elements of the financial statements, a value judgment would have to be made that certain items are unimportant for readers to see. Accounting guidance does not allow for such a value judgment. Therefore, all elements of the financial statements must be depicted.

There are four financial statements (Statement of Income, Statement of Retained Earnings, Balance Sheet and Statement of Cash Flows) and all have different uses and formats. The Balance Sheet is prepared based on balances that exist at the close of business on a specific day, and the other three statements cover a period of time that ends on the Balance Sheet date. Given the differences, rules specific to each statement need to be developed.

As part of this development process, a sample annual report is used. The company is Tootsie Roll Industries, Inc., and the annual report is for the year ended December 31, 2001 with comparative years of 2000 and 1999 included. Tootsie Roll was chosen because of its accessibility (it came packaged with a financial accounting textbook). The rules for depicting each statement will be developed separately.

General Rules

To prevent the types of problems in graphing financial information that has been identified, the number of vertical gradations should be prescribed, and all graphs should contain (or start at) zero. The number of vertical gradations has been arbitrarily set at 15. Therefore, taking the maximum value the graph will contain and dividing by 14 will produce the increment of each gradation (after rounding up). Where there are both negative and positive values, the lowest and greatest values are summed and then divided by 14 to get the increment.

Setting the number of gradations at 15 is arbitrary, but so is much of accounting. There is no reason that intangible assets should be amortized over the lesser of useful life, legal life or 40 years, nor is there any reason to cap the maximum depreciable life. Arbitrary rules are employed in many situations.

Balance Sheet

The Balance Sheet is divided into current assets, non-current assets (frequently shown under the headings of plant, property and equipment, investments, intangible assets and other), current liabilities, non-current liabilities and the equity section. Based on prevalence in the literature, common usage of the current asset and liability sections are to predict short-term liquidity. The current ratio (current assets divided by current liabilities) is a popular ratio,
and a variation is the quick ratio (cash plus accounts receivable plus marketable securities divided by current liabilities). The quick ratio recognizes that not all assets (even among current ones) are equal in the ability to be collected in the short term.

The visual depiction of the financial statements should not make a value judgment as to including or omitting any item that appears, but at the same time should recognize user needs in the construction. Since current assets and current liabilities are frequently combined in financial calculations, they will be graphed simultaneously. The numerical value to be graphed for each will be a cumulative number, so that the final data point will be equal to the total current assets and total current liabilities. The reader will have immediate knowledge about relative values of total current assets and current liabilities, and the incrementally growing values as each variable is added in order of liquidity. The Balance Sheet of Tootsie Roll is shown in Figure 1.

Graphing the Balance Sheet according to the rules produces the visual depiction shown in Figure 2.

From Figure 2, it is obvious that current assets are much greater than current liabilities and that the most liquid assets are much greater than the most liquid liabilities. The visual depiction clearly shows that Tootsie Roll is in an excellent liquidity position.

Additionally, if a line were drawn between the point representing total current assets and total current liabilities, the inverse of the slope would be the current ratio, one of the commonly calculated ratios. Visually, it would appear to be a strong current ratio.

Noncurrent assets and liabilities are graphed on a separate graph.

Using similar protocols (the amounts are cumulative, listed in the same order as in the financial statements). it is apparent that noncurrent assets are substantially greater than noncurrent liabilities. The visual financial statement leads to a much quicker conclusion than analysis of the underlying financial statements, and also provides a visualization of the relative difference.

The equity section is contained in a third and fourth graph.

The graphs show that 2001 was marginally better than 2000. In the case of Tootsie Roll, the visual presentation of the equity section allows for a quick interpretation that the results for 2001 and 2000 were similar.

**Income Statement**

The Income Statements for Tootsie Roll for the years 2001, 2000 and 1999 are contained in Figure 5.

The Income Statements would seem to be pretty consistent. The consistency is readily apparent when the Income Statement is graphed.

Using the standard of 15 gradations, the Income Statements for the three years are virtually identical. This leads to the quick (and inescapable) conclusion that Tootsie Roll has a stable earnings pattern over the three period.

**Statement of Cash Flows**

The Statement of Cash Flows shows operating cash flows of consistent levels over the three years, an acquisition of a business in 2000 leading to a larger use of funds for investing, and a lower use of funds for financing in 2001 than 2000 or 1999.
Graphing the Statement of Cash Flows leads to similar conclusions.

[INSERT FIGURE 8 HERE]

CONCLUSION

Graphs can provide visual information about underlying financial statements that aids in user understanding and processing. Graphing a complete set of financial statements for Tootsie Roll Industries, Inc. yields the visual depictions presented.

REFERENCES


### Tootsie Roll Industries, Inc and Subsidiaries

**Consolidated Statement of Financial Position**

Thousands except per share data

**December 31, 2001**

<table>
<thead>
<tr>
<th>ASSETS</th>
<th>2001</th>
<th>2000</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CURRENT ASSETS:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cash and cash equivalents</td>
<td>$106,532</td>
<td>$60,882</td>
</tr>
<tr>
<td>Investments</td>
<td>68,629</td>
<td>71,605</td>
</tr>
<tr>
<td>Accounts receivable trade, less allowances of $2,037 and $2,147</td>
<td>20,403</td>
<td>23,568</td>
</tr>
<tr>
<td>Other receivables</td>
<td>3,329</td>
<td>1,230</td>
</tr>
<tr>
<td><strong>Inventories:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Finished goods and work-in-process</td>
<td>24,770</td>
<td>24,984</td>
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<tr>
<td>Raw materials and supplies</td>
<td>16,392</td>
<td>16,906</td>
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<tr>
<td>Prepaid expenses</td>
<td>4,269</td>
<td>2,685</td>
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<tr>
<td>Deferred income taxes</td>
<td>1,772</td>
<td>1,351</td>
</tr>
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<td><strong>Total current assets</strong></td>
<td>246,096</td>
<td>203,211</td>
</tr>
<tr>
<td><strong>PROPERTY, PLANT AND EQUIPMENT, at cost:</strong></td>
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<td></td>
</tr>
<tr>
<td>Land</td>
<td>8,364</td>
<td>8,327</td>
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<tr>
<td>Buildings</td>
<td>43,613</td>
<td>36,937</td>
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<tr>
<td>Machinery and equipment</td>
<td>189,528</td>
<td>183,858</td>
</tr>
<tr>
<td><strong>Less - Accumulated depreciation</strong></td>
<td>241,495</td>
<td>229,122</td>
</tr>
<tr>
<td><strong>Intangible assets, net of accumulated amortization of $30,695 and $26,917</strong></td>
<td>117,499</td>
<td>121,263</td>
</tr>
<tr>
<td>Investments</td>
<td>71,131</td>
<td>62,548</td>
</tr>
<tr>
<td><strong>Cash surrender value of life insurance and other assets</strong></td>
<td>132,575</td>
<td>131,118</td>
</tr>
<tr>
<td><strong>Intangible assets, net of accumulated amortization of $30,695 and $26,917</strong></td>
<td>240,005</td>
<td>228,113</td>
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<tr>
<td><strong>Total assets</strong></td>
<td>$618,676</td>
<td>$562,442</td>
</tr>
<tr>
<td></td>
<td>2022</td>
<td>2021</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>--------</td>
<td>--------</td>
</tr>
<tr>
<td><strong>CURRENT LIABILITIES:</strong></td>
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<tr>
<td>Accounts payable</td>
<td>$9,223</td>
<td>$10,296</td>
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<tr>
<td>Dividends payable</td>
<td>3,536</td>
<td>3,436</td>
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<tr>
<td>Accrued liabilities</td>
<td>34,295</td>
<td>33,336</td>
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<tr>
<td>Income taxes payable</td>
<td>10,792</td>
<td>10,378</td>
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<tr>
<td><strong>Total current liabilities</strong></td>
<td>57,846</td>
<td>57,446</td>
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<tr>
<td><strong>NONCURRENT LIABILITIES:</strong></td>
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<td></td>
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<tr>
<td>Deferred income taxes</td>
<td>16,792</td>
<td>12,422</td>
</tr>
<tr>
<td>Postretirement health care and life insurance benefits</td>
<td>7,450</td>
<td>6,956</td>
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<tr>
<td>Industrial development bonds</td>
<td>7,500</td>
<td>7,500</td>
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<tr>
<td>Deferred compensation and other liabilities</td>
<td>20,627</td>
<td>19,422</td>
</tr>
<tr>
<td><strong>Total noncurrent liabilities</strong></td>
<td>52,369</td>
<td>46,300</td>
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<tr>
<td><strong>SHAREHOLDERS’ EQUITY</strong></td>
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</tr>
<tr>
<td>Common stock, $.69-4/9 par value -</td>
<td></td>
<td></td>
</tr>
<tr>
<td>120,000 and 120,000 shares authorized -</td>
<td>23,708</td>
<td>22,907</td>
</tr>
<tr>
<td>Class B common stock, $.69-4/9 par value -</td>
<td></td>
<td></td>
</tr>
<tr>
<td>40,000 and 40,000 shares authorized -</td>
<td>11,332</td>
<td>11,150</td>
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<tr>
<td>Capital in excess of par</td>
<td>323,981</td>
<td>256,698</td>
</tr>
<tr>
<td>Retained earnings, per accompanying statement</td>
<td>161,345</td>
<td>180,123</td>
</tr>
<tr>
<td>Accumulated other comprehensive earnings (loss)</td>
<td>(9,913)</td>
<td>(10,190)</td>
</tr>
<tr>
<td>Treasury stock (at cost) -</td>
<td></td>
<td></td>
</tr>
<tr>
<td>53 shares and 52 shares, respectively</td>
<td>(1,992)</td>
<td>(1,992)</td>
</tr>
<tr>
<td><strong>Total shareholders’ equity</strong></td>
<td>508,461</td>
<td>458,696</td>
</tr>
</tbody>
</table>

(The accompanying notes are an integral part of these statements.)
Figure 2

Tootsie Roll
Balance Sheet
Current Assets and Liabilities
December 31, 2001 and 2000

Assets
- Cash
- Investments
- Accts Rec
- Other Rec
- Inventory
- Prepaid Exp
- Def Inc Tax

Liabilities
- Accts Pay
- Dividends Pay
- Accrued Liab
- Inc Tax Pay

Current

(in millions, cumulative)
Non-Current Assets and Liabilities
December 31, 2001 and 2000

<table>
<thead>
<tr>
<th>Assets</th>
<th>Liabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>PP&amp;E (net)</td>
<td>Def Inc Tax</td>
</tr>
<tr>
<td>Intangibles</td>
<td>Postretir Health</td>
</tr>
<tr>
<td>Investments</td>
<td>Indust Dev Bonds</td>
</tr>
<tr>
<td>Cash Surr Val</td>
<td>Def Comp</td>
</tr>
</tbody>
</table>
Figure 4

Tootsie Roll
Balance Sheet
Shareholders' Equity
December 31, 2001 and 2000

Common stock
Common Stock Class B
Capital In Excess of Par
Retained Earnings
Accum Other Comp Earnings
Treasury Stock

Cash Dividends
Stock Dividends
### Consolidated Statement of Earnings, Comprehensive Earnings and Retained Earnings

<table>
<thead>
<tr>
<th></th>
<th>2001</th>
<th>2000</th>
<th>1999</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net sales</td>
<td>$423,496</td>
<td>$427,054</td>
<td>$396,750</td>
</tr>
<tr>
<td>Cost of goods sold</td>
<td>216,657</td>
<td>207,100</td>
<td>192,561</td>
</tr>
<tr>
<td>Gross margin</td>
<td>206,839</td>
<td>219,954</td>
<td>204,189</td>
</tr>
<tr>
<td>Selling, marketing and</td>
<td>109,117</td>
<td>105,805</td>
<td>96,964</td>
</tr>
<tr>
<td>administrative expenses</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amortization of intangible</td>
<td>3,778</td>
<td>3,420</td>
<td>2,706</td>
</tr>
<tr>
<td>assets</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Earnings from operations</td>
<td>93,944</td>
<td>110,729</td>
<td>104,519</td>
</tr>
<tr>
<td>Other income, net</td>
<td>6,843</td>
<td>7,079</td>
<td>6,928</td>
</tr>
<tr>
<td>Earnings before income taxes</td>
<td>100,787</td>
<td>117,808</td>
<td>111,447</td>
</tr>
<tr>
<td>Provision for income taxes</td>
<td>35,100</td>
<td>42,071</td>
<td>40,137</td>
</tr>
<tr>
<td>Net earnings</td>
<td>$65,687</td>
<td>$75,737</td>
<td>$71,310</td>
</tr>
<tr>
<td>Net earnings</td>
<td>$65,687</td>
<td>$75,737</td>
<td>$71,310</td>
</tr>
<tr>
<td>Other comprehensive earnings</td>
<td>277</td>
<td>(1,250)</td>
<td>1,583</td>
</tr>
<tr>
<td>loss</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comprehensive earnings</td>
<td>$65,964</td>
<td>$74,487</td>
<td>$72,893</td>
</tr>
<tr>
<td>Retained earnings at</td>
<td>$180,123</td>
<td>$158,619</td>
<td>$164,652</td>
</tr>
<tr>
<td>beginning of year</td>
<td>65,687</td>
<td>75,737</td>
<td>71,310</td>
</tr>
<tr>
<td>Net earnings</td>
<td>14,021</td>
<td>(13,350)</td>
<td>(11,654)</td>
</tr>
<tr>
<td>Cash dividends ($ .28, .26</td>
<td>(70,444)</td>
<td>(40,883)</td>
<td>(65,689)</td>
</tr>
<tr>
<td>and .23 per share)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stock dividends</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Retained earnings at</td>
<td>$161,345</td>
<td>$180,123</td>
<td>$158,619</td>
</tr>
<tr>
<td>end of year</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Earnings per share</td>
<td>$1.30</td>
<td>$1.49</td>
<td>$1.37</td>
</tr>
<tr>
<td>Average common and class B</td>
<td>50,451</td>
<td>50,898</td>
<td>51,877</td>
</tr>
<tr>
<td>shares outstanding</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(The accompanying notes are an integral part of these statements.)
<table>
<thead>
<tr>
<th>Year</th>
<th>Net Sales</th>
<th>Cost of Goods Sold</th>
<th>Gross Margin</th>
<th>Selling, Marketing, Admin Exp</th>
<th>Earnings From Operations</th>
<th>Income Taxes</th>
<th>Net Earnings</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1999</td>
<td>31</td>
<td>62</td>
<td>93</td>
<td>124</td>
<td>155</td>
<td>186</td>
<td>217</td>
</tr>
</tbody>
</table>

Tootsie Roll
Income Statement
Years Ended December 31, 2001, 2000, 1999

Net Sales
Cost of Goods Sold
Gross Margin
Selling, Marketing, Admin Exp
Earnings From Operations
Income Taxes
Net Earnings

(in millions)
<table>
<thead>
<tr>
<th>CASH FLOWS FROM OPERATING ACTIVITIES:</th>
<th>2001</th>
<th>2000</th>
<th>1999</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net earnings</td>
<td>$65,687</td>
<td>$75,737</td>
<td>$71,310</td>
</tr>
<tr>
<td>Adjustments to reconcile net earnings to net cash provided by operating activities:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depreciation and amortization</td>
<td>16,700</td>
<td>13,314</td>
<td>9,979</td>
</tr>
<tr>
<td>Gain on retirement of fixed assets</td>
<td>-</td>
<td>(46)</td>
<td>(43)</td>
</tr>
<tr>
<td>Changes in operating assets and liabilities, excluding acquisitions:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accounts receivable</td>
<td>3,096</td>
<td>(4,460)</td>
<td>400</td>
</tr>
<tr>
<td>Other receivables</td>
<td>(2,100)</td>
<td>4,486</td>
<td>(2,392)</td>
</tr>
<tr>
<td>Inventories</td>
<td>910</td>
<td>(768)</td>
<td>1,592</td>
</tr>
<tr>
<td>Prepaid expenses and other assets</td>
<td>(8,857)</td>
<td>(7,903)</td>
<td>(15,672)</td>
</tr>
<tr>
<td>Accounts payable and accrued liabilities</td>
<td>(224)</td>
<td>(1,717)</td>
<td>968</td>
</tr>
<tr>
<td>Income taxes payable and deferred</td>
<td>4,402</td>
<td>5,691</td>
<td>2,232</td>
</tr>
<tr>
<td>Postretirement health care and life insurance benefits</td>
<td>494</td>
<td>399</td>
<td>412</td>
</tr>
<tr>
<td>Deferred compensation and other liabilities</td>
<td>1,206</td>
<td>337</td>
<td>4,162</td>
</tr>
<tr>
<td>Other</td>
<td>191</td>
<td>(189)</td>
<td>(13)</td>
</tr>
<tr>
<td>Net cash provided by operating activities</td>
<td>81,505</td>
<td>84,881</td>
<td>72,935</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CASH FLOWS FROM INVESTING ACTIVITIES:</th>
<th>2001</th>
<th>2000</th>
<th>1999</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquisitions of businesses, net of cash acquired</td>
<td>-</td>
<td>(74,293)</td>
<td>-</td>
</tr>
<tr>
<td>Capital expenditures</td>
<td>(14,148)</td>
<td>(16,189)</td>
<td>(20,283)</td>
</tr>
<tr>
<td>Purchase of held to maturity securities</td>
<td>(243,530)</td>
<td>(156,322)</td>
<td>(238,949)</td>
</tr>
<tr>
<td>Maturity of held to maturity securities</td>
<td>228,397</td>
<td>176,576</td>
<td>235,973</td>
</tr>
<tr>
<td>Purchase of available for sale securities</td>
<td>(64,640)</td>
<td>(78,993)</td>
<td>(117,694)</td>
</tr>
<tr>
<td>Sale and maturity of available for sale securities</td>
<td>74,166</td>
<td>82,754</td>
<td>113,960</td>
</tr>
<tr>
<td>Net cash used in investing activities</td>
<td>(19,755)</td>
<td>(66,467)</td>
<td>(26,993)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CASH FLOWS FROM INVESTING ACTIVITIES:</th>
<th>2001</th>
<th>2000</th>
<th>1999</th>
</tr>
</thead>
<tbody>
<tr>
<td>Issuance of notes payable</td>
<td>-</td>
<td>43,625</td>
<td>-</td>
</tr>
<tr>
<td>Repayments of notes payable</td>
<td>-</td>
<td>(43,625)</td>
<td>-</td>
</tr>
<tr>
<td>Treasury stock purchases</td>
<td>-</td>
<td>-</td>
<td>(1,019)</td>
</tr>
<tr>
<td>Shares repurchased and retired</td>
<td>(1,932)</td>
<td>(32,945)</td>
<td>(25,850)</td>
</tr>
<tr>
<td>Dividends paid in cash</td>
<td>(14,168)</td>
<td>(13,091)</td>
<td>(11,313)</td>
</tr>
<tr>
<td>Net cash used in financing activities</td>
<td>(16,100)</td>
<td>(46,036)</td>
<td>(38,182)</td>
</tr>
<tr>
<td>Increase (decrease) in cash and cash equivalents</td>
<td>45,650</td>
<td>(27,622)</td>
<td>7,760</td>
</tr>
<tr>
<td>Cash and cash equivalents at beginning of year</td>
<td>60,882</td>
<td>88,504</td>
<td>80,744</td>
</tr>
<tr>
<td>Cash and cash equivalents at end of year</td>
<td>$106,532</td>
<td>$60,882</td>
<td>$88,504</td>
</tr>
</tbody>
</table>

**Supplemental cash flow information:**

<table>
<thead>
<tr>
<th>Income taxes paid</th>
<th>2001</th>
<th>2000</th>
<th>1999</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$30,490</td>
<td>$35,750</td>
<td>$38,827</td>
</tr>
<tr>
<td>Interest paid</td>
<td>$356</td>
<td>$1,067</td>
<td>$453</td>
</tr>
</tbody>
</table>

(The accompanying notes are an integral part of these statements.)
Figure 8

Tootsie Roll
Statement of Cash Flows
Years Ended December 31, 2001, 2000, 1999

Cash Flows from Operating
Cash Flows from Investing
Cash Flows from Financing
Change in Cash

(in millions)
Does Wall Street Reward Diversity?

Melissa Griswold, Quincy University
David Porras, Webster University
Debbie Psihountas, Webster University

Abstract

This paper investigates the stock performance of firms recognized by Fortune in their list of “50 Best Companies for Minorities. Cumulative abnormal returns and buy-and-hold abnormal returns are computed for sample firms using two benchmarks: the CRSP value-weighted index and portfolios created based on firm size and book-to-market equity. Returns are also tested in time-series regressions against the Fama and French (1993) and Carhart (1997) factors. No conclusive evidence is found tying diversity to performance. While diverse firms do not outperform their peers, diversity efforts do not appear to hurt their stockholders.

Introduction

Racial diversity has long been a topic of interest among U.S. corporations and society at large. Businesses have initiated diversity programs aimed at improving performance while heading off potentially costly and image-tarnishing lawsuits\(^1\). As the U.S. population becomes more diverse\(^2\), and companies increase their participation in the world economy, managing diversity effectively becomes increasingly important.

The heated arguments surrounding the recent Supreme Court Litigation related to the University of Michigan’s student selection process, shows that substantial disagreement exists over the desirability and effectiveness of diversity initiatives. Businesses clearly supported the need for diversity. Sixty-six U.S.-based corporations stepped forward in support of the University of Michigan (Supreme Court Cases 02-241 and 02-516). They argue that (page 24):

“Instead of finding that the consideration of diversity leads to racial tension and stigmatization, as petitioner and amici argue, businesses have discovered just the opposite: valuing diversity has helped their bottom line.”

The belief that diversity and performance are positively related is widespread. In a 2000 survey of Fortune 500 CFO’s, 96% of respondents agreed that a more diverse workforce benefits the bottom line, while 83% agreed that the benefits of diversity are

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\(^1\) The EEOC filed 33,191 race-based discrimination complaints in 2002.
\(^2\) It is estimated by the U.S. Census Bureau that by 2050, approximately 47.2% of all Americans will be African American, Hispanic, Asian American or Native American.
difficult to measure. According to a survey conducted by the New York Times Job Market, 70% of organizations with diversity programs believe that these initiatives have a positive impact on their business performance. Perhaps because of the difficulty in quantifying this relationship, little research exists investigating the ties between diversity and financial performance. In a competitive world where resources are limited and firms are competing for market share, the financial implications of diversity are important. Particularly in difficult economic times, it is necessary to justify diversity initiatives to shareholders.

The limited evidence that does exist in this area is mixed. Wright, Ferris, Hiller, and Kroll (1995) is the only paper we are aware of which attempts to tie diversity directly to stock price performance. A positive announcement effect is found for firms recognized by the Department of Labor (DOL) for outstanding affirmative action programs.

Others have investigated the link between diversity and work group or financial performance. Research by Pelled, Eisenhasch, and Xin (1999) concludes that while diversity in the forms of race, age, and tenure influence emotional conflict in work groups, there is no substantial tie to performance. Morrisette (1997) finds that size and type of firm have substantially more impact on a firm’s performance than diversity. Griswold, Porras and Scott (2002) report that companies which have been recognized by _Fortune_ for their commitment to minorities, experience superior operating performance over their industry and a group of matched firms.

This paper investigates whether or not companies with outstanding diversity programs display exemplary stock performance. We test a sample of firms recognized by _Fortune_ as the “50 Best Companies for Minorities” for abnormal performance. The stock returns earned by these firms are compared to two benchmarks:

1. The CRSP value-weighted index.
2. Benchmark portfolios created based on firm size and book-to-market equity (B/M).

Returns are also tested in time-series regressions against the Fama and French (1993) and Carhart (1997) factors.

No conclusive results are found. There is some indication that sample firms outperform the market in the year subsequent to appearing in _Fortune_. Positive short-term performance is not reported, however, with size-B/M benchmarks. In fact long-term buy-and-hold returns are negative in this series of tests. Time series regressions show the abnormal return on a portfolio of diverse firms to be positive but insignificant.

**Data and Methodology**

**A. Data**

The sample consists of corporations recognized by _Fortune_ magazine as the “50 Best Companies for Minorities.” Each year since 1998 _Fortune_ has produced this list in collaboration with the Council on Economic Priorities. Companies from the _Fortune_
1000 and the 200 largest privately held firms are compared based on 15 categories. Special attention is paid to how many minorities (defined by Fortune as Hispanics, Blacks, Asians, and/or Native Americans) are in leadership roles (Board of Directors, top management, top 50 paid employees, and throughout the management chain,) companies with the highest percentage of minorities among all employees, companies that recruit and hire from minority schools, the use of minority distributors and other factors are also considered.5

Between 1998 and 2002, Fortune recognized 95 firms. Table 1 shows the list. Testing includes only U.S.-based corporations, thus ADRs are excluded. Included firms must also be publicly-traded and have necessary financial information reported by CRSP and Compustat. The total book value of equity (Compustat item 60) must be available for the year prior to a firm first appearing on the list. Additionally, the price of a firm’s common stock must be included in CRSP during June of the year of inclusion. Based on these criteria, one ADR and 23 firms with missing data are dropped from the study, leaving a sample of 71 firms6.

Table 2 contains descriptive data. Panel A shows average and median size and B/M of the sample and of the CRSP/Compustat database. Panel B details industry representation. Given that only the 1000 largest public firms are considered by Fortune, sample firms would be among the largest in the database. Average and median value of equity are $38 and $22 billion versus $2 billion and $94 million for all stocks listed on CRSP and Compustat. Sample firms also appear to be relatively high-priced based on B/M values. Median B/M is less than half that of the average CRSP/Compustat firm: .23 vs. .58.

Industry membership, defined by 2-digit SIC codes, is relatively well-balanced with 24 industries represented. Of these, only two industries, Chemical and Allied Products and Food Products, make up greater than 10% of the sample. Combined, these two industries account for 23% of the test group versus 11% of the S&P 500.

B. Methodology
Event-Time Tests

Event-time studies compare the stock price performance of our sample of diverse firms to two benchmarks. First, we look at relative performance using the CRSP value-weighted index as a benchmark.

Next, returns are compared to benchmark portfolios constructed based on size and B/M as recommended by Barber and Lyon (1997). On June 30 of each year, all firms in the CRSP/Compustat universe (excluding ADRs and any firm appearing on Fortune’s list of diverse firms) are divided into size deciles. Size is computed based on stock price and common shares outstanding as of June 30. Decile breakpoints are determined using only New York Stock Exchange listed firms. Each size grouping is further divided into five B/M portfolios. B/M is calculated as of the end of the prior calendar year. This leaves a total of 50 portfolios. Returns on each sample firm are compared to the average return on the appropriate benchmark portfolio.

The size and B/M distribution of our firms is consistent with the data presented in Table 2. 52 out of the 71 sample firms belong to the largest size decile. 62 belong to

6 19 firms were excluded due to missing Compustat data; 4 did not have prices listed on CRSP.
deciles 8-10. There is a less pronounced preference toward low B/M firms. 34 firms belong to the lowest two B/M quintiles versus 24 in the top two.

Return calculations begin on July 1 of the year in which a firm is first named to Fortune’s list. Abnormal returns are computed by subtracting benchmark returns from those of sample firms. If CRSP stops reporting returns for a stock, we assume that both the firm and its benchmark earn returns of 0% for the remainder of the time period. Return differences are reported for a number of time periods ranging from three months through four years.

There is no general agreement on whether Cumulative Abnormal Returns (CARs) or Buy-and-Hold Abnormal Returns (BHARs) should be used as a measure of abnormal performance⁷. We report equal- and value-weighted averages of both measures. BHARs represent the difference in compound returns between the sample and benchmark. CARs are the summation of monthly abnormal returns.

Calendar-time Tests

As a further test of performance, excess returns on a sample portfolio are regressed against the time-series factors of Fama and French (1993) and Carhart (1997). The sample portfolio is created by purchasing diverse firms as soon as they are listed in Fortune and holding them until December 31, 2002. On July 1, 1998, firms appearing on the first list are added to the portfolio. The portfolio is updated on July 1 in subsequent years to account for newly listed firms. Equal and value-weighted returns are computed. Value-weighted returns assume annual rebalancing to reflect current market values. Returns are computed for the period July 1998-December 2002.

Excess monthly returns are computed by subtracting the return on a 30-day t-bill from the portfolio return. These returns are regressed against factors meant to account for return variation related to the market (RMRF), size (SMB), B/M (HML) and momentum (MOM). RMRF is the excess return on the CRSP value-weighted index. The other three factors are zero-cost, arbitrage portfolios. SMB is created by subtracting monthly returns on a portfolio of big stocks from returns on a small stock portfolio. HML is the difference in returns between high and low B/M stocks. MOM is the difference in returns between stocks with high returns over the prior 12-month period and those with poor performance.

Results

Fortune has claimed that diverse firms outperform the market⁸. Looking at raw returns there is some indication that it is correct. Table 3 compares the return on a portfolio of Fortune firms, updated each year to include all firms recognized in the magazine as minority-friendly, to the return on the CRSP value-weighted index. Over the period July 1999 – December 2002 the overall market declined 17.06%. During this time an equal-weighted portfolio of sample firms earned 11.78%, or 28.84% more than the market. This performance appears to be driven by smaller firms. When the portfolio is value-weighted, returns drop to -15.70% - very similar to the market.

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⁷ Barber and Lyon (1997) investigate the performance of a variety of measures and find that neither BHARs nor CARs consistently dominates the other. Fama (1998) prefers CARs, arguing that compounding can exaggerate the observed distribution of returns.

⁸ For example in its August 3, 1999 issue Fortune compares returns on its diverse firms to the market over 1, 3 and 5 year periods. It concludes that “minority-friendly firms tend to be superior performers.”
This pattern continues when the buy-and-hold returns on individual firms are compared to the market. Table 4 shows that on an equal-weighted basis, sample firms earn buy-and-hold returns 15.52% above that of the market. This amount is not significant, however, with a t-statistic of 1.60. When value-weighted BHARs are calculated, the four-year difference is -2.83%. Value-weighted results do show some indication of superior short-term performance. Three-month and one-year results are significant at the 10% level. BHARs over these periods are 4.40% and 10.63%. These differences are not maintained over longer periods. In fact, over three years, sample firms underperform the market by a statistically significant 3%.

Panel B of Table 4 shows results when size and B/M benchmarks are employed. Diverse firms fare much worse here. Sample firms underperform their benchmarks over three and four-year periods, regardless of whether equal or value-weighted returns are used. On a value-weighted basis the difference is roughly 30%.

CARs are reported in Table 5. Results of testing with the CRSP value-weighted index as the benchmark are similar to those found with BHARs. Our sample outperforms the market over a one-year period. Equal-weighted results show this difference to continue, remaining a significant 14.33% over three years. Value-weighted results for longer periods are not significant. Four-year results are negative but insignificant.

Panel B shows that when CARS are calculated based on size-B/M benchmarks, no significant results are obtained. Equal-weighted averages remain close to 0% over the entire period studied. Value-weighted results turn sharply negative over three and four-year periods, but neither result is significant.

Calendar-time tests are reported in Table 6. Using either equal or value-weighed returns we find an average abnormal return of .44% per month. This amount is not significant in either case.

**Conclusion**

As minorities become a larger portion of the population and as businesses continue to expand internationally, the financial implications of diversity initiatives become increasingly important. While many CEOs believe that a diverse workforce benefits the bottom line, the expense associated with initiating diversity programs must be justified to stockholders as they look to maximize wealth. At the very least, stockholders will want conclusive evidence that such initiatives do not hamper the ability of the corporation to compete in financial markets.

The academic community has shed little light on the issue. This paper attempts to address the link between diversity and performance by investigating the stock price performance of a set of firms which have been recognized by Fortune for their commitment to minorities.

Our testing confirms Fortune’s assertion that on average minority-friendly firms earn higher raw returns than that of the market. This result, however, does not hold up to more extensive testing. Compared to the market, sample firms produce positive abnormal performance in the short-term. However, this result does not extend to longer holding periods. Further, sample firms have significantly lower buy-and hold returns than size-B/M benchmarks over 3- and 4-year periods. Time-series regressions yield positive but insignificant abnormal returns.
References


Supreme Court, Nos. 02-241 and 02-516, 2003, Brief for Amici Curiae 65 leading americana businesses in support of respondents.

Supreme Court, Nos. 02-241 and 02-516, 2003, Brief for General Motors Corporation as Amicus Curiae in support of respondents.

U.S. Census Bureau website, Civilian labor force, by sex, age, race, and hispanic origin.


Table 1: Companies appearing on Fortune’s list of 50 Best Companies for Minorities (1998-2002)

Table includes all firms listed by Fortune as one of the “50 best companies for minorities.” Also included is date firms first appear on list and number of times recognized.

<table>
<thead>
<tr>
<th>Company</th>
<th>First on List</th>
<th>Times on List</th>
<th>Company</th>
<th>First on List</th>
<th>Times on List</th>
<th>Company</th>
<th>First on List</th>
<th>Times on List</th>
</tr>
</thead>
<tbody>
<tr>
<td>AFC Enterprises*</td>
<td>2001</td>
<td>1</td>
<td>Du Pont</td>
<td>1998</td>
<td>4</td>
<td>Procter &amp; Gamble</td>
<td>2001</td>
<td>1</td>
</tr>
<tr>
<td>AFLAC</td>
<td>2002</td>
<td>1</td>
<td>Eastman Kodak</td>
<td>2002</td>
<td>1</td>
<td>Pub Serv Co of New Mexico</td>
<td>1999</td>
<td>4</td>
</tr>
<tr>
<td>Allstate</td>
<td>1998</td>
<td>5</td>
<td>Fannie Mae</td>
<td>1998</td>
<td>5</td>
<td>Prudential</td>
<td>2002</td>
<td>1</td>
</tr>
<tr>
<td>American Express*</td>
<td>1998</td>
<td>4</td>
<td>Federal Express*</td>
<td>1998</td>
<td>3</td>
<td>Reebok</td>
<td>1998</td>
<td>1</td>
</tr>
<tr>
<td>AMR Corp</td>
<td>1999</td>
<td>1</td>
<td>Freddie Mac</td>
<td>2001</td>
<td>2</td>
<td>Safeway</td>
<td>2000</td>
<td>1</td>
</tr>
<tr>
<td>Applied Materials</td>
<td>1998</td>
<td>5</td>
<td>General Motors</td>
<td>1998</td>
<td>1</td>
<td>SBC Communications</td>
<td>1999</td>
<td>4</td>
</tr>
<tr>
<td>AT&amp;T</td>
<td>1998</td>
<td>1</td>
<td>Hilton Hotels*</td>
<td>2000</td>
<td>3</td>
<td>Schering-Plough</td>
<td>1999</td>
<td>3</td>
</tr>
<tr>
<td>Avis</td>
<td>2000</td>
<td>1</td>
<td>Hyatt*</td>
<td>1999</td>
<td>3</td>
<td>Sempra Energy</td>
<td>1998</td>
<td>5</td>
</tr>
<tr>
<td>Avon</td>
<td>1999</td>
<td>3</td>
<td>Intel</td>
<td>2002</td>
<td>1</td>
<td>SGI International*</td>
<td>2000</td>
<td>2</td>
</tr>
<tr>
<td>Bell Atlantic</td>
<td>1998</td>
<td>3</td>
<td>Knight-Ridder</td>
<td>1999</td>
<td>2</td>
<td>Southern California Edison*</td>
<td>1998</td>
<td>5</td>
</tr>
<tr>
<td>Campbell Soup</td>
<td>1998</td>
<td>1</td>
<td>Lilly (Eli) &amp; Co.</td>
<td>1999</td>
<td>3</td>
<td>Texas Instruments</td>
<td>1999</td>
<td>1</td>
</tr>
<tr>
<td>Chrysler</td>
<td>1998</td>
<td>1</td>
<td>Lucent</td>
<td>1998</td>
<td>5</td>
<td>Times Mirror*</td>
<td>1998</td>
<td>1</td>
</tr>
<tr>
<td>CIGNA Corp</td>
<td>1998</td>
<td>1</td>
<td>Marriott</td>
<td>1998</td>
<td>5</td>
<td>Toyota Motor Sales*</td>
<td>1999</td>
<td>1</td>
</tr>
<tr>
<td>Citigroup</td>
<td>1999</td>
<td>2</td>
<td>Merck</td>
<td>1998</td>
<td>2</td>
<td>U.S. West*</td>
<td>1999</td>
<td>2</td>
</tr>
<tr>
<td>Coca-Cola</td>
<td>2001</td>
<td>2</td>
<td>Merrill Lynch</td>
<td>1998</td>
<td>1</td>
<td>UAL</td>
<td>2000</td>
<td>3</td>
</tr>
<tr>
<td>Colgate-Palmolive</td>
<td>1999</td>
<td>4</td>
<td>Morgan (JP)*</td>
<td>1999</td>
<td>4</td>
<td>Union Bank of California*</td>
<td>1999</td>
<td>4</td>
</tr>
<tr>
<td>Darden Restaurants</td>
<td>1999</td>
<td>4</td>
<td>Pepsico</td>
<td>1999</td>
<td>4</td>
<td>Xerox</td>
<td>1998</td>
<td>5</td>
</tr>
<tr>
<td>Dole Food</td>
<td>2000</td>
<td>2</td>
<td>PG&amp;E</td>
<td>1999</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Not included in study.
Table 2
Sample Firms – Characteristics and Industry Membership

This table compares average size and book-to-market equity of a sample of 71 firms recognized by Fortune as the “50 best for minorities” from 1998-2002 to that of the all firms with data reported by CRSP and Compustat.

<table>
<thead>
<tr>
<th>Panel A: Size and Book-to-Market Equity</th>
<th>Size(millions)</th>
<th>Book-to-Market</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Median</td>
</tr>
<tr>
<td>Sample</td>
<td>38,180</td>
<td>22,052</td>
</tr>
<tr>
<td>CRSP/Compustat Average</td>
<td>1,867</td>
<td>94</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Panel B: Industry Composition of Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industry</td>
</tr>
<tr>
<td>------------------------------------------</td>
</tr>
<tr>
<td>Chemical &amp; allied products</td>
</tr>
<tr>
<td>Food products</td>
</tr>
<tr>
<td>Industrial machinery &amp; equipment</td>
</tr>
<tr>
<td>Communications</td>
</tr>
<tr>
<td>Electricity &amp; gas</td>
</tr>
<tr>
<td>Non-depository institutions</td>
</tr>
<tr>
<td>Insurance</td>
</tr>
<tr>
<td>Printing and publishing</td>
</tr>
<tr>
<td>Instrument &amp; related products</td>
</tr>
<tr>
<td>Banks &amp; savings institutions</td>
</tr>
<tr>
<td>Footwear</td>
</tr>
<tr>
<td>Electronics</td>
</tr>
<tr>
<td>Transportation equipment</td>
</tr>
<tr>
<td>Transportation by air</td>
</tr>
<tr>
<td>Eating &amp; drinking places</td>
</tr>
<tr>
<td>Hotels &amp; other lodging</td>
</tr>
<tr>
<td>Business service</td>
</tr>
<tr>
<td>Automobile rental &amp; leasing</td>
</tr>
<tr>
<td>Agricultural products</td>
</tr>
<tr>
<td>Apparel &amp; other textile products</td>
</tr>
<tr>
<td>Petroleum &amp; coal products</td>
</tr>
<tr>
<td>Food Stores</td>
</tr>
<tr>
<td>Apparel &amp; Accessory stores</td>
</tr>
<tr>
<td>Security &amp; commodity brokers</td>
</tr>
</tbody>
</table>
Table 3
Raw Returns on Diverse Sample Firms and CRSP Value-weighted Index (July 1998 – December 2002)

This table reports the buy-and-hold returns on the CRSP value-weighted index and on a portfolio of 71 diverse firms. Firms are added to the portfolio in July of the first year they are recognized by Fortune for their diversity programs.

<table>
<thead>
<tr>
<th></th>
<th>Buy and Hold Returns</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRSP Value-weighted Index</td>
<td>-17.06%</td>
</tr>
<tr>
<td>Equal weighted Sample</td>
<td>11.78%</td>
</tr>
<tr>
<td>Value-weighted Sample</td>
<td>-15.70%</td>
</tr>
</tbody>
</table>
Table 4
Buy and Hold Abnormal Returns

The sample is 71 firms appearing on the Fortune list of “50 best companies for minorities.” Buy-and-hold returns are compared to two benchmarks. Panel A displays the results of testing in which the CRSP value-weighted index is used as the benchmark. Panel B compares sample returns to 50 size-B/M benchmarks. Size deciles are formed using NYSE breakpoints. Firms appearing in the CRSP/Compustat intersection are added to the appropriate portfolios. Size quintiles are subsequently divided into B/M quintiles. Abnormal returns are the difference between sample firm returns over each time period and the corresponding benchmark.

<table>
<thead>
<tr>
<th>Time-period</th>
<th>Equal-weighted</th>
<th>Median</th>
<th>t-stat</th>
<th>prob</th>
<th>Value-weighted</th>
<th>t-stat</th>
<th>Prob</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-month</td>
<td>1.70%</td>
<td>1.73%</td>
<td>0.69</td>
<td>0.49</td>
<td>4.40%</td>
<td>1.86</td>
<td>0.07</td>
</tr>
<tr>
<td>6-month</td>
<td>2.64%</td>
<td>2.02%</td>
<td>0.66</td>
<td>0.51</td>
<td>3.34%</td>
<td>0.95</td>
<td>0.35</td>
</tr>
<tr>
<td>1-year</td>
<td>8.34%</td>
<td>-3.81%</td>
<td>1.44</td>
<td>0.16</td>
<td>10.63%</td>
<td>1.71</td>
<td>0.09</td>
</tr>
<tr>
<td>2-year</td>
<td>17.63%</td>
<td>-4.59%</td>
<td>1.11</td>
<td>0.27</td>
<td>12.49%</td>
<td>0.81</td>
<td>0.42</td>
</tr>
<tr>
<td>3-year</td>
<td>8.95%</td>
<td>-5.41%</td>
<td>1.09</td>
<td>0.28</td>
<td>-3.00%</td>
<td>-0.38</td>
<td>0.07</td>
</tr>
<tr>
<td>4-year</td>
<td>15.52%</td>
<td>6.67%</td>
<td>1.60</td>
<td>0.12</td>
<td>-2.83%</td>
<td>-0.27</td>
<td>0.79</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Time-period</th>
<th>Equal-weighted</th>
<th>Median</th>
<th>t-stat</th>
<th>prob</th>
<th>Value-weighted</th>
<th>t-stat</th>
<th>Prob</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-month</td>
<td>-0.74%</td>
<td>0.25%</td>
<td>0.31</td>
<td>0.75</td>
<td>3.61%</td>
<td>1.35</td>
<td>0.18</td>
</tr>
<tr>
<td>6-month</td>
<td>-0.66%</td>
<td>0.13%</td>
<td>-0.19</td>
<td>0.85</td>
<td>-1.24%</td>
<td>-0.36</td>
<td>0.72</td>
</tr>
<tr>
<td>1-year</td>
<td>1.33%</td>
<td>-4.32%</td>
<td>0.25</td>
<td>0.80</td>
<td>4.17%</td>
<td>0.66</td>
<td>0.51</td>
</tr>
<tr>
<td>2-year</td>
<td>7.13%</td>
<td>-16.49%</td>
<td>0.45</td>
<td>0.65</td>
<td>-1.67%</td>
<td>-0.01</td>
<td>0.99</td>
</tr>
<tr>
<td>3-year</td>
<td>-20.32%</td>
<td>-22.47%</td>
<td>-2.33</td>
<td>0.02</td>
<td>-30.52%</td>
<td>-2.88</td>
<td>0.01</td>
</tr>
<tr>
<td>4-year</td>
<td>-18.49%</td>
<td>-18.71%</td>
<td>-1.91</td>
<td>0.06</td>
<td>-30.37%</td>
<td>-2.36</td>
<td>0.00</td>
</tr>
</tbody>
</table>
This table shows Cumulative Abnormal Returns (CARs) of 71 sample firms compared to two benchmarks. The benchmarks are as described in Table 4. Abnormal returns are the difference between the monthly return on sample firms and that of the appropriate benchmark. CARs are the sum of monthly abnormal returns.

<table>
<thead>
<tr>
<th>Time-period</th>
<th>Equal-weighted</th>
<th>Median</th>
<th>t-stat</th>
<th>prob</th>
<th>Value-weighted</th>
<th>t-stat</th>
<th>Prob</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-month</td>
<td>0.77%</td>
<td>2.31%</td>
<td>0.28</td>
<td>0.78</td>
<td>4.72%</td>
<td>1.90</td>
<td>0.06</td>
</tr>
<tr>
<td>6-month</td>
<td>1.12%</td>
<td>3.49%</td>
<td>0.29</td>
<td>0.77</td>
<td>3.66%</td>
<td>1.01</td>
<td>0.32</td>
</tr>
<tr>
<td>1-year</td>
<td>8.09%</td>
<td>0.83%</td>
<td>1.81</td>
<td>0.08</td>
<td>10.69%</td>
<td>2.09</td>
<td>0.04</td>
</tr>
<tr>
<td>2-year</td>
<td>8.36%</td>
<td>4.65%</td>
<td>1.04</td>
<td>0.30</td>
<td>8.05%</td>
<td>0.90</td>
<td>0.37</td>
</tr>
<tr>
<td>3-year</td>
<td>14.33%</td>
<td>17.17%</td>
<td>1.74</td>
<td>0.08</td>
<td>4.99%</td>
<td>0.49</td>
<td>0.62</td>
</tr>
<tr>
<td>4-year</td>
<td>18.37%</td>
<td>25.83%</td>
<td>1.44</td>
<td>0.16</td>
<td>-9.64%</td>
<td>-0.05</td>
<td>0.96</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Time-period</th>
<th>Equal-weighted</th>
<th>Median</th>
<th>t-stat</th>
<th>prob</th>
<th>Value-weighted</th>
<th>t-stat</th>
<th>Prob</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-month</td>
<td>-1.01%</td>
<td>-3.18%</td>
<td>-0.29</td>
<td>0.77</td>
<td>3.49%</td>
<td>0.81</td>
<td>0.42</td>
</tr>
<tr>
<td>6-month</td>
<td>-1.44%</td>
<td>2.17%</td>
<td>-0.31</td>
<td>0.76</td>
<td>2.99%</td>
<td>0.51</td>
<td>0.61</td>
</tr>
<tr>
<td>1-year</td>
<td>-0.77%</td>
<td>-1.39%</td>
<td>-0.01</td>
<td>0.99</td>
<td>2.01%</td>
<td>0.25</td>
<td>0.80</td>
</tr>
<tr>
<td>2-year</td>
<td>0.02%</td>
<td>4.64%</td>
<td>0.15</td>
<td>0.89</td>
<td>-3.24%</td>
<td>-0.21</td>
<td>0.81</td>
</tr>
<tr>
<td>3-year</td>
<td>0.49%</td>
<td>8.89%</td>
<td>0.04</td>
<td>0.97</td>
<td>-21.45%</td>
<td>-1.39</td>
<td>0.17</td>
</tr>
<tr>
<td>4-year</td>
<td>-1.94%</td>
<td>11.63%</td>
<td>-0.10</td>
<td>0.92</td>
<td>-41.96%</td>
<td>-1.48</td>
<td>0.15</td>
</tr>
</tbody>
</table>
Table 6
Carhart 4-Factor Regression on Diverse Company Portfolio

The monthly returns on a portfolio of 71 diverse firms are regressed against four factors developed by Fama and French (1993) and Carhart (1997). The time period used is July 1998-December 2002. The regression equation is as follows:

$$R_{pt} = \alpha_p + \beta_p RMRF_t + s_p SMB_t + h_p HML_t + m_p MOM_t + e_{pt}$$

Here, $R_{pt}$ is the excess monthly return on the portfolio of sample firms. Firms are added to the portfolio on July 1 of the year in which they initially appear on Fortune’s list of diverse firms. Monthly excess returns are calculated by subtracting the return on a 30-day treasury bill from the portfolio return. $RMRF_t$ is the return on the CRSP value-weighted index less that on a 30-day treasury bill. SMB is the difference in returns between portfolios of small stocks and big stocks. HML is the difference in returns between portfolios of high B/M firms and low B/M returns. MOM is the difference in returns between portfolios of firms with high stock returns over the prior 12 month period and those with low returns.

<table>
<thead>
<tr>
<th></th>
<th>Equal-weighted</th>
<th>Value-weighted</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coefficient</td>
<td>t-stat</td>
</tr>
<tr>
<td>alpha</td>
<td>0.0044</td>
<td>1.54</td>
</tr>
<tr>
<td>RM-RF</td>
<td>0.93</td>
<td>14.24</td>
</tr>
<tr>
<td>SMB</td>
<td>-0.14</td>
<td>-2.23</td>
</tr>
<tr>
<td>HML</td>
<td>0.38</td>
<td>4.61</td>
</tr>
<tr>
<td>MOM</td>
<td>0.05</td>
<td>0.80</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.87</td>
<td></td>
</tr>
</tbody>
</table>
THE EFFECT OF THE KEY PERSON AND MARKET EFFICIENCY: 
THE MARTHA STEWART OMNIMEDIA CASE

Cheryl Frohlich, PhD, University of North Florida
Chris Shoup, University of North Florida
Richard Fretz, University of North Florida

ABSTRACT

The efficient market hypothesis (EMH) is the idea that securities markets are efficient, with the prices of securities reflecting their economic value. Empirical results seem to indicate that the degree of efficiency can be disputed and additional questions can be raised. Are there cases where the market does not behave in an efficient manner allowing the investor the opportunity to earn excess returns? Will the outside behavior of a key person of a company have an effect upon the company of the key person? How does the ethical behavior of a key person affect a company’s stock value? This became the question of interest in the Martha Stewart allegations of insider trading in ImClone Systems.

The outside financial behavior of a company’s CEO is analyzed in order to examine if the CEO’s behavior affects his company’s stock. The affect on Martha Stewart Living Omnimedia (MSLO) stock due to its CEO’s alleged illegal insider trading on another company for the CEO’s personal portfolio is examined.

Using a regression methodology with CAR’s, our results showed there was a statistical significance of abnormal returns surrounding day zero. MSO saw a mix of negative and positive returns throughout the last thirty days. A search was done by using the LexisNexis news search databases to determine if any significant news released on MSO, other than news on the event being studied, was published, appendix I. The search revealed that the news released on those days were related to the Martha Stewart alleged insider dealing. Thus, there were no news released other than those on the event studied to contaminant the results. Therefore, it appears in this case that key management person’s alleged personal financial misbehavior had affected the company’s performance.

INTRODUCTION

One widely held belief among students of finance is the efficient market hypothesis that maintains that a set of information is immediately reflected in the market prices. Until recently, event studies have found that our major markets are at the very least weak-form efficient and at the most semi strong-efficient markets. Basically if the market is truly efficient the investor is unable to earn any abnormal returns from their security selection.

The efficient market hypothesis (EMH) is the idea that securities markets are efficient, with the prices of securities reflecting their economic value. It states that prices quickly and fully reflect the different types of available information. This information is divided into weak, semi strong, and strong-form efficiency. Weak form states that historical prices and volume data should already be reflected in current prices and has no value in predicting future price changes. Semi strong form states the current prices reflect all publicly available information. Strong form states that prices reflect all information, public and private (Finnerty, 1976).

Several studies have reported what appear to be market anomalies (the ability to earn abnormal returns given public information). Some of the earlier works in this area dealt with unexpected earnings announcements (Latane and Jones, 1979), size effect (Reinganum, 1981 and 1983; Arbel and Strebel, 1983; Carleton and Lakanishok, 1986), January effect (Rogalski and Tinic, 1986; Keim, 1987), and P/E
effect (Dowen and Bauman, 1986; Peavy III and Goodman, 1983). More current work on market efficiency has ranged from the impact of analysts’ recommendations (Palmon, Sun, and Tang 1994; Peterson, 1995) to impact of the federal budget deficit upon returns (Darrat and Brocato 1994). The aforementioned studies support a widely held belief that the market is highly efficient in adjusting stock share prices to new information.

Some event studies have incorporated political/social responsibility issues in evaluating their effect upon a company’s stock value. For example, the stock market impact of environmental disasters such as the Three Mile Island nuclear accident (Bowen, Castanias and Daley 1983), Chernobyl nuclear accident (Pruitt, Tawarangkoon, and Wei, 1987), and Exxon Valdez accident and oil spill (Mansur and Phillips, 1991) have been studied.

Also, studies on the overall effect new or changes in regulations/laws and the lobbying efforts of political action groups on the market have been introduced to the finance literature. Cornett and Tehranian (1990) study on the passage of the Garn-St. Germain Depository Institutions Act of 1982 affect upon returns of large savings and loans and commercial banks revealed positive abnormal returns. Dann and James (1982) found negative cumulative abnormal returns as long as 15 days after the event when they investigated the removal of deposit interest rate regulations upon stock-owned savings and loans. Swary (1986) investigated the market’s response to the financial distress of Continental Illinois National Bank in 1984. He found significant negative abnormal returns.

Empirical results seem to indicate that the degree of efficiency can be disputed and additional questions can be raised. Are there cases where the market does not behave in an efficient manner allowing the investor the opportunity to earn excess returns? Will the outside behavior of a key person of a company have an effect upon the company of the key person? This became the question of interest in the Martha Stewart allegations of insider trading in ImClone Systems.

THE EVENT

On June 6, 2002 news broke that Martha Stewart Living Omnimedia’s (MSLO) Chief Executive, Martha Stewart, might have sold securities on insider information. Martha Stewart, a close friend of Samuel D. Waksal the former chief executive of ImClone Systems, sold all her shares of the biotechnology company a day before Imclone announced an unfavorable ruling by the Food and Drug Administration. Samuel D. Waksal resigned two weeks before the news about Martha broke, under allegations that he tipped off friends and family members to sell Imclone shares before the F.D.A. ruling was made public. Erbitux, a promising drug in the fight against cancer, was used to reduce the size of tumors in case studies, but it was denied an application of approval by the F.D.A. The news on the drug broke to the public on December 28, 2001. Martha Stewart sold her 3,928 shares at $58 dollars each on December 27, 2001. Weeks later she would reveal that she verbally told her Merrill Lynch broker to sell the stocks if it dropped below $60.

The outside personal financial behavior of a company’s CEO is analyzed in order to examine if this behavior affects the companies stock value. The affect on MSLO’s stock due to its CEO’s alleged illegal insider trading on another company for the CEO’s personal portfolio is examined. The hypothesis is that the market did not act efficiently around the announcement date of June 6, 2002 relative to the MSLO stock price and that abnormal returns were possible.

The literature has little on the personal financial behavior of CEOs or personal illegal financial accusations and the affect upon the CEOs company’s stock price. However, articles on insider information are abundant. It has been speculated that some insider trading is done to manipulate public information and asset
pricing (Benabon & Laroque, 1992). Other scholars view insider trading as a tool that could be used to better reflect the true value of a company (Leland, 1992).

The Martha Stewart event is unique since the insider accusations are not associated with the trading of the CEO’s company’s stock but pertains to the CEO’s trading on another company’s stock in her personal portfolio. The event may be thought of an ethical issue regarding the CEO that may result in investor’s loss of confidence in their CEO and affecting the CEO’s company’s stock value.

**DATA AND METHODOLOGY**

Since news broke on June 6, 2002 that Living Omnimedia’s (MSLO) Chief Executive, Martha Stewart, might have sold securities on insider information, the announcement date was June 6, 2001. The event period included 60 days surrounding the event date of June 6, 2001 (30 days before and after the date). The pre-event period included 150 trading days’ returns prior to starting of the event period on April 24, 2002.

Daily returns for Martha Stewart Living OmniMedia (MSO), the Dow Jones, NASDAQ, and S&P 500 during the pre-event period (September 18, 2001 through April 23, 2002):

\[ R_t = \frac{P_t - P_{t-1} + D_t}{P_{t-1}} \]

Where:

\( P_t \) is the price of the company or portfolio on day \( t \) and \( D_t \) is the cash dividend paid out (if any) on day \( t \).

Three regressions were run with MSO as the dependent variable and the market index (Dow Jones Industrial Average, S&P 500, and NASDAQ (See Appendix IV)) as the independent variable. The regressions gave us an alpha and beta for all three of the market indices. The regression with the highest adjusted R-squared was chosen as the proper market index (NASDAQ).

The alpha and beta from the NASDAQ regression on the pre-event period was used to determine the expected return during the event period (April 24, 2002 through July 2, 2002) as follows:

\[ E(R_t) = a + \beta R_{mt} \]

where:

\( a \) and \( \beta \) are ordinary least squares coefficients for MSO estimated over the 150 trading-day interval from \( t = -180 \) to \( -30 \) relative to the event date of \( t=0 \), and \( R_{mt} \) is the return on the S&P 500 index with dividends at time

The prediction errors, \( PE_t \), for MSO was calculated for a 60 trading day period surrounding the event using the following equation:

\[ PE_t = R_t - (a + \beta R_{mt}) \]

where:

\( a \) and \( \beta \) are ordinary least squares coefficients for MSO estimated over the 150 trading-day interval from \( t = -180 \) to \( -30 \) relative to the event date of \( t=0 \), \( R_t \) is the observed return for each company or portfolio at time \( t \), and \( R_{mt} \) is the return on the S&P 500 index with dividends at time \( t \).

The T statistic for each event period day was calculated as follows:

\[ T = \frac{PE_t}{s} \]

where:

\( PE_t \) is the prediction error for MSO on day \( t \), and \( s \) is the standard deviation of MSO’s returns during the pre-event period.

The calculated T-statistic for a 95% significance using 149 degrees of freedom for each event day was tested. Any calculated T greater than 1.9799 indicates that there was a statistical difference with a 95% probability between the actual and expected return for MSO. The tests are showed in Appendix II.

**RESULTS**

Our results showed there was a statistical significance of abnormal returns surrounding day zero. As seen in Appendix
II and III, there were significant abnormalities in the company’s returns at the 5% confidence level on June 7-12, 19, 24-26, and July 23. MSO saw a mix of negative and positive returns throughout the last thirty days.

A search was done by using the LexisNexis news search databases to determine if any significant news released on MSO, other than news on the event being studied, was published, Appendix I. The search revealed that the news released on those days were related to the Martha Stewart alleged insider dealing. Thus, there were no news released other than those on the event studied to contaminant the results.

In addition, since all of the returns are normal before the announcement date, there appears to have been no leakage of information before the announcement date. Therefore, it appears, in this case, that key management person’s alleged personal financial misbehavior had affected the company’s performance.

CONCLUSION

This study looked at how a company’s stock was affected by allegations that its CEO (key management) partook in illegal actions with another company, and the affects on the CEO’S company’s stock prices. Key management insurance is one of the hedging techniques that firms use to reduce risk of loss in case any significant events involving a key person such as death or absence occurs; however, the management insurance policy has never covered the key person’s personal financial behavior. Our results reveal that, at least, this firm’s financial performance was affected by the company’s key person’s personal financial behavior.

The efficient market theory may not always hold true in situations when its CEO is tarnishing a company’s name. The personal financial behavior of a key person did affect this company’s stock for an extended period beyond the announcement of the behavior (June 6). This result leads to the following conclusion.

Companies that are dependent upon a few key persons will need not only to explore the normal key person insurance, but may need to include in the policy coverage any illegal or unethical personal financial behavior of the key management. Further, empirical studies into this area seem to be indicated.

REFERENCES


Darrat, Ali F. and Joe Brocato, "Stock Market Efficiency and the Federal Budget


## APPENDIX I

### NEWS ON DAYS OF ABNORMAL RETURNS

**June 7, 2002.** The New York Times, Late Edition - Final, Section C; Page 4; Column 5; Business/Financial Desk, 835 words, Martha Stewart Said to Sell Shares Before F.D.A. Ruling, By ANDREW POLLACK

**June 13, 2002.** National Post (f/k/a The Financial Post), National Edition, Financial Post; Pg. FP1, 732 words, Martha Stewart denies role in ImClone scandal: Long-time friend arrested, Peter Morton, WASHINGTON

**June 19, 2002.** Globe, Third Edition, Pg. C4, 180 words, Material from Bloomberg News was used in this report.; STEWART DENIES INSIDER TRADING; EXPERTS SAY SHE COULD FACE PROBE, Reuters

**June 24, 2002.** The Associated Press State & Local Wire, BC cycle, Business News; State and Regional, 869 words, Investigators look at information contradicting Stewart's statements on stock sale, By MARCY GORDON, AP Business Writer, WASHINGTON

**June 25, 2002.** The Associated Press State & Local Wire, BC cycle, Business News; State and Regional, 870 words, Investigators look at information contradicting Stewart's statements on stock sale, By MARCY GORDON, AP Business Writer, WASHINGTON

**July 2, 2002.** AFX European Focus, COMPANY NEWS, 407 words, Martha Stewart faces probe into possible obstruction, false statements- report, LONDON

**July 3, 2002.** The New York Times, Late Edition - Final, Section C; Page 1; Column 2; Business/Financial Desk, 1081 words, THE MEDIA BUSINESS: ADVERTISING; Stewart Broker Handled Shares For Her Friends, By CONSTANCE L. HAYS and PATRICK McGEEHAN
## Appendix II

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Appendix III

Percent Change During Sample Period

Dates

% Change

NASDAQ
S&P 500
### Appendix IV

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Alpha: 0.002  
Beta: 1.269
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Alpha | 0.002  
Beta | 0.798
### SUMMARY

### OUTPUT

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**Coefficients**

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<th>Upper 95%</th>
<th>Lower 95.0%</th>
<th>Upper 95.0%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>0.003</td>
<td>0.480</td>
<td>0.631</td>
<td>-0.004</td>
<td>0.007</td>
<td>-0.004</td>
<td>0.007</td>
</tr>
<tr>
<td>DOW</td>
<td>0.233</td>
<td>4.923</td>
<td>0.06</td>
<td>0.687</td>
<td>1.609</td>
<td>0.687</td>
<td>1.609</td>
</tr>
</tbody>
</table>

**Alpha**

- 0.001

**Beta**

- 1.148
AN INDIVIDUAL’S CHOICE AND SUCCESS IN THEIR PROFESSION MAY BE EFFECTED BY THE INDIVIDUAL’S DOMINANT BRAIN HEMISPHERE AND THEIR LEARNING STYLE: AN EMPIRICAL INVESTIGATION

Cheryl J. Frohlich, University of North Florida

ABSTRACT

The manner in which an individual processes information may lead one to naturally excel in certain disciplines. While the left-brain hemisphere thought processes are dominant in verbal and analytical ability, the right brain thought processes are rapid, complex, whole-pattern, spatial, and specialized for visual imagery and musical ability. The right-brain thought processes include the tendency to synthesize rather than analyze, and to relate to things in a concrete rather than a symbolic fashion. Left-brain thinking tends to represent wholes by abstraction. Research on both center-brain and the more common left or right brain subjects since the 1960s has confirmed that both hemispheres of the brain use high-level cognitive modes. (Gale Encyclopedia of Psychology, 2nd ed. Gale Group, 2001 in association with The Gale Group and LookSmart. http://www.findarticles.com/cf_dls/g2699/0002/2699000296/print.html)

This study examined what the incoming and outgoing undergraduate business students sorted by majors exhibited as their dominate hemispheric process and if a particular type of sensory learning style was dominant among particular business majors.

INTRODUCTION

CHANGE AND LEARNING STYLES

Students who are willing and able to learn come in all shapes, sizes, and maturity and age levels. It should, therefore, be no surprise that students have different learning styles and that those learning styles determine how students will conceptualize and process information.

During the 1950’s and early 1960’s educators still expected all students to sit, listen, take notes and recount (spit back) information through standardized, multiple guess or weekly tests. The dropout rate of students during this period increased due in part to this single dimension of teaching style that lacked differentiation in presentation, methodology and relevance for the student’s learning styles. Even with an increasing dropout rate, this dimension in the style of teaching was acceptable and not questioned because there were jobs in manufacturing for students who dropped out of school.

By the mid 1960’s with more cultural and ethnic diversity in schools (Civil Rights Act of 1964), increased needs for a specialized skilled workforce, and a new sensitivity to Carl Jung’s early theory of psychological types, educators began a national dialogue on how the student learns and appropriate teaching styles to facilitate learning. Schools of education began to focus on the triple educational concerns of (1) the quality of learning, (2) changes in education standards and practices and (3) outcome based education assessment and evaluation.

Recognizing the high dropout rate and, finally, acknowledging that different students processed information in different manners, educators earnestly began the dialogue concerning how students learned. Research
conducted in the 1950s and 1960s established that the two hemispheres of a normally functioning brain operated in a complementary fashion with both hemispheres involved in higher cognitive functioning. The primary difference between them was found to involve the mode rather than the level of thinking as originally thought (Gale Encyclopedia of Psychology, 2nd ed. Gale Group, 2001. in association with The Gale Group and LookSmart.).

Some students process information and gain knowledge as visual learners, others as auditory learners, while many students today (2003) must have hands-on, tactile and kinesthetic processing to learn concepts. During the 1960s, research found that the two hemispheres of the brain were engaged in a complementary fashion in different modes of thinking, both highly complex (Left and Right Sides of the Brain, 1996). In addition, whether the right or left hemisphere of an individual’s brain was dominant influenced an individual’s creativity and analytical ability.

“Biologists figured out years ago, that the left hemisphere of the brain is the seat of most logical thought, and the right half of the brain is where most creativity occurs. In most people, the two halves of the brain have difficulty passing information back and forth. Scientists discovered this by studying head-trauma patients. In most people, the left half of the brain is jealously dominant. This, also, has been shown by studying head-trauma patients (Mitchell, 1997).”

In general, the brain’s dominant hemisphere is responsible for an individual’s mode of thinking. Table I lists the mode of thinking associated with the dominant brain hemisphere.

<table>
<thead>
<tr>
<th>LEFT BRAIN</th>
<th>RIGHT BRAIN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Logical</td>
<td>Random</td>
</tr>
<tr>
<td>Sequential</td>
<td>Intuitive</td>
</tr>
<tr>
<td>Rational</td>
<td>Holistic</td>
</tr>
<tr>
<td>Analyzes</td>
<td>Synthesizes</td>
</tr>
<tr>
<td>Objective</td>
<td>Subjective</td>
</tr>
<tr>
<td>Parts</td>
<td>Wholes</td>
</tr>
</tbody>
</table>

Source: RIGHT/LEFT BRAIN THINKING (http://www.eiu.edu/~edtech/teamTeach_Ex/rightbra.htm)

“Further evidence accumulated showed that the mode of the left hemisphere is verbal and analytic, while that of the right is nonverbal and global. New evidence found by Jerre Levy in her doctoral studies showed that the mode of processing used by the right brain is rapid, complex, whole-pattern, spatial, and perceptual – processing that is not only different from but comparable in complexity to the left brain's verbal, analytic mode. It was also found that the two modes of processing interfere with each other, preventing maximal performance (Left and Right Sides of the Brain, 1996).”

The Hermann Brain Dominance Indicator Model classified students in terms of relative preferences for thinking in four different modes based on the task-specialized functioning of the brain. The model (Felder, 1996) classified students as the following:
left brain-cerebral thinker:
   being logical, analytical, quantitative, factual and critical
left brain-limbic thinker:
   tendencies to be sequential, organized, planned, detailed, and structured
right brain-limbic thinker:
   considered emotional, interpersonal, sensory, kinesthetic, and symbolic
right brain-cerebral thinker:
   characterized as visual, holistic, and innovative

Although, most individuals have a distinct preference for one of these styles of thinking; some individuals are more "centered brained" and are equally adept at both modes. Since the left brain subjects focus on verbal, logical-analytical thinking, detail and accuracy one would expect that most business students would exhibit a left brain preference. But, business disciplines range from the marketing discipline that synthesizes information for the company’s more global views to the very structured-detail oriented accounting curriculum; as a result, one might expect a difference in the success of students in the various business disciplines to be somewhat associated with the strength of their dominant hemisphere.

METHODOLOGY

Brain Works: A Self Assessment Test by Synergistic Learning Incorporated determines an individual’s right/left brain dominance and their visual/auditory learning styles. This test was rendered to incoming business students (Junior level) and graduating business students. The incoming business students’ (Junior level) right/left brain dominance and their choice of majors was compared to graduating business students’ right/left brain dominance and the major in which they graduate to see if the sensory learning style was more dominate in a particular business major. The results of these tests may lend insight in helping individuals choose a major and subsequent profession in which they will be more likely to succeed. The student sample consisted of 127 students. Of the 127 students, 69 were Juniors and the remaining 58 were outgoing Seniors.

RESULTS

From the following tables, it can be seen that the incoming Accounting Majors is predominantly left brained but a significant percentage is also centered brained. However, the outgoing Seniors that are Accounting Majors are significantly more left brained with a very small percentage being balanced or right brained.

Of the incoming Finance Majors, the left brained is the predominate hemisphere but with a significant percentage of centered brained and small percentage of right brained hemispheric dominance. The outgoing Finance Seniors exhibited a significant increase in the right brained dominance while maintaining the predominant left brain dominance with a lesser significant center brain dominance.

Incoming Management Juniors although predominately left brained exhibited a significant lesser dominance than either the Accounting or Finance Majors. In addition, the outgoing Senior Management Majors did not differ significantly from the incoming Juniors.

The incoming Marketing Majors were predominately right or centered brained.
However, the outgoing Marketing Majors were predominately left or centered brained.

<table>
<thead>
<tr>
<th>Junior Hemispheric Tendencies (%)</th>
<th>Balanced</th>
<th>Left</th>
<th>Strong</th>
<th>Right</th>
<th>Strong</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incoming Major</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACC</td>
<td>33.3</td>
<td>66.7</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>FIN</td>
<td>31.3</td>
<td>62.5</td>
<td>0</td>
<td>6.3</td>
<td>0</td>
</tr>
<tr>
<td>MAN</td>
<td>20.7</td>
<td>58.6</td>
<td>3.5</td>
<td>17.2</td>
<td>0</td>
</tr>
<tr>
<td>MAR</td>
<td>50</td>
<td>16.7</td>
<td>0</td>
<td>33.3</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Outgoing Major</th>
<th>Balanced</th>
<th>Left</th>
<th>Strong</th>
<th>Right</th>
<th>Strong</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACC</td>
<td>6.7</td>
<td>80</td>
<td>6.7</td>
<td>6.7</td>
<td>0</td>
</tr>
<tr>
<td>FIN</td>
<td>16.7</td>
<td>50</td>
<td>0</td>
<td>33.3</td>
<td>0</td>
</tr>
<tr>
<td>MAN</td>
<td>31.3</td>
<td>50</td>
<td>6.3</td>
<td>12.5</td>
<td>0</td>
</tr>
</tbody>
</table>

Of those outgoing Seniors that had changed majors to Finance more left hemisphere dominance occurred with a decrease in the percentage of Finance majors centered brain dominance and the addition of some right brained dominance. The outgoing Seniors that had changed majors to Management exhibited no strong left brain dominance and an increase in the percentage of balanced brain dominance.

<table>
<thead>
<tr>
<th>Hemispheric Tendencies (%)</th>
<th>Changed Major</th>
<th>Balanced</th>
<th>Left</th>
<th>Strong</th>
<th>Right</th>
<th>Strong</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incoming Major</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACC</td>
<td>20</td>
<td>80</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>FIN</td>
<td>50</td>
<td>50</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>MAN</td>
<td>20</td>
<td>60</td>
<td>20</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Changed Major</th>
<th>Balanced</th>
<th>Left</th>
<th>Strong</th>
<th>Right</th>
<th>Strong</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outgoing Major</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FIN</td>
<td>20</td>
<td>60</td>
<td>0</td>
<td>20</td>
<td>0</td>
</tr>
<tr>
<td>MAN</td>
<td>33.3</td>
<td>66.7</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>MAR</td>
<td>50</td>
<td>50</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

There appears a greater divergence between incoming Juniors and outgoing Seniors Sensory Learning styles than in their divergence in hemispheric brain dominance. The following table lists the Sensory learning styles of the incoming Junior and the outgoing Seniors. Outgoing Senior Accounting majors exhibited more balanced and auditory learning styles with less dominance on visual learning than the incoming majors. Outgoing Senior Finance majors exhibited much more auditory learning than the income Juniors. Both incoming and outgoing Management Majors exhibited basically similar learning styles. The outgoing Marketing majors exhibited a slight increase in a balanced learning style than the incoming Juniors.
### CONCLUSIONS

Although the dominance of the left hemisphere of the brain is the norm for any business major, there is significant variation by majors as to the degree of dominance. This would indicate that the choice of a major may be aided by testing a student’s dominant hemispheric thought process. The divergence between major and the dominant sensory learning process was more pronounced. Accounting majors tended to be much more visual while Finance majors were either visual or auditory with little balance. Management majors tended to be more balanced in that they used both visual and auditory sensory styles. The marketing major was more visual, but with a significant amount of them using both sensory styles.

These outcomes may be used to help the incoming student choose a major in which they will be more successful and happy. Of course further studies must be completed before one can actually ascertain these traits with a definite assurance. In addition, the testing of those successful in the business world in the various disciplines will lend further information about whether certain brain hemispheric dominance and sensory learning styles are more useful in certain fields.

### REFERENCES


http://www.findarticles.com/cf_dls/g2699/0002/2699000296/print.jhtml


Synergistic Learning Incorporated. *Brain Works: A Self Assessment Test*
AN EMPIRICAL INVESTIGATION OF GOODWILL ATTRIBUTES AND SUBSEQUENT IMPAIRMENT IN THE FRAME OF FASB STATEMENTS NO. 141 AND 142

Samir M. El-Gazzar, Rudy Jacob, Pace University
Afaf A. Shalaby, New Jersey City University

ABSTRACT

This paper has a two-fold objective. First, we analyze the attributes of goodwill of the target company prior to the merger. We examine a set of hypotheses contributing to the realized goodwill, i.e., the premium paid to the acquired firm. Second, we test the validity of a set of clues (present at time of acquisition) as indicators of potential goodwill impairment subsequent to the merger. In the exposure drafts that preceded statements of financial accounting standards Nos. 141 and 142, the FASB introduced the following factors as indicators of potential impairment of goodwill subsequent to the acquisition: a) a significant premium was paid over the market capitalization of the acquired firm prior to the start of the acquisition discussion; b) the acquisition involved a clearly visible auction or bidding process; c) the amount of goodwill was significant relative to the cost of the acquired enterprise; and d) the purchase consideration was primary in the form of acquiring enterprise’s shares. The findings of this research have implications for accounting policy makers (FASB), company managements, financial analysts, and for the accounting firms planning to audit business combinations after mergers.

We use a sample of mergers and acquisitions that were completed in the period of 1995 to 1998. We also use the Tobin’s Q metric to estimate impairments in goodwill. Our first phase results show the presence of a significant association between goodwill (premium paid to acquired firm) and target firm’s attributes such as research and development spending, advertising, brand names, and recorded intangibles (such as trade marks and rights). The results from the second phase confirm some of the hypotheses. For instance, results show significant relationship between goodwill impairment and the form of payment as well as the amount of goodwill relative to the purchase price. If acquirer’s shares are used as all or part of the consideration for the acquisition, the likelihood of goodwill impairment tends to increase. Similarly, if goodwill is large relative to the price paid for the acquisition, the likelihood of goodwill impairment tends to increase. The results do not support the expected effect of the excess premium paid over market capitalization of acquired firm or the effect of the visible bidding process. One reason may be the shortage of hard information regarding “market capitalization” or “bidding wars” when the target firms are not stand-alone entities.

The results lead to the inference that goodwill resulting from costly and competitive mergers may not be fully recoverable in the future. Therefore, acquiring firms should exercise prudent accounting through continuous examination of goodwill recoverability and write down of the impairment to enhance reliability of reported information. Similarly, auditors should devote attention to the valuation of goodwill for clients, especially for those resulting from seemingly costly business combinations.
Should More Local Governments Purchase a Bond Rating?

Arthur Allen, University of Nebraska-Lincoln
and
George Sanders, Western Washington University

1. Introduction

Local government bond issuers wish to minimize the interest cost of their new issues. Purchasers of these bonds demand a yield premium as default risk increases. Many investors lack the expertise to accurately assess default risk while other investors prefer to avoid the cost of assessing default risk for each security purchased. Bond ratings are widely believed to provide information to market participants regarding an issue’s default risk. In the pursuit of lower yields, most municipal bond issuers contract to have their bond issues rated, and in the case of almost half of local government bond issues, to acquire bond insurance. The rating agencies charge a fee to the issuer to rate bonds; however, an issuer will only purchase a bond rating if the interest savings is believed to be greater than the cost of the rating. Therefore, although most issuers choose to purchase a bond rating, many issuers choose to forgo the rating. This study examines whether more issuers should purchase a bond rating.

Prior studies have examined the importance of bond ratings. The major limitation of these studies is that researchers were unable to determine, for unrated issues, what the rating would have been if a rating had been purchased. Issuers who know that their rating is likely to be low are expected to be more likely to forgo purchasing a rating. Prior studies found that unrated bonds sell for higher yields than most rated bonds. However, because we do not know what a rating would have been if it had been purchased, the results of prior studies are difficult to interpret. Higher yields may reflect a lack of information and, hence, uncertainty, or a true state of nature.

This study uses estimator ratings provided by Moody’s Investor Service to proxy for what the rating would have been if that issue had been rated. These estimator ratings were based on the same information used in actual ratings with the exception that the bond rater did not speak with issuer representatives. The bond raters did not know that these estimator ratings were part of a study rather than part of the normal ratings business of Moody’s. We are better able to determine whether the higher yields associated with unrated bonds is caused by the lack of information or by higher default risk of these bonds.

The results show that bond issuers who forgo a rating tend to have more default risk than issuers that purchase a rating. The yields of bonds with an estimated A rating are significantly less than the yields of
bonds with an estimated Baa or Ba rating. This result shows that bond purchasers are able to make some independent assessment of default risk and are not completely reliant on the bond raters. In addition, bond yields are no lower when the bond actually receives an A (Baa) rating than when it is unrated with an estimated A (Baa) rating. This result suggests that bond issuers are, on average, making rational decisions to purchase or not purchase a bond rating. We also examine the determinants of the decision to purchase a bond rating.

This paper proceeds as follows. Section two reviews the prior literature. Section three summarizes the research on the decision to obtain a rating. Section four presents the methodology to be used. The results are presented in section five, and section six provides the conclusions.

2. The Importance of a Bond Rating.

The bond rating agencies are periodically criticized for their perceived bias or lack of accuracy. For example, a Beckett and Sender (2002) article quoted Boaz Wienstein, head of credit derivatives trading at Deutsche Bank Securities in New York as saying “The [rating agencies] models have performed extremely poorly...They have underestimated both the frequency of default and the severity of defaults.” The agencies were widely criticized for not downgrading Enron’s rating sooner.1

Some argue that the ratings agencies enjoy a lack of competition for their services (Partnoy 1999; White 2002). For example, one critic argues that “as an oligarchy, they exist in a comfortable environment. The regulations guarantee an artificial demand for their services. They have more incentive to cut costs than to do a good job.” (John Macy quoted by Sender (2003)).2 Other critics argue that the agencies are not independent because they depend on fees paid by issuers and do not wish to anger them (Sender 2003).

Despite the criticism, it is clear that there continues to be strong demand for the rating agencies’ product. As one observer put it “…few investors have any other way of judging the risk of buying one borrower’s bonds versus another's” (Sender 2003). Investor surveys show that almost all investors put some reliance on bond ratings (e.g., Ellis 1998; Baker and Mansi 2002). There is a large body of academic research investigating the effect of bond ratings on stock prices and bond yields. Some of that research has explicitly attempted to answer the question of whether bond ratings have an independent effect on prices (e.g., Ederington, Yawitz and Roberts 1987; Liu & Moore 1987). Bond rating changes or reviews have been found to affect common stock prices (e.g., Barron, Clare and Thomas 1997). Partnoy (1999) argues that regulations from the SEC and others based on credit ratings have “... encouraged the rating agencies to shift from the business of providing valuable credit information to the far more lucrative business of selling regulatory licenses.” Partnoy also argues that these regulatory licenses have created “incentives for the agencies to provide inaccurate ratings.”

1 The rating agencies argue that if the auditors could not find the financial manipulation, then the rating agencies could not be expected to find them because auditors have far greater access to information and are paid far more to do this job (O’Neill 2003).

2 Partnoy (1999) argues that regulations from the SEC and others based on credit ratings have “… encouraged the rating agencies to shift from the business of providing valuable credit information to the far more lucrative business of selling regulatory licenses.” Partnoy also argues that these regulatory licenses have created “incentives for the agencies to provide inaccurate ratings.”
1997; Clark, Foster and Ghani 1997; Goh and Ederington 1999), corporate bond yields (e.g., Followill and Martell 1997; Liu, Seyyad and Smith 1999; Hite and Warga 1997), preferred stock prices (Stickel 1986), analysts’ earnings forecasts (Ederington and Goh 1998; Caton and Goh 2003), and municipal bond yields (e.g., Ingram 1984). Several studies have found that bond ratings have an independent effect on yields apart from other financial information that could be used by investors in both the corporate (e.g., Reiter and Ziebart 1991) and municipal markets (e.g., Liu and Seyyed 1991).\(^3\)

3. The Decision to Purchase a Bond Rating

Numerous papers have investigated the effect of disagreements in ratings between Moody’s and Standard & Poor’s, when an issue has been rated by both agencies, in both the corporate (e.g., Billingsley, et al. 1985; Jewell and Livingston 1998) and municipal markets (e.g., Allen 1996; Johnson and Kriz 2002). The evidence is mixed with several papers finding that yields of split-rated bonds are similar to the yields of bonds with the lower rating (e.g., Liu and Moore 1987) while other papers find that the yields of split-rated bonds are between the yields of bonds with the higher and lower rating (e.g., Cantor, Packer and Cole 1997; Perry, Liu and Evans 1988). Similarly, papers examining the effect of rating changes often find an effect only for ratings downgrades (e.g., Holthausen and Leftwich 1986).

At least two papers have investigated whether issuers should purchase two ratings or only one rating. Hsueh and Kidwell (1988) and Thompson and Vaz (1990) both found evidence that a second identical rating is associated with lower yields than when only one rating is obtained. These authors recommended that issuers should purchase the second rating because the yields were estimated to be lowered more than the cost of the additional rating. However, there would seem to be little advantage to purchasing a second rating if it was likely to be lower than the first, especially given that some prior research has concluded that the lower rating is the more influential.

Prior research has been unable to assess whether a second rating would likely be higher or lower than the first, and therefore, it is difficult to make recommendations about whether the second rating would be beneficial to the issuer. Similarly, prior research has not been able to provide evidence on whether unrated issuers should purchase at least one rating.\(^4\) This paper is able to investigate the importance of a bond rating more directly than prior research because we have access to a sample of estimated ratings provided by Moody’s. Thus, we are able to

\(^3\) For a further discussion of the bond ratings industry, see Cantor and Packer (1995), Sinclair (2003), and White (2002-2003).

\(^4\) Reeve and Herring (1986) examined the yields of unrated municipal bonds and found that they are, on average, similar to the yields of Baa rated bonds. They argue that issuers of unrated bonds are rational in their decision because the cost of obtaining a rating exceeds the benefits. Like prior research, they were unable to examine the most important factor in the decision to obtain a rating, the expected rating.
directly compare the yields of bonds that received a particular rating (e.g., Baa) to the yields of unrated bonds that would have received that rating had the issuer applied for it. In addition, we examine the determinants of the decision to purchase a rating.

## 4. Data and Methods

This study uses a regression model based on earlier work in the analysis of the municipal bond markets (e.g., Kidwell et al., 1987; Roden and Bassler, 1996; Leonard 1999). The dependent variable is the reoffering yield of the new issue. The independent variables represent issuer characteristics, market characteristics, bond ratings and Moody’s estimator ratings.\(^5\) The data on bond issue characteristics was drawn from the Bond Buyer Online over a period beginning January 20, 1999 and ending December 31, 2000. We downloaded sale information for all competitive and negotiated general obligation bond issues. Revenue bonds, certificates of participation, etc. were excluded because reoffering yields can vary widely depending on issue and issuer characteristics that cannot be captured by the available data. Bond ratings were obtained from Moody’s Bond Record. A complete data set was obtained for 2229 issues.

### 4.1 Reoffer Yields

We used the 10 year reoffering yield to measure the interest cost of the issue.\(^6\) We choose 10 years because this was the average maturity of the competitive issues and it was commonly available. Where a 10 year reoffering yield was not available, we used the reoffering yield closest to 10 years. We choose to use reoffering yield instead of TIC (true interest cost) because the reoffering yield most directly measures the behavior of bond buyers. If reoffering yields are unavailable, we use the TIC or NIC for the issue as reported in the bond buyer. There are 1,964 observations where a reoffering yield is available, and 265 observations use TIC or NIC as the dependent variable. The results are substantively the same when the sample is restricted to observations where the reoffering yield is available.

### 4.2 Issue and Market Characteristics:

To control for the level of municipal bond interest rates, we use the Bond Buyer’s index of weekly yields on long-term investment grade bonds. We use the log of maturity (in months) to control for the term structure of interest rates.\(^7\) We

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\(^5\) At least two prior studies used a two-stage regression model to alleviate any self-selection problems caused by the choice to obtain an second bond rating (Hsueh and Kidwell, 1988; Cantor and Packer, 1997). We considered using a similar model for the choice to obtain at least one bond rating. However, we were unable to find variables for this model that were not in the yields equation. See section 5.3 for a model of the decision to obtain a bond rating.

\(^6\) We choose 10 years because this was the average maturity of the competitive issues and it was commonly available. Where a 10 year reoffering yield was not available, we used the reoffering yield closest to 10 years.

\(^7\) Prior studies have used a variety of specifications to control for maturity. The results are substantively unchanged when maturity is defined as the log of maturity in years or when maturity is defined as the number of years to maturity.
include a dummy variable in the regression to control for competitive vs. negotiated issues. Benson (1979) analyzed a sample of municipal issues and found evidence that interest cost varies inversely with the number of bidders for competitive issues. We control for this underwriter competition effect by including the log of the number of bidders listed in the online Bond Buyer for each issue. The number of bidders is set to 1 for negotiated issues. Call provisions reduce the duration of the bond and therefore are expected to increase yields. We include a variable coded 1 for callable bonds and 0 otherwise.

Although we do not include revenue bonds, we do include bonds from counties and school districts as well as municipalities. We include separate dummy variables for counties and school districts with municipalities the excluded group. Refunding bonds are typically associated with less risk than other issues so we include a dummy variable coded 1 for refunding bonds and 0 for other issues. Bonds that are bank qualified are in high demand and therefore are expected to sell for lower yields. We code a dummy variable 1 for bank qualified bonds and 0 for other bonds. The size of the issue proxies for marketability. Because size is not linearly related to yields, we use several dummy variables to measure size.

Roden and Bassler (1996) hypothesized that prestigious underwriters are associated with lower yields. We use the annual Bond Buyer’s Municipal Marketplace ranking of the top 100 underwriters by volume. We use this ranking as a measure of underwriter prestige. Our measure of underwriter prestige is inverse; the higher the prestige, the lower the underwriter rank. Prior research such as Lovely and Wasylenko (1992) and Kidwell, Koch, and Stock (1984, 1987) find that municipal bond yields are lower in states which impose state taxes on out-of-state bonds but not in-state bonds. We control for this with a variable defined as the maximum personal income tax rate for states with differential taxation. This variable is coded zero for states which do not differentiate in-state vs. out-of-state bonds. Roden and Bland (1986) found that issuers with more experience in the market are able to issue bonds at lower yields. We measure experience using the log of the number of prior issues in the ten years prior to the current issue. This data is obtained from the annual publication Moody’s Municipal & Government Manual (1990-2001).

4.3 Bond Ratings

Moody’s bond ratings are gathered from the monthly publication Mergent Bond Record. If

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8 The top 100 underwriters accounted for 213 out of 219 billion dollars of new local government bonds issued during 1999. The few underwriters not in the top 100 were coded 101.

9 Moody’s was kind enough to examine most of the uninsured issues in the sample to verify their rating. They were able to identify a few issues that were insured that were not reported as such in the Bond Buyer. In addition, Moody’s was able to identify a few issues that had higher ratings than the entity’s underlying G.O. rating because that issue benefited
no rating could be found, a search
was made for a Standard & Poor’s
rating in their Municipal Ratings
Handbook. Several ratings variables
are used: Aa, A, Baa, Ba with Aaa
being the excluded group. Each
rating variable is coded 1 if it falls
into that rating category and 0
otherwise. Although insured bonds
generally receive a Aaa rating, they
tend to trade at rates higher than
uninsured Aaa bonds (e.g., Hsueh
and Chandy, 1989). Therefore, we
include a dummy variable coded 1 for
insured bonds and 0 for other bonds.

The variables of interest in this
study were based on Moody’s
estimator ratings. A sample of
uninsured, unrated issues was
provided by the authors to Moody’s.
Moody’s then contacted the issuers to
obtain information as part of their
ratings process. Moody’s was able to
obtain information for 184 unrated
issues with 179 of these remaining in
the final sample. The analysts who
worked on the estimator ratings were
unaware that these issues were part
of an academic study.10 The only

difference between the process used
by Moody’s to create the estimator
ratings and the process used to create
an actual public rating was that the analysts did not have access
to the rated entity’s personnel. The
first author of this paper signed a
confidentiality agreement with
Moody’s not to release the estimator
ratings. A separate variable is used
to identify issues that are unrated for
which the estimator ratings are
unavailable.

The primary research question
in this study is whether issuers that
are not purchasing insurance or a
rating could lower their yields by
purchasing a bond rating. To answer
this question, the coefficients on the
estimator ratings will be compared to
the coefficients on the ratings
variables. If the coefficients for the
estimator ratings are higher than the
coefficients for the corresponding
rating (e.g., A and estimated A), this
would imply that issuers who
currently forgo a rating are paying
higher yields and should consider
purchasing a rating. Conversely,
similar coefficients for the
corresponding variables would

10 When the authors asked a representative of Moody’s
whether the analysts knew that the estimator ratings
provided were not part of the normal business of
Moody’s, their response was as follows:

“No they did not. A large percentage
of our business is assessing credits
outside of providing an actual public
rating. For example, in 2003 we
assigned over 28,000 rating actions
in the public finance group, only
7,000 were new issues. Analysts
routinely perform updates on
existing transactions as well as
assess the credit risk for other debt
instruments. We also provide a
similar type of rating estimate or
“code” for insured debt so that our
analysts who follow the insurance
companies can assess the risk profile
of the insurer. Our analysts are
expected to do these types of
analyses as part of their routine
responsibilities. The analysts who
worked on the estimated ratings for
your project were not aware that
these estimated ratings were for a
pricing project nor did it seem
unusual for them to have to provide
such ratings.”
indicate a lack of evidence that these issuers are paying higher yields without a rating.  

5. Results

5.1 Descriptive Statistics

Table 1 provides descriptive statistics for the data used in the study. There were 2229 observations available with all data required. Half of the sample was insured. There were 383 observations that were unrated. Of these, we have estimator ratings available for 179 observations. The variable “unrated” was coded 1 only if no estimator rating was available (214 observations). For the observations with an estimator rating, 63 were estimated to be an A rating, 97 to be Baa rated, and 19 to be Ba rated. Of the uninsured bonds with a rating available, 102 had Aaa ratings, 377 had Aa ratings, 201 had A ratings, 37 had Baa ratings, while only 4 had a Ba rating. The estimated ratings for unrated bonds tend to be much lower than the actual ratings for rated bonds, which suggests that issuers that expect a low rating are less likely to apply for a rating. This issue is further investigated in the supplemental analysis.

The large majority of the bonds were callable (90.9%). A substantial majority of the bonds in the sample were competitively issued (80.9%). Most of the issuers were cities (55%) with almost a third of the sample consisting school districts (31%) while a smaller number were counties (14%).

5.2 The Effect of Ratings on Bond Yields: Regression Results

Table 2 provides the results of the regression model that examines the determinants of bond yields. All variables except County are significant at the .10 level (two-tailed test). The R-square of .86 shows a good model fit. The coefficient on the Insurance variable (.071) is insignificantly different from the coefficient on the A Rating variable (.062) which indicates that their yields are similar. The coefficient of the Unrated variable (.138) is significantly greater than the coefficient on the A Rating variable, but is significantly less than the coefficient on the Baa Rating variable (.298). This result suggests that the issuers who choose to forgo a rating are not universally viewed by the market as having high default risk.

The variables of interest in the model were the estimator ratings variables in comparison to the actual ratings variables. Aaa ratings were the excluded group so the coefficients are in comparison to the yields of a Aaa bond. The sample does not contain any estimated Aa ratings. The coefficients on the variables for the estimated A rating (.055) are significantly less than those of the estimated Baa rating (.153) and the estimated Ba rating (.176). This shows that bond buyers have some ability to assess default risk even when bond ratings are not publicly available.

The coefficients for the A rating variable and the estimated A rating

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11 Only one of the estimator ratings was Aa. Because the sample size was so small, it was impossible to code a separate variable for the estimated Aa rating. Therefore, it had to be excluded from the sample.
variable are quite similar and are not significantly different. The coefficients for the Baa ratings variable are larger than the estimated Baa ratings. The coefficients for the Ba ratings variable are similar to the estimated Ba ratings variable. The results do not provide evidence that, on average, unrated issuers would benefit from purchasing a bond rating. Issuers appear to be making rational decisions on whether to purchase a rating.

5.3 Determinants of the Decision to Apply for a Rating

The primary purpose of this paper is to investigate whether some issuers would benefit by purchasing a bond rating if they are not currently doing so. We find no evidence of irrational behavior on the part of issuers. However, an unanswered question is why some issuers rationally choose to purchase a rating while others do not. Prior research has investigated the determinants of the decision to receive a rating (Ziebell and Rivers 1992; Moon and Stotsky 1993). These studies found that financial and demographic factors expected to be correlated with ratings were found to be important determinants of the decision to receive a rating. They also found that the size of the city or the issue is important.

We can provide some additional evidence on this issue because of our more direct measure of the rating agency’s assessment of the credit quality of the issuer. We use a second prediction model to investigate the determinants of the decision to purchase a rating. The dependent variable in this model (Purchase) is coded 1 if the issuer chooses to purchase a rating and 0 if the issuer forgoes a rating. The most important determinant of Purchase is likely to be the rating the issuer expects to receive. We believe that issuers that expect a low rating are much less likely to purchase a bond rating. We code the variable Bond Rating Expected 5 for Aaa, 4 for Aa, 3 for A, 2 for Baa, and 1 for Ba. Both actual and estimated ratings are used to create this variable. The Bond Rating Expected variable can not be coded properly for insured bonds or for unrated bonds for which estimator ratings are unavailable. Therefore, these observations are eliminated from this sample. The final sample for this model is 900 issues.

We do not have a theory to determine other predictors of the decision to purchase a rating. As an alternative to theory driven variables, we use the independent variables used to predict bond yields. However, the ratings variables are replaced by the Bond Rating Expected variable as described above. Insurance and Unrated can not be used because their observations were deleted. Because the dependent variable is a 0/1 variable, we use logistic regression. Because the analysis is exploratory rather than theory driven, we use a backward selection technique to select variables.

Table 3 shows the results of the logistic regression model. Twelve variables are significant at the .05 level. The model is highly predictive as evidenced by 96.3% concordant pairs. School districts and counties are less likely to purchase a bond rating. Callable issues and
refunding issues are less likely to purchase a bond rating. Issues with larger state tax differences are more likely to purchase a bond rating. It is not clear why there is an association between these variables the decision to purchase a rating. This analysis is exploratory rather than a test of theory.

However, there are several variables for which we have reason to expect an association with the decision to purchase a rating. Our strongest expectation is that the decision to purchase a rating is determined in large part by the rating the issuer expects to receive. Table 3 confirms our expectation. We also expect that small issues that are marketed locally would be less likely to purchase a rating because local buyers are better able to assess default risk (Feroz and Wilson 1994). A similar view is Reeve and Herring’s (1986) suggestion that if issuers can market the issue to a narrow audience, the issuer will be able to provide the necessary information to that audience, and therefore, will be able to forgo a rating. We do not have a direct measure of whether the issue is marketed locally or to a narrow audience, but we expect that small issues, negotiated issues, issues with fewer bidders, and issues with less prestigious underwriters would be proxies for issues that are marketed locally or to a narrow audience. The results in table 3 confirm our expectations for all these variables. Issues less than $5,000,000 are less likely to have a bond rating. Issues with a more prestigious underwriter, issues with more bidders, and competitive issues are all more likely to purchase a bond rating.

6.0 Conclusions

We conclude that the empirical results provide evidence that local government bond issuers who do not contract for a bond rating do not pay a higher yield than would be expected given the issuers’ level of default risk. We interpret this to indicate that investors have alternative ways to assess bond default risk and adjust the risk premium in a way indistinguishable from the risk premia associated with alternative bond ratings. We provide evidence that issuers who expect a lower rating are less likely to contract for a rating. Factors that we interpret as indicative that an issue will be marketed more broadly appear to be associated with a greater likelihood that an issuer will obtain a rating, perhaps because purchasers of these issues are less likely to be able to observe the issuer directly.
The underlying data for the non-rated securities used in this study was supplied by Moody’s Investors Service. We would like to thank Moody’s Investor Service for their cooperation. We would also like to thank Donna Dudney for her helpful comments on the paper.
Table 1
Descriptive Statistics: N=2229

<table>
<thead>
<tr>
<th>Panel A: Continuous Variable</th>
<th>Mean</th>
<th>Std Dev</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reoffer Yield</td>
<td>4.86</td>
<td>.390</td>
<td>3.45</td>
<td>6.40</td>
</tr>
<tr>
<td>Interest Rate</td>
<td>5.56</td>
<td>.313</td>
<td>4.96</td>
<td>6.11</td>
</tr>
<tr>
<td>Log of Maturity (in months)</td>
<td>4.75</td>
<td>.179</td>
<td>3.18</td>
<td>5.70</td>
</tr>
<tr>
<td>Log of Bids</td>
<td>1.32</td>
<td>.557</td>
<td>.693</td>
<td>3.14</td>
</tr>
<tr>
<td>Underwriter Rank</td>
<td>42.66</td>
<td>36.78</td>
<td>1</td>
<td>101</td>
</tr>
<tr>
<td>State Tax Difference</td>
<td>5.21</td>
<td>3.09</td>
<td>0</td>
<td>12</td>
</tr>
<tr>
<td>Log of Prior Issues</td>
<td>0.79</td>
<td>1.03</td>
<td>0</td>
<td>4.84</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Panel B: Categorical Variables</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>377</td>
<td>16.91</td>
</tr>
<tr>
<td>A</td>
<td>201</td>
<td>9.02</td>
</tr>
<tr>
<td>Estimated A rating</td>
<td>63</td>
<td>2.83</td>
</tr>
<tr>
<td>Baa</td>
<td>37</td>
<td>1.66</td>
</tr>
<tr>
<td>Estimated Baa rating</td>
<td>97</td>
<td>4.35</td>
</tr>
<tr>
<td>Ba</td>
<td>4</td>
<td>0.18</td>
</tr>
<tr>
<td>Estimated Ba rating</td>
<td>19</td>
<td>0.85</td>
</tr>
<tr>
<td>Unrated</td>
<td>214</td>
<td>9.60</td>
</tr>
<tr>
<td>Insurance</td>
<td>1115</td>
<td>50.02</td>
</tr>
<tr>
<td>PSF</td>
<td>61</td>
<td>2.74</td>
</tr>
<tr>
<td>Smallest Issuer</td>
<td>225</td>
<td>10.09</td>
</tr>
<tr>
<td>Smaller Issuer</td>
<td>415</td>
<td>18.62</td>
</tr>
<tr>
<td>Small Issuer</td>
<td>490</td>
<td>21.98</td>
</tr>
<tr>
<td>Large Issuer</td>
<td>324</td>
<td>14.54</td>
</tr>
<tr>
<td>Larger Issuer</td>
<td>262</td>
<td>11.75</td>
</tr>
<tr>
<td>Callable</td>
<td>2027</td>
<td>90.94</td>
</tr>
<tr>
<td>Refunding Bonds</td>
<td>200</td>
<td>8.97</td>
</tr>
<tr>
<td>Competitive Issue</td>
<td>1803</td>
<td>80.89</td>
</tr>
<tr>
<td>County</td>
<td>311</td>
<td>13.95</td>
</tr>
<tr>
<td>School District</td>
<td>671</td>
<td>31.10</td>
</tr>
<tr>
<td>Bank Qualified</td>
<td>961</td>
<td>43.11</td>
</tr>
</tbody>
</table>

The reoffer yield is the 10 year reoffering yield (or the reoffering yield closest to 10 years if the 10 year reoffer yield is unavailable). Interest Rate is the Bond Buyer weekly index of long-term municipal bond interest rates. Log of Maturity is the natural log of the maturity (in months) of the associated reoffer yield. Log of Bids is the natural logarithm of one plus the number of bids for competitive issues (coded 1 for negotiated issues). Underwriter Rank is coded 1-101 for the rank of the underwriter by the total dollar amounts underwritten during the year of issuance for the top 100 underwriters with unrated underwriters coded 101. State Tax Difference is the maximum income tax rates for states which tax interest on out-of-state municipal bonds but not in-state municipal bonds; this variable is coded zero if there is no difference in taxation between in-state and out-of-state municipal bonds. Log of Prior Issues is the natural logarithm of one plus the number of bond issues the entity had made in the 10 years prior to the current issue. PSF is a guarantee by the state of Texas for their school district’s bonds. The issue variables are coded as Smallest if under $1,000,000; Smaller if between $1,000,000 and $2,500,000; Small if between $2,500,000 and $5,000,000; Large if between $5,000,000 and $25,000,000; Larger if over $25,000,000.
Table 2
The Effect of Ratings on Bond Yields: Regression Results

<table>
<thead>
<tr>
<th>Variable</th>
<th>Parameter Estimate</th>
<th>Standard Error</th>
<th>t-statistic</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-3.50522</td>
<td>0.11171</td>
<td>-31.38</td>
<td>.0001</td>
</tr>
<tr>
<td>Interest Rate</td>
<td>1.01804</td>
<td>0.01163</td>
<td>87.51</td>
<td>.0001</td>
</tr>
<tr>
<td>Log of Maturity (in months)</td>
<td>0.56660</td>
<td>0.01901</td>
<td>29.80</td>
<td>.0001</td>
</tr>
<tr>
<td>Log of Bids</td>
<td>-0.03267</td>
<td>0.00651</td>
<td>-5.02</td>
<td>.0001</td>
</tr>
<tr>
<td>Underwriter</td>
<td>-0.00237</td>
<td>0.00096</td>
<td>-2.46</td>
<td>.0138</td>
</tr>
<tr>
<td>State Tax Difference</td>
<td>-0.00622</td>
<td>0.00111</td>
<td>-5.60</td>
<td>.0001</td>
</tr>
<tr>
<td>Log of Prior Issues</td>
<td>0.01072</td>
<td>0.00356</td>
<td>3.01</td>
<td>.0027</td>
</tr>
<tr>
<td>Aa</td>
<td>0.03097</td>
<td>0.01680</td>
<td>1.84</td>
<td>.0653</td>
</tr>
<tr>
<td>Estimated A Rating</td>
<td>0.05522</td>
<td>0.02550</td>
<td>2.17</td>
<td>.0304</td>
</tr>
<tr>
<td>A</td>
<td>0.06243</td>
<td>0.01907</td>
<td>3.27</td>
<td>.0011</td>
</tr>
<tr>
<td>Estimated Baa Rating</td>
<td>0.15252</td>
<td>0.02317</td>
<td>6.58</td>
<td>.0001</td>
</tr>
<tr>
<td>Baa</td>
<td>0.29784</td>
<td>0.02978</td>
<td>10.00</td>
<td>.0001</td>
</tr>
<tr>
<td>Estimated Ba Rating</td>
<td>0.17579</td>
<td>0.03885</td>
<td>4.53</td>
<td>.0001</td>
</tr>
<tr>
<td>Ba</td>
<td>0.19415</td>
<td>0.07701</td>
<td>2.52</td>
<td>.0118</td>
</tr>
<tr>
<td>Unrated</td>
<td>0.13817</td>
<td>0.01965</td>
<td>7.03</td>
<td>.0001</td>
</tr>
<tr>
<td>Insurance</td>
<td>0.07055</td>
<td>0.01607</td>
<td>4.39</td>
<td>.0001</td>
</tr>
<tr>
<td>PSF</td>
<td>0.03651</td>
<td>0.02152</td>
<td>1.70</td>
<td>.0899</td>
</tr>
<tr>
<td>Smallest Issue</td>
<td>0.21870</td>
<td>0.01483</td>
<td>14.74</td>
<td>.0001</td>
</tr>
<tr>
<td>Smaller Issue</td>
<td>0.06183</td>
<td>0.01088</td>
<td>5.68</td>
<td>.0001</td>
</tr>
<tr>
<td>Small Issue</td>
<td>0.03139</td>
<td>0.00956</td>
<td>3.29</td>
<td>.0010</td>
</tr>
<tr>
<td>Large Issue</td>
<td>0.05514</td>
<td>0.01143</td>
<td>4.83</td>
<td>.0001</td>
</tr>
<tr>
<td>Larger Issue</td>
<td>0.05862</td>
<td>0.01287</td>
<td>4.55</td>
<td>.0001</td>
</tr>
<tr>
<td>Callable Issue</td>
<td>0.04168</td>
<td>0.01146</td>
<td>3.64</td>
<td>.0003</td>
</tr>
<tr>
<td>Refunding Issue</td>
<td>-0.02601</td>
<td>0.01177</td>
<td>-2.21</td>
<td>.0273</td>
</tr>
<tr>
<td>Competitive Issue</td>
<td>-0.08966</td>
<td>0.00998</td>
<td>-8.99</td>
<td>.0001</td>
</tr>
<tr>
<td>County</td>
<td>-0.00581</td>
<td>0.00964</td>
<td>-0.60</td>
<td>.5467</td>
</tr>
<tr>
<td>School District</td>
<td>-0.07067</td>
<td>0.00828</td>
<td>-8.53</td>
<td>.0001</td>
</tr>
<tr>
<td>Bank Qualified</td>
<td>-0.01642</td>
<td>0.00886</td>
<td>-1.85</td>
<td>.0640</td>
</tr>
</tbody>
</table>

N=2,229. Adjusted R-square = .86
The model is OLS regression. The dependent variable is the reoffering yield of the issue.
See Table 1 for a description of the variables.
### Table 3
Determinants of the Decision to Apply for a Rating: Logistic Regression

<table>
<thead>
<tr>
<th>Variable</th>
<th>Parameter Estimate</th>
<th>Standard Error</th>
<th>Chi-Square</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-4.229</td>
<td>1.1644</td>
<td>13.19</td>
<td>0.0003</td>
</tr>
<tr>
<td>Log of Bids</td>
<td>0.650</td>
<td>0.3088</td>
<td>4.561</td>
<td>0.0327</td>
</tr>
<tr>
<td>Callable Issue</td>
<td>-1.290</td>
<td>0.5836</td>
<td>4.886</td>
<td>0.0271</td>
</tr>
<tr>
<td>Refunding Issue</td>
<td>-1.141</td>
<td>0.4332</td>
<td>6.934</td>
<td>0.0085</td>
</tr>
<tr>
<td>Competitive Issue</td>
<td>1.166</td>
<td>0.5123</td>
<td>5.178</td>
<td>0.0229</td>
</tr>
<tr>
<td>County</td>
<td>-1.062</td>
<td>0.4504</td>
<td>5.560</td>
<td>0.0184</td>
</tr>
<tr>
<td>School District</td>
<td>-3.056</td>
<td>0.4262</td>
<td>51.404</td>
<td>0.0001</td>
</tr>
<tr>
<td>Smallest Issuer</td>
<td>-1.885</td>
<td>0.6264</td>
<td>9.059</td>
<td>0.0026</td>
</tr>
<tr>
<td>Smaller Issuer</td>
<td>-2.525</td>
<td>0.5935</td>
<td>18.106</td>
<td>0.0001</td>
</tr>
<tr>
<td>Small Issuer</td>
<td>-2.229</td>
<td>0.6132</td>
<td>13.209</td>
<td>0.0003</td>
</tr>
<tr>
<td>Log of Prior Issues</td>
<td>0.258</td>
<td>0.2132</td>
<td>1.466</td>
<td>0.226</td>
</tr>
<tr>
<td>State Tax Differences</td>
<td>0.208</td>
<td>0.0489</td>
<td>18.00</td>
<td>0.0001</td>
</tr>
<tr>
<td>Underwriter</td>
<td>-0.013</td>
<td>0.0041</td>
<td>9.93</td>
<td>0.0016</td>
</tr>
<tr>
<td>Bond Rating Expected</td>
<td>2.549</td>
<td>0.2592</td>
<td>96.687</td>
<td>0.0001</td>
</tr>
</tbody>
</table>

The dependent variable is coded 1 if the entity applied for a bond rating. It is coded 0 if the entity is unrated and a Moody's estimator rating is available. Observations were deleted if there were insured or they were unrated bonds for which no estimator rating was available. Bond Rating Expected is coded 5 for Aaa, 4 for Aa, 3 for A, 2 for Baa, and 1 for Ba; these ratings are either actual or estimated.

N=900. Concordant pairs = 96.3%
References


White, Lawrence J., “The SEC’s Other Problem: It is time to open the bond rating industry to new entrants,” Regulation, (Winter 2002-2003), Vol. 25, No. 4, pp. 38-42.

Accounting Research Using Intervention Analysis: 
An Introduction and Illustrative Example

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ABSTRACT

First proposed by Box and Tiao, Intervention Analysis uses as its model a special case of the rational form of the linear transfer function model. The time series for a single intervention is represented by two separate components: an underlying stochastic disturbance term, and the deterministic intervention term. The model takes the form

\[ Y_t = C + \frac{T(B)}{*B} [I_t] + N_t \]

where \( C \) is a constant term and \( I_t \) is a binary indicator vector which defines the intervention period. The term \( N_t \) represents the noise term. The rational term \( \frac{T(B)}{*B} \) characterizes the effect of the intervention. Use of the rational polynomial term allows the impact of the intervention to be characterized along two different dimensions: (1) Onset (or speed), which can be either abrupt or gradual, and (2) Duration, which can be either permanent or temporary. Intervention Analysis is used to examine the market response to a set of firm-specific Superfund announcements which occurred during the first fifteen years of the enforcement of Superfund. This paper makes contributions by both briefly explaining the use of Intervention Analysis in accounting research and also by illustrating a situation where the firm-specific market response for firms in the sample did take more than one form.

I. INTRODUCTION

The question of whether information has value is an important one in accounting research. Disclosures of a variety of information in a variety of ways can all have an impact on a firm or groups of firms. The most common approach in accounting event studies has been the Cumulative Abnormal Return methodology. An alternative approach used in many other fields is Intervention Analysis. The use of Intervention Analysis in accounting research has been limited, most likely due to a lack of familiarity with the concept on the part of accounting researchers. It is particularly useful in researching situations where the reaction to a particular disclosure event can take more than one form. The purpose of this methodology paper is to provide researchers with a useful brief introduction to the theory behind Intervention Analysis and then to illustrate its use as a research tool to examine an actual disclosure event. The paper illustrates successful use of Intervention Analysis in examining firm-specific Superfund events and revealing that firms in the sample did experience more than one type of market reaction.

II. RESEARCH METHODOLOGY

Interrupted Time Series Analysis

Using the standard Cook and Campbell (1979) notation the interrupted time series quasi-experimental design is diagramed as
Transfer Function Models

A transfer function model is a multivariate extension of the univariate ARIMA model. It is designed to examine the dynamic relationship between two time series processes, i.e., the effect of series "X" that is "transferred" as an impact on series "Y." For notational simplicity, consider a transfer function model with two variables, Yt and Xt. Assuming that both Yt and Xt are stationary, the general form of the transfer function model can be expressed as

\[ Y_t = C + T(B)X_t + N_t \quad t=1,2,...,n \]  

(eq. 1)

where each O denotes a time series observation and X denotes a discrete intervention. The intervention thus splits the time series into two segments, one preintervention and one postintervention. This research design tests the conventional null hypothesis of "no difference" between the preintervention and postintervention levels of the series. Rejection of the null hypothesis supports the conclusion that there was a statistically significant impact produced by the intervention. In the early days of interrupted time series research it was standard for researchers to use Ordinary Least Squares (OLS) Regression estimates of the pre and post levels of the series to test the null. It has since been seen that such a test is invalid because an important assumption required for the proper use of OLS is violated. OLS "assumes" that the adjacent regression error terms are uncorrelated, i.e., covariance(εt,εt-1) = 0 but, realistically, this is seldom true with respect to time series data. The existence of correlated error terms produces OLS parameter estimates that are biased because of understated variance. As a result, the t-statistic used to test the null hypothesis will overstate the statistical significance of the impact. (McDowall et al, 1980).

Intervention Analysis takes a different approach in dealing with the existence of correlated errors. Instead of simply ignoring the existence of the errors, the IA approach is to model empirically any existing serial dependence as a time series process. Thus, the confounding serial dependence is statistically controlled by modeling, and the difference between the pre and post levels can then be tested in the conventional manner. The next section discusses the transfer function model and then introduces Intervention Analysis as a special case of the transfer function model.

The Intervention Model

Box and Tiao (1975) proposed a procedure for analyzing a time series in the presence of known external events, termed "interventions." This procedure has become commonly known as Intervention Analysis. The intervention model is a special case of the rational form of the transfer function model presented earlier as Equation 2. Following Box and Tiao the time series for a single intervention is represented by two separate components: (1) an underlying stochastic disturbance term and, (2) the deterministic intervention term. The model takes the form

\[ Y_t = C + T(B)I_t + N_t \]  

(eq. 3)

where I is a binary indicator vector, i.e., a vector assuming the values 0 or 1, which defines the intervention period. The rational term T(B)*I(B) will characterize the effect of the intervention, which will be discussed in detail later in the paper. Upon completion of the analysis, if the intervention component turns out to be statistically significant and improves the explanatory power of the model then it can be concluded that the intervention had a significant effect on the time series process.

The deterministic component of the model, I, is not identified using statistical techniques. Instead, it is postulated based on knowledge of the timing of the intervention being examined. The stochastic component, N, is assumed to be measured with error and this component is used to filter out the
noise present in the stochastic series due to imperfect measurement. $\eta_t$ is modeled as an ARIMA process using the well-known three-step search heuristic developed by Box and Jenkins (1970) for model identification. Successful identification seeks to produce an appropriate, parsimonious model.

Although Intervention Analysis can seem procedurally and notationally obtuse to those uninitiated in the intricacies of ARIMA modeling, conceptually it is quite simple to describe. First, the preintervention portion of the series is modeled separately, using the conventional iterative three-step ARIMA modeling approach. This model then serves as the "steady state benchmark" or "counterfactual" in the analysis. That is, the preintervention series, as modeled, is assumed to continue through the postintervention period. This "what would have happened otherwise" postintervention series (the assumed "no treatment" series) is then compared to the actual postintervention series to statistically test for a difference, i.e., an impact (Mohr 1992).

Impact Characterizations for an Intervention

There are two general types of interventions that can be represented by the intervention function. First is an exogenous intervention that occurs for a single period only, e.g., the effect of an eighteen-hour power-outage on a time series of daily factory output. Second is the intervention that takes effect starting at a particular point in time and remains in effect, e.g., the effect of a new restrictive import law on a time series of imports of a raw material. Either type of intervention can be easily modeled using a binary indicator vector.

The binary vector representing an intervention that takes place for only a single period is commonly referred to as a Pulse Function. It is usually presented notationally as $P_t^{(T)}$, where $T$ represents the point in time in which the intervention occurs. Such a pulse function time series would have the following appearance:

$$\ldots O O O O O O 1 O O O O O \ldots$$

A vector representing an intervention that remains in effect is referred to as a Step Function. It can be represented as $S_t^{(T)}$, with $T$ representing the period over which the intervention occurs. The step function time series would have the following appearance:

$$\ldots O O O O O O 0 1 1 1 1 1 1 1 \ldots$$

Pulse and step functions are the most common characterizations for exogenous interventions. Note that there is an exact relationship between the pulse function and the step function representation. The transformation is

$$(1 - B)S_t^{(T)} = P_t^{(T)} \quad (\text{eq. 4})$$

which establishes that the binary indicator vector representing a step function can always be converted to a vector representing a pulse function through the process of "first differencing." Simply put, a pulse function is a differenced step function.

Recall that the response to an intervention is characterized by the rational polynomial $T(B)/\ast(B)$. The operator in the numerator, $T(B)$, represents the impact of the intervention and the "delay" or length of time it takes for the impact to be reflected in the time series. For example, the effect of a production worker strike on shipments of finished goods may not be seen for several days if the factory already has a large quantity of finished goods on hand. If the intervention has a contemporaneous effect, i.e., the effect occurs at the same time, then the effect is characterized as $T(B) = T_0$. $T(B) = T_1B$ is an effect not "seen" until the next period, and $T(B) = T_0 + T_1B$ is an effect that occurs in both the current period and the following period.

The operator in the denominator, $\ast(B)$, represents the manner in which an impact dissipates or "fades away." Operator $\ast(B)$ of an intervention model can often be represented by a low order polynomial such as, $\ast(B) = 1 - \ast_1(B)$. If the intervention has a longer residual effect, then the value of $\ast_1$ will be "large." In contrast, if the effect is of short duration, then the value of $\ast_1$ will be "small." When the intervention has zero residual effect then $\ast_1 = 0$.

Use of the rational polynomial form allows the impact of the intervention to be characterized along two different dimensions: (1) Onset (or speed), which can be either abrupt or gradual, and (2) Duration, which can be either permanent or temporary. Thus, intervention analysis allows a researcher to categorize an intervention into one of four different impact classifications:

1. Abrupt, Temporary impact
2. Abrupt, Permanent impact
3. Gradual, Permanent impact
(4) Gradual, Temporary impact

As a practical matter, McDowall et al. (1980) note that category (4) cannot be easily modeled since the demarcation between a "very gradual, very temporary impact" and "no impact" is difficult to establish. Therefore, classification category (4) is merged with the null classification of "no impact" and, in practice, a series that fails to be appropriately classified into one of the first three categories is assigned a "no impact" classification.

Empirical Testing of "Competing" Intervention Models

If a researcher could always be assured of working from a well-established body of theory then the theory would define the type of intervention impact to be expected. Thus, the theory itself would direct the choice of intervention component. In new research areas, however, adequate theory may be lacking. McDowall et al. (1980) offer a sequential approach for testing "rival" impact hypotheses in the absence of established theory.

Step 1--An abrupt, temporary impact is hypothesized. The intervention function is modeled as a first-order transfer function applied to a differenced $I_t$ as

$$f(I_t) = T(B)(1 - B)I_t$$  \hspace{1cm} (eq. 5)

Upon analysis if the $T$ value is "too large," i.e., not significantly different from 1 or greater than 1, then the existence of a temporary impact is rejected.

Step 2--A gradual, permanent impact is hypothesized. The intervention function is modeled as a first-order transfer function only

$$f(I_t) = T(B)I_t$$  \hspace{1cm} (eq. 6)

Upon analysis if the $T$ value is now "too small," i.e., not significantly different from zero, the existence of a gradual impact is rejected.

Step 3--An abrupt, permanent impact is hypothesized. The intervention function is modeled as simply a zero-order transfer function

$$f(I_t) = T(B)$$  \hspace{1cm} (eq. 7)

Upon analysis if the $T$ value is not significant, then the existence of an abrupt, permanent impact is rejected.

Step 4--Any series which fails to be appropriately classified in one of the first three categories is then classified as "no impact" (McDowall et al. 1980).

Expert System

In the past much time was consumed in using time series modeling in simply identifying the model which best modeled the data under examination. With advances in computing power and speed sophisticated time series software now offers automatic ARIMA model identification. The system used in this study was part of commercially available time series package produced and sold by Scientific Computing Associates, Incorporated (SCA). The standard SCA system has been commercially available since 1981 and the expert system module for automatic model identification has been in commercial use since 1992. The SCA expert system was developed by several principals within that organization and captures their expertise. The experts include statisticians George E. P. Box (of Box and Jenkins fame), George C. Tiao, Ruey S. Tsay, and Lon-Mu Liu. All are well-known experts in the field of time series analysis.

III. SUPERFUND

Crucial to business management and other parties with an interest in financial disclosure is the following fact: "Because Superfund imposes retroactive liability, all companies that have at any time in the past disposed of hazardous waste in landfills have a potential liability on their balance sheets" (Bloom and Scott-Morton 1991). [emphasis added] One corporate general counsel expressed the problem: "One can of paint which can be traced to a business can expose that business to millions of dollars of liability, even if it was legally dumped" (Lavelle 1993). To further compound the problem, Superfund liability is easily transmitted to other parties. Corporate parents are held liable for actions of subsidiaries and successor corporations are held liable for their predecessors' acts (Lyons 1989). Dealing with the uncertainty of Superfund liability at the firm-specific level is not a trivial problem and the impact on U.S. businesses could be devastating. In a report to Congress the independent Office of Technology Assessment projected total costs for cleanup of existing hazardous waste sites in the United States to be 500 billion dollars with businesses paying 400 billion of the total (Acton 1989).
Superfund Liability
The legal basis for Superfund’s liability scheme is formed by three doctrines (Acton and Dixon 1992): (1) Strict Liability—the Environmental Protection Agency (EPA) must only prove the Principally Responsible Party’s (PRP’s) involvement with the waste site, thus, there is no requirement for the EPA to prove negligence. (2) Joint and Several Liability—any party that was or is involved with the site in any way may be held responsible for the cost of cleaning the entire site, regardless of the party’s actual degree of involvement. (3) Retroactive Liability—parties can be held liable for past actions, even those that may have been legal at the time.

EPA Notice Letters
Formal communication between the EPA and those parties believed to be statutorily liable for Superfund cleanup costs begins with a letter from the EPA. This initial letter is called the General Notice Letter (GNL). Letter recipients are known as Potentially Responsible Parties (PRP’s). The purpose of the letter is “to inform PRP’s of their potential liability for future response costs, to begin or continue the process of information exchange, and to initiate the process of informal negotiations” (Steinberg and Mays 1993).

At a later point in time the EPA will issue a Special Notice Letter (SNL). This letter is used “to invoke the statutory moratorium on certain EPA actions and to initiate the process of formal negotiations. The purpose of the moratorium is to provide for a formal period of negotiation between the EPA and PRP’s, during which the PRP’s will be encouraged to conduct or finance response activities” (Ibid.). Before cleanup can begin the EPA conducts a Remedial Investigation to gather information on the site and a Feasibility Study is performed. The result of that process is the announcement of the Record of Decision (ROD), which identifies the particular cleanup method to be used at the site.

Each of these events identifies a possible risk to a firm. The firm-specific risk is dependent on a variety of factors, including the size of the site, the number of other principally responsible parties (and their financial strength), and the cost for the cleanup of the site. If this new risk information is important to the market then an effect will be seen in the firm stock return.

This study explores environmental information by using Intervention Analysis within the event study paradigm to empirically examine the market response to firm-specific Superfund information. Intervention Analysis is especially appropriate for this study because the uncertainty surrounding potential Superfund liability makes it likely that the market response could take more than one form. The study examines three key information events in the early stages of a Superfund cleanup. The three events are the release of the (1) General Notice Letter, (2) Special Notice Letter, and (3) Record of Decision.

The research questions explored in the study are: (1) Did the market respond to initial Superfund information releases during the first fifteen years of the program? (2) Because of the uncertainty surrounding Superfund are there different types of responses?

IV. DATA AND SAMPLE
The sample for the study consists of randomly selected firms meeting the following criteria: (1) The firm is listed in the CRSP database. (2) The firm is named a potentially responsible party (PRP) at least once in the EPA Superfund Enforcement Tracking System (SETS), available within the Lexis/Nexus database. (3) The firm has complete data available for each required event returns series.

For this paper only the first time a firm has been designated a PRP is examined. The sample selection process began with the firms present in the CRSP database. The selection process was first restricted to firms with a daily return series that ended in the year 1980 or later. A total of 14,413 firms in the CRSP database met this requirement. The sample was then further restricted to the years 1980 through 1994, a time period representing the first fifteen years of the enforcement of Superfund, the early period of most uncertainty as to the impact of Superfund on a particular firm. A sample of CRSP firms was then randomly selected and a search was made of the EPA’s SETS database (Superfund Enforcement and Tracking System) to discover if the firm had ever been named a PRP (Potentially Responsible Party) by the EPA. This labor-intensive individual PRP search was done for a total of 1,238 randomly selected CRSP firms. Of those firms 79 had been named a PRP one or more times.

In the typical event study the selection of study period length is an arbitrary decision. For this study some guidance was offered in the time series literature. In a simulation study Lorek and McKeown (1978) confirmed the optimality of a 50 (quarterly) observation series. This study uses a 50 daily observation series for the preintervention estimation period and a 50 daily observation series for the postintervention event impact period. This gives a
Each sample firm’s daily return with dividend was calculated. The market return index used was the equally-weighted market index (including dividends) contained within the CRSP database. This market return index has been widely used and accepted in previous event studies (Peterson 1989).

In criticizing a paper by Cheng (1986) which used Intervention Analysis, Thompson (1986) emphasized the importance of controlling for the confounding influence of aggregate market movements on the firm-specific ARIMA model. This study adopts a control used by Tsay, Alt, and Gordon (1993). They describe their procedure as:

"We analyzed a scaled return series rather than a raw series in conducting the intervention analysis. A scaled series is defined as the return series divided by the corresponding market returns (defined as the equally weighted average of the returns on all stocks listed on the NYSE and AMEX) series for each time “t”. In other words, a scaled series is an indexed series relative to market returns. The rationale for this approach is similar to that of performing a general price-level adjustment to nominal financial data. That is, a jump up or down in a security's return could be caused by a general market factor, which should not be interpreted as a reaction to a particular firm event (intervention)” (Tsay, Alt, and Gordon 1993).

### V. EMPIRICAL RESULTS

Table 1 reveals, for each firm in the sample, whether the firm experienced each event. It also indicates for each event whether there was a detectable reaction. Table 2 further bifurcates the reaction group into Abrupt, Temporary and Abrupt, Permanent classifications. A summary of the reactions per event is the final item presented in Table 2. Note that 17 of the 79 sample firms, almost one-fourth, experienced some type of reaction for one of the three events, but none of the sample firms had a reaction for more than one event, although 69 of the 79 firms, almost ninety percent, experienced either two or three of the three possible events.

The study examined three information events: (1) GNL, (2) SNL, and (3) ROD. In the GNL dataset, 10 of the 72 firms were found to have a detectable intervention. Of these ten interventions, six were of the Abrupt, Temporary type and four were of the Abrupt, Permanent type. In the SNL dataset, 4 of the 12 firms were found to have a detectable reaction. All four were of the Abrupt, Permanent type. In the ROD dataset only 3 of the 61 firms were found to have a detectable intervention. Of these three interventions, one was of the Abrupt, Temporary type and two were of the Abrupt, Permanent type. The results of the Intervention Analysis would suggest that the GNL and SNL events are both useful sources of information to investors, with the SNL event producing the largest proportion of reactions. The ROD event seems to be the least useful to investors and it may not be useful at all since the proportion of ROD firms with a reaction is less than that which would be expected to occur by chance at the conventional .05 level of significance.

Where a market reaction occurred for firms in the study it was an Abrupt response; either an Abrupt, Temporary response or an Abrupt, Permanent response. No firms in the study were found to have a Gradual response.

Examination of Table 1 reveals the existence of a small number of firms with a "U" classification for a particular event. This "U" identifies a returns series that was Unmodelable by the SCA expert system software used for automatic model identification. This type of result can occur when the analysis is attempting to fit the data into a prespecified model. In a comparative study Jarrett (1990) notes that the use of prespecified models can result in series that are unmodelable. The analysis in this paper resulted in 9.4% of the individual series analyzed being unmodelable, a result similar to that found by Jarrett when using prespecified models.

### VI. CONCLUSION
The empirical results of this research study seem to offer several implications. First, it provides further evidence that Intervention Analysis exists as a useful tool for empirical use in accounting research of the event study type. Second, specifically in terms of Superfund research, it suggests that both the GNL and particularly the SNL announcements are viewed as important by the market. In marked contrast, however, the ROD announcements produce little, if any, statistically significant market reaction. Only three interventions were detected in the ROD dataset, fewer than could be expected to have occurred by chance.
Figure 1–Impact Types

Abrupt, Temporary Impact

Abrupt, Permanent Impact

Gradual, Permanent Impact

Gradual, Temporary Impact
<table>
<thead>
<tr>
<th>Firm ID #</th>
<th>GNL</th>
<th>SNL</th>
<th>ROD</th>
<th>Firm ID #</th>
<th>GNL</th>
<th>SNL</th>
<th>ROD</th>
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<td>Watsco Incorporated</td>
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<td>.</td>
<td>Olin Corporation *</td>
<td>P</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
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<td>.</td>
<td>Eagle-Picher Industries</td>
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<td>Teltronic Services Inc</td>
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<td>U</td>
<td>Autoclave Engineers Inc</td>
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