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Abstract

In this paper we develop a model in support of the argument that the imposition of a "social responsibility" constraint could lead to increased profitability of the firm. To empirically test this, we compare the characteristics of firms making up the DS 400 index with that of a control group of firms not included in the DS 400. We find that socially responsible firms are, at a minimum, not dominated by their peer firms on the basis of returns. They are also not dominated by their peers on the basis of their betas, but dominate them on the basis of their degree of unique risk. Our analysis also indicates that a socially responsible orientation does not come at a cost to the shareholders. To the contrary, it appears that these firms provide their investors with risk/return opportunities that are at least equal to, and at time superior to, those provided by their peers. We find strong evidence indicating that socially responsible firms employ significantly less leverage in their capital structure. Finally, we find that firms that are added to (deleted from) the DS 400 Index experience a positive (negative) abnormal returns on the occasion of such announcements.

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I. Introduction:

Various aspects of "corporate social responsibility" (CSR) have recently captured the attention of researchers in the fields of economics and finance (Orlitzky et al, 2003; Statman, 2005; Goss & Roberts 2006; Milevsky et al 2006). This phenomenon follows more than a decade of research and dozens of studies published largely in the strategic management and business ethics literatures which have striven to explore the links between corporate social performance (variously defined) and corporate financial performance (Waddock and Graves, 1997; Roman et al, 1999; Margolis & Walsh, 2001; Orlitzky & Benjamin, 2001). Whilst one interpretation of these studies may be that the evidence for a causal, or even *de facto* link between social and financial performance remains elusive, another would be that the balance of evidence suggests that enhanced social performance may be lagging indicator of effective management and therefore a leading indicator of future financial performance (Wheeler, 2003). In their 2003 review of 52 studies internationally, Orlitzky and colleagues were somewhat unequivocal in judging the evidence as favoring social responsibility as a more likely benefit than impairment to investors.

All of these studies leave open the question of the purpose of the firm and ideological contestations of whether managers should deploy corporate resources towards social goals where likelihood of a financial return is moot. In the Anglophone corporate governance literature, the traditional view regards CSR as an activity that may or may not lead to the creation of value for society and the broader universe of stakeholders but it is

certainly not in the interests of investors and should therefore be discouraged if not outlawed. Strident commentaries advocating this somewhat simplistic application of agency theory have long been associated with Milton Friedman and Michael Jensen (Friedman, 1970, Jensen, 2005; Jensen & Meckling, 1976 & 2005). An alternative proposition, expounded in corporate governance, strategic management and business ethics literatures is that of pragmatic 'stakeholder theorists' such as Edward Freeman who contends that not only is it the right thing to do to take into account the impact of the firm on its various constituencies, but most importantly that it is only through the effective mobilization of the resources of the stakeholders that value is created both for the firm *and* its stakeholders (Freeman, 1984; Freeman & McVea, 2001; Freeman et al 2004). This position separates Freeman from more normative stakeholder theorists who adopt a more critical stance toward the role of business in society.

John Roberts (2004) takes a similar approach to the pragmatic approach of Freeman (and even the later writings of Jensen where a case is made for an 'Enlightened Value Maximization' perspective). Consistent with European and Asian constructions of corporate governance and the purpose of the firm, he argues that "firms are institutions created to serve human needs." The more complex question, however, is whether the needs to be served are those of the shareholders alone, customers, employees, society at large, the government, the environment, or those of yet others. Roberts' assessment is that the answer might be reduced to that of Friedman i.e. that the purpose of the firm is to serve shareholders and the maximization of their wealth, under a very restrictive set of assumptions. But he argues further that these assumptions do not hold in "the real

world." Therefore, he concludes – like Freeman - that "it is necessary that all relevant interests are recognized and taken into account."

So it seems that a longstanding dichotomy may be beginning to heal. The traditional stockholder *versus* stakeholder debate that has raged in Anglophone jurisdictions for several decades may now be converging, with shareholder advocates coming to recognize that shareholder value may be directly impacted by stakeholder perspectives and so it may be wise to take the pragmatic view. Both sets of former views: corporate social responsibility as an "ethical" approach to corporate management that should transcend financial and other trade-offs *versus* the more traditional view that a manager's responsibility should be limited to the maximization of shareholders' wealth, imply that there is a conflict between the interests of the investors and CSR. However, the emerging perspective recognizes a potential 'business case' for CSR (and especially 'CSR reputation', given the increasingly socially constructed nature of value) and thus researchers are turning to investigate to what extent corporate financial objectives may be aligned with CSR objectives and indeed even enhanced by the practice of CSR..

In the finance literature, for example, Barnia and Rubin (2005) argue that the relationship between the firm value and CSR expenditures is a non-monotonic function with a maximum point. At low levels of CSR expenditure, there is a positive relationship between these expenditures and firm's value. Beyond a certain level, the marginal cost of these expenditures will outweigh their benefits to shareholders. Thus, the value maximizing approach calls for keeping these expenditures at the level where the non-

monotonic function is at its maximum level. However, they still argue that managers and corporate insiders may overdo CSR expenditures for their personal benefits at the expense of majority shareholders.

The non-monotonic relationship between firm value and the level of CSR expenditures seems to be confirmed by Goss and Roberts who examine the issue of CSR from the perspective of a lender. They report that firms that exhibit a very low level, or no degree, of social responsibility are penalized by banks through a higher cost of borrowing. Specifically they report an average borrowing cost that is higher by 16 basis points for firms with little or no concerns for their social responsibility. Furthermore, by using the Granger Causality technique, they find that increases in earnings induce firms to undertake socially responsible investments but that these investments do not increase earnings. The premise of their work is that, beyond a certain level, socially responsible activities do not help the firm.

Statman (2005) compares the returns of the four indexes of socially responsible companies (the Domini 400 Social Index (DS 400 Index), the Calvert Social Index, the Citizens Index, and the U.S. portion of the Dow Jones Sustainability Index) with that of the S&P 500 index and finds that Socially Responsible Investment (SRI) indexes did better than the S&P 500 during the boom of the 1990s but lagged during the bust of the early 2000s. Further, he finds that the DS 400 performed better than the S&P 500 during the overall May 1990 - April 2004 but not in every sub-period.

Zakri Bello (2004) uses a sample of socially responsible stock mutual funds matched to randomly selected conventional funds of similar net assets to investigate differences in characteristics of assets held, portfolio diversification, and effects of diversification on investment performance. He reports that socially responsible funds do not differ significantly from conventional funds in terms of any of these attributes. Furthermore, he reports that the effect of diversification on investment performance does not differ across the two groups.

Becchetti, Giacomo and Pinnacchio (2005) investigate whether the inclusion and permanence in the Domini social index affects corporate performance. They find that inclusion into the Domini index is associated with a significant increase in total sales per employee but a reduction in return on equity. However, the lower returns on equity for the Domini firms seem to be accompanied by relatively lower conditional volatility and lower reaction to extreme shocks.

Milevsky, Aziz, Goss, Comeault, and Wheeler (2006) investigate whether the imposition of a constraint, on portfolio selection, to include only “socially responsible companies” has a negative effect on the performance of such companies. Using an optimization algorithm, they eliminate a group of “socially undesirable stocks” and replace them with comparable “socially responsible firms” and show that the difference in returns is “economically insignificant.”

Given that the focus on the issue of social responsibility and its effect on corporate performance is a recent phenomenon, it is not surprising that many of the findings are inconclusive. This paper aims to contribute to this debate by addressing the following questions:

1. Is it possible to impose a constraint (e.g., CSR) to a non-monotonic function (e.g., profits function) that results in the attainment of a higher maximum point than what would be possible without such a constraint?

2. Can an investor form a portfolio of socially responsible firms and achieve a better performance than would investors who do not face such a constraint (and who have a broader selection base that include CSR firms)?

To address the first question, we introduce a mathematical model wherein the constraint contains an argument that also affects the function. Within such a model, we show that the answer to the first question is in the affirmative. More specifically, we introduce a constraint into the firm's production function that results both in a higher cost per unit of product and also shifts the demand curve so that the net result is higher profits for the firm.

Addressing the second question has several dimensions. If socially responsible firms can produce better than average profits, they may be able to also provide better than average returns for their stockholders. Whether a portfolio of such firms can outperform similar portfolios that are formed without this constraint remains to be examined. Many managers claim that their stock picking ability enables them to choose a subset of stocks from a well diversified portfolio and form a smaller portfolio with a better return.[1] Assuming these claims are valid, a trade off question arises as to what these managers

[1] Whether a portfolio of socially responsible firms could be one of these smaller portfolios or not is essentially an empirical question.

give up in order to achieve a higher return. By holding a less-than fully diversified (market) portfolio, the managers are exposed to some level of unsystematic risk. Whether a portfolio of socially responsible firms provides sufficient (if any) extra return to compensate for the added unsystematic risk remains an unanswered empirical question.

The issue of performance evaluation has dramatically evolved during the last quarter of a century. Given that portfolio performance can now be measured along various dimensions, it is not always easy to unequivocally rank various portfolios. Even when one considers only two such dimensions, risk and return, s/he may use different measures to judge among the various portfolios. More importantly, these measures are not always consistent in ranking portfolios. Nonetheless, the question of proper risk/return trade off cannot be addressed without picking one such measure. Furthermore, if a portfolio outperforms the market on a consistent basis, it may also imply a persistent mispricing. This, in turn, contains implication for the Efficient Market Hypothesis (EMH). Therefore, any potential valuation benefits in becoming a socially responsible corporation may be captured quickly during a brief window of time. This calls for an examination of the effect of announcements that help clarify a firm's commitment, or lack thereof, to social responsibility.

As the first step in addressing some of these questions, in this study, we examine the characteristics of firms making up the DS 400 index and compare them with that of a control group of firms not included in the DS 400. Using data over the 16-year period 1990-2005, we examine the degree of market risk and the total risk of firms making up

the DS 400 and compare them with the degrees of market and total risks of a control portfolio outside the DS 400 index. We also compare their returns over the same time period. We find that while firms included in DS 400 index have essentially the same market risk and return as the control group, their total risk is lower. This implies that a portfolio of socially responsible firms has a lower residual risk. It also implies that this portfolio may offer a better risk/return trade off than the control portfolio. Furthermore, we compare the two groups on the basis of their ongoing valuations. More specifically, we compare the group of firms designated as socially responsible to their control group on the basis of their market to book ratio, excess equity/sales ratio, and their Tobin's Q. We observe that socially responsible firms appear to enjoy the same valuation, and at the margin a more favorable one, when compared to their peers.

To investigate how the investors respond to signals regarding a firm's commitment to corporate social responsibility, we examine the market's reaction to announcements regarding the inclusion in or deletion form the DS 400 index. We find that the addition to (deletion from) a socially responsible index enhances (reduces) the appeal of the assets to the investor base.

The rest of this paper is organized as follows: In section II, we present a model to illustrate that, under some circumstances, the introduction of a constraint may enhance the corporate profits (maximum point of a non-monotonic function). In section III, we explain the nature of our data, followed by our empirical results in Section IV. Section V summarizes the paper and presents a conclusion regarding our findings.

II. Mathematical Justification for CSR

To claim that a portfolio of socially responsible investments outperforms a more broadly based portfolios is similar to claiming that the introduction of a constraint (limiting investments to socially responsible companies) to a non-monotonic function will result in a higher maximum (a better performance) than the one that could be obtained in the absence of such constraints on the investment strategy (i.e., forming a portfolio from the universe of all securities). This may appear contrary to simple mathematical intuition. However, if the constraint also forces a shift in the objective function, it is possible to imagine cases where the resulting maximum is higher than the maximum obtained without such a constraint. In our attempt to apply this to corporate profitability and investment performance, we set out to investigate the following two questions:

1. Can a firm impose a constraint on its activities such that it becomes socially responsible and yet have a higher profitability than the rival firms who do not impose such constrains?

2. Can an investor form a portfolio of socially responsible firms and obtain better results than investors without such a constraint?

In addressing the first question, we design a simple example of a firm operating in a perfectly competitive market for its products. We assume that its production function exhibits "decreasing returns to scale" and can be described by $q = f(x_1, x_2) = Ax_1^{\alpha} x_2^{\beta}$, where q denotes quantity of the output, x_1 and x_2 denote input variables, and $\alpha + \beta < 1$. The input variables, x_1 and x_2, can also be obtained in a perfectly competitive market at a price of r_1 and r_2, respectively. The profit function for this firm, therefore, is:

$\pi = pf(x_1, x_2) - r_1x_1 - r_2x_2 - b$, where π denotes profits and b denotes the fixed cost. This profit function can be maximized with respect to x_1 and x_2.

The first order condition for maximizing this profit function with respect to x_1 and x_2 is that we set the partial derivatives with respect to these inputs to zero.

$$\frac{\partial \pi}{\partial x_1} = pf_1 - r_1 = 0 \text{ and } \frac{\partial \pi}{\partial x_2} = pf_2 - r_2 = 0 \tag{1}$$

The second order condition for maximization requires that the production function is strictly quasi-concave. This means that in our production function the principle minors of the relevant Hessian determinants alternate in sign:

$$\frac{\partial^2 \pi}{\partial x_1^2} = pf_{11} < 0 \quad \text{and} \quad \frac{\partial^2 \pi}{\partial x_2^2} = pf_{22} < 0 \tag{2}$$

And $$\begin{vmatrix} \frac{\partial^2 \pi}{\partial x_1^2} & \frac{\partial^2 \pi}{\partial x_1 \partial x_2} \\ \frac{\partial^2 \pi}{\partial x_2 \partial x1} & \frac{\partial^2 \pi}{\partial x_2^2} \end{vmatrix} = p^2 \begin{vmatrix} f_{11} & f_{12} \\ f_{21} & f_{22} \end{vmatrix} > 0 \tag{3}$$

Condition (2) ensures that profit is decreasing with respect to further use of either x_1 or x_2 (given that p>0 marginal product of both inputs are decreasing), and condition (3) ensures that profit is decreasing with respect to further use of *both* x_1 and x_2.

Maximizing this profit function with respect to x_1 and x_2 results in determining an optimum level of input utilization (x^*_1 and x^*_2), output quantity (q^*), and the profit level (π^*). Assume, now, that there is an alternative production technique that uses a more environmental friendly input, x_3, (say green fertilizer) which has the same marginal productivity as x_1 but is more expensive. If the manager replaces x_3 for x_1, its production

cost will increase. Under ordinary circumstances, introducing this (self imposed or otherwise) constraint will reduce the profit level. However, if as a result of introducing this constraint (going green) the demand curve for the product shifts rightward and the product is sold at a higher price p^* (p^*>p), the optimizing procedure could result in a higher profits level π^{**} ($\pi^{**}>\pi^{*}$)[2].

This simple example illustrates that firms may have the ability to impose constraints on themselves to be socially responsible and still make higher profits than their otherwise "non-constrained" peer firms. Higher profits, if sustained, will result in a higher valuation of these firms as well. The example may be extended to much more complicated cases in many directions. One can introduce a constraint that shares an argument with the price function (more applicable to markets other than perfectly competitive markets). One can also introduce the time element into the model so that it can reflect characteristics of market trends and the advantage of being an "early bird" firm. The example can also be extended to a more realistic uncertain framework, where many of the variables in the firm's objective function are probabilistic. Also, one can introduce the element of risk management and long term sustainability. In that framework, it my be possible to show that socially-responsible managed firms are less likely to face lawsuits or customer boycotts and may enjoy a lower cost of capital and a higher valuation, ceteris paribus.

[2] A numerical example is presented in the appendix to illustrate this point.

In all these cases, one can show that the answer to the first question, presented in this section, (i.e. whether a firm that imposes a constraint on itself to be socially responsible can experience a higher level of profits) may be in the affirmative. Our second question can be addressed in many ways. If socially responsible firms are able to produce better than average profits, they may also be able to provide better than average returns for their stockholders. However, the answer to the question of whether this could imply that a portfolio of socially responsible firms can outperform a portfolio constructed without such a constraint rest on the answer to a few questions including: whether such portfolios have a higher residual risks than other portfolios. Therefore, we must address the issue of risk /return trade off.

III. Data

We obtained the names and the CUSIP numbers of the firms in the Domini 400 Social Index for 1990, and all subsequent additions and deletions to the index during the course of the following 15 years (1991-2005) from the KLD Research & Analytics. Based on this information, we developed the "dynamic" list of Domini 400 firms for a 16-year period (1990-2005) covered by our study. In order to ensure that we compare the performance of firms considered as socially responsible portfolio with a relevant benchmark, we form a portfolio of control firms from the companies traded in NYSE and AMEX with characteristics that match those of the Domini 400 firms. This control portfolio is formed by screening firms out of the universe of publicly traded companies

that are (1) in the same line of business (have the same two-digit SIC code) and (2) are the closest in size (market capitalization) to the Domini firms[3].

We then compare the performance of the two portfolios on the basis of several characteristics. These characteristics and their definitions are listed in Table 1. Table 2 illustrates the details of these selected characteristics; market-to-book values (MV/BV), return on assets (ROA), return on equity (ROE), return on sales (EBIT/Sales), leverage ratio, capital expenditures to sales ratio, R&D expenditures to sales, advertising to sales, excess equity to sales[4] and Tobin's Q. All balance sheet and income statement data were extracted from COMPUSTAT, and the data items related to prices and returns are obtained from the CRSP tapes. The means and standard deviations of the underlying variables for the two portfolios are presented in Panels I through X.

IV. Empirical Results:

Our discussion of the empirical results is divided into two parts: we first discuss the valuation and risk return characteristics of the two groups. We then discuss the valuation consequence (in terms of abnormal return) of being added to or deleted from the Domini 400 Index.

a. Risk/Return Characteristics of the Two Groups:

For each of the characteristics listed in Table 1, we test the null hypothesis that the difference between the means of the two groups is statistically indiscernible. An

[3] Given that KLD has an apparent emphasis on the largest publicly traded firms our control firms are, invariably, smaller in size than Domini firms.

[4] The excess equity to sales ratio is a measure of valuation, capturing possible differential valuation effects. It differs from Tobin' Q in that it captures the effect on equity value, as oppose to the overall value of the firm. See, for example Bodnar, Tang and Weintrop (1997).

examination of the t-statistics for the pooled time series cross sectional data over the 1990-2005 period indicates that the two groups are significantly different than one another with regard to all but two measures: return on equity and the ratio of advertising to sales. These results are reported in the last row of each of the panels I through X of Table 2[5]. According to these results, Domini firms have a lower market to book ratio, higher return on assets, higher return on sales, lower leverage, lower capital expenditures per dollar of sales, lower R&D expenditures per dollar of sales, a lower ratio of excess equity value per dollar of sales, and lower Tobin's Q ratios.

Interestingly, most of these difference disappear once we consider only the cross sectional tests. More specifically, when we examine the t-statistics for the comparison of the two groups for each of the years 1990 through 2005 (reported in the first 16 rows of each Panels of Table 2) we often can not reject the null hypotheses of no difference between the means of the measures for the two groups. The two groups are sometimes significantly different on the basis of a given measure of comparison in one year, but not so the next and certainly not uniformly different across all periods[6]. However, the null hypotheses of no differences across the two groups are rejected most frequently for two measures, the degree of leverage and the ratio of excess value of equity to sales. Therefore, it appears that we can safely state that, on the basis of these test results, socially responsible firms (represented by those included in the Domini index) use less leverage in their capital structure and also suffer from a lower level of valuation of their

[5] As expected, and discussed under footnote 3, the two groups are different with regard to size. When the two groups are compared on the basis of their capitalization figures, the null hypotheses of no differences in the means of the two groups are uniformly rejected for all time series and cross sectional time series tests.

[6] Our examination of these differences over time does not reveal a discernible pattern of association of significance in differences of means, or lack thereof, with any particular set of macro developments or market cycles.

equity per dollar of sales. However, tests of significance of differences across the two groups with regard to two other measures of relative valuation, i.e., the market to book ratio and the Tobin's Q ratio, cast a shadow of doubt with regard to any inferences for the valuation of socially responsible firms. First consider the market to book ratio: Out of the 16 periods considered, the null hypothesis of no differences across the means of the market to book ratios of the two groups is rejected Once in favor the socially responsible firms and three times against them. Therefore, on this basis, we can safely set aside the explanation that socially responsible firms suffer from a lower level of valuation. This is reinforced by an examination of the results with regard to the Tobin's Q ratios. Out of the 16 periods considered, the null hypotheses of no differences between the means of the two groups are rejected only for the 1996, 2000 and 2001 periods. For all other periods, the means are statistically identical. Therefore, it appears that the lower ratio of excess value of equity to sales for our socially responsible firms may be driven by other factors. The lower levels of leverage employed by these firms may be considered one such factor.

We also compare the total risk (standard deviation of returns) of firms in the two groups. Table 3 reports the means and standard deviations of total risk calculated for each group for each year. As these results illustrate, total risk of the firms included in the Domini 400 group is lower than that of the control group in each and every year. The differences are statistically significant at less than 1% confidence level for all 16 years. Therefore, we can safely conclude that socially responsible firms, represented by those included in the Domini 400, have significantly lower degrees of total riskiness and are, therefore, less risky when held as individual assets.

We next proceed to investigate the differences across the two groups with regard to the degree of market riskiness (i.e., differences in the riskiness of the two groups when they are held within well-diversified portfolios). Table 4 reports the means and the standard deviations of the betas of the two groups for each of the 16 years (1990-2005) covered in our analysis. An examination of these results suggests that the betas of the Domini 400 firms are neither lower, nor higher, on a uniform basis. To be precise, the betas of the Domini firms are significantly higher than those of their control groups for four years (these are concentrated in the early periods of comparison: 1990, 1991, 1992, and 1997). However, they appear to be significantly less risky than their counterparts in three other periods (2000, 2001, and 2002). We conclude, therefore, that firms classified as socially responsible have the same degree of market risk as those not classified as such. By extension, we can also conclude that these firms have significantly less unique risk than their counterparts[7].

The lower unique risk of the DS 400 may be an evidence that the socially responsible firms offer products and/or services that are perceived to be less controversial, less risky, and safer (both from the perspective of the consumer and the society at large). If so, it follows that these firms will have a lower degree of unique risk. This can be attributed, for example, to the steady demand from a loyal customer base, lower probability of consumer boycotts, fewer environmental challenges and lawsuits, and a less-hostile but more committed and energized employee base.

[7] Therefore, they may be ideal candidates for intending to hold less-than fully diversified portfolios.

Next, we compare the two groups on the basis of the daily returns provided to their shareholders. Results, as reported in Table 5, indicated that for 11 out of 16 years of study, Domini firms outperform their counterparts. However, only for two years (1997 and 1998) the differences are statistically significant (with probability value of less than 3 percent). For the remaining nine years, the differences are not statistically discernible at 5% level. In none of the 16 years covered by our analysis Domini firms significantly underperformed their counterparts.

Therefore, it appears that our socially responsible firms, at a minimum, provide the same return on equity as their counterparts outside the index. Indeed, a case can be made, albeit a weak one, that they dominate their peers along this dimension. Further, they are not dominated by their peers on the basis of their betas, and dominate them on the basis of their degree of unique risk. Therefore, the conclusion can be drawn that the socially responsible firms, represented by those firms in Domini 400, provide a better risk return profile than the control group. Bear in mind that firms in the Domini 400 index generate superior performance on the basis of ROA. This superior performance diminishes when it comes to ROE due to significantly lower leverage.

To further examine whether these Domini firms provide for better investment vehicles than their peers, we also study the differences across the two groups with regard to their alphas. These results, reported in Table 6, indicate that our socially responsible firms have significantly higher alphas in eight of the 16 periods considered. The reverse

holds true only for one period (1991). Therefore, we can safely conclude that socially responsible firms provide the investors with alphas superior to those of their peers.

As a final test of the viability of socially responsible firms as investment vehicles, we compare the two groups on the basis of their Sharpe ratios. These results are reported in Table 7. A quick overview of these results leads one to the observation that in all, but two of the periods analyzed, the Sharpe ratios of Domini firms have been larger than those of their peers, and for four of these years (1995, 1997, 1998, and, marginally, 2000) the differences are statistically significant. Combined with the results on the comparison of the alphas, these results suggest that, if one is to draw any conclusions regarding the relative merits of the two groups as investment vehicles, it would be that the socially responsible firms are at least on par and quite possibly superior to their peers.

In summary, the results of our examination in this section seem to provide evidence (albeit not statistically significant on a uniform basis) that socially responsible orientation does not come at a cost to the shareholders. To the contrary, it appears that these firms provide their investors with risk/return opportunities that are at least equal to, and at time superior to, those provided by their peers. To further examine this hypothesis, we next investigate market's reaction to the announcement of deletion from or addition to Domini 400 index.

b. Market Reaction to Announcements of Additions to or Deletions from the Index

As previously described, we obtained a listing of all additions to and deletions from the Domini Index from KLD Research and Analytics. As a matter of policy, KLD drops a firm from its index once it makes a determination that it has violated one of its indicators of social responsibility. Although the information regarding these violations may be widely available to markets for some time prior to KLD's announcement of a deletion, the announcement itself sends an unambiguous signal about KLD's assessment of violations. Therefore, one may hypothesize that this constitutes a signal to those monitoring KLD's pronouncements. As such, it may cause the participants in the marketplace to revise their valuation of the firm through a process of 'social reconstruction' of value. Once a firm has been targeted for deletion the index it is replaced with a firm deemed socially responsible. Here, too, the activities of firms targeted for addition to the index may be fully transparent to the markets at large. However, a case can be made that a decision by KLD to add the firm to its index sends an unambiguous signal regarding its socially responsible behavior. Therefore, once again, there may be attendant (socially constructed) valuation consequences for these firms.

To evaluate the market's response to KLD's announcements we perform two event studies for which the event date is defined as the first date on which KLD makes its decisions public. In one we will examine valuation consequences to those firms that are added to the index, and in the other those accrued to firms slated for deletion. The methodology utilized is the standard event study technique.

The Model:

We employ the traditional market model, Equation (4), to determine the expected (required) rate of return of all stocks as a linear function of market rate of return.

For each group, we run the following regression:

$$R_{it} = a_i + b_i R_{mt} + u_{it} \qquad (4)$$

Where

R_{it} = Return on stock *i* in period *t*

a_i = Intercept term for stock *i*

bi = Slope term for Security *i* (an estimate of bets)

R_{mt} = Return on the market index (S&P 500) in period *t*.

u_{it} = Error term on security *i* in period *t*.

The statistical package used for this purpose is the Eventus Package. To obtain regression coefficients a_i and b_i for each company, we used a 255-day estimation period, ending at 30 days before the day for which we calculate abnormal return (from day -290 to day -35, from day -289 to day -34, and so forth). Using these regression estimates, we examine the abnormal returns of all firms during the 10-trading-day period surrounding the announcement day (Day -5 to day +5, where Day 0 is the announcement date) for firms in each groups separately. The abnormal return for security *i* at time *t* is estimated as follows:

$$\hat{e}_{it} = R_{it} - \hat{a}_i - \hat{b}_i R_{mt} \,, \qquad (5)$$

where $\hat{e}_{it}$ is the estimate of the abnormal return for security *i* at time *t*, and $\hat{a}_i$ and $\hat{b}_i$ are the least squares estimates of a_i and b_i, respectively. Because the event day is not the same for all firms, the chance for cross-sectional correlation of the abnormal returns is very low. For each day, we calculate the average abnormal return (AR_t) across all firms. We also calculate the Cumulative Average Return at time *t*, CAR_t as the sum of average returns from the day -5 up to the time in which we are interested, as shown below:

$$CAR_t = \sum_{i=-5}^{t} AR_i \,, \quad \text{for t= -5, -4, …, 5} \qquad (6)$$

We measure the impact of announcements by examining AR_t and CAR_t around the announcement date (day 0). If the announcement has a positive (negative) impact on the firm, we expect to observe a significantly positive (negative) cumulative abnormal return during the event window (-5 to +5).

The Results:

The result of our these tests, summarized in Tables 8 and 9, suggest that firms that are added to the Domini Index experience a positive revaluation by the market. On the contrary, firms that are no longer deemed socially responsible and are dropped from the Domini Index experience a negative revaluation by the market. More specifically, we find a statistically significant positive abnormal return of 0.43% on the day of the announcement of the inclusion a firm to the Index (Table 8). The three-day cumulative abnormal return surrounding the announcement (-1, 0, +1) is also statistically significant

at 0.67%. The CARs during the event window are shown in figure 1 for firms that are added to the index.

Firms that are deleted from the index experience an average abnormal return of -0.44% on the day that the announcement of a deletion is made public. However, although this is not statistically significant, the preceding day's return of -0.36% is statistically significant, as is the cumulative three-day abnormal returns of -1.22% (Table 9). The CARs during the event window are shown in Figure 2 for firms that are deleted from the index.

In both cases (addition to and deletion from the index) there is a significant (positive for the addition and negative for the deletion) abnormal return on Day -2, which we attribute to "leakage of information." These results suggest that the market attaches a significant value to signals confirming a firm's socially responsible activities or a confirmation of its failure on such measures. Once a firm is classified as a socially responsible entity, the market rewards it with an upward re-estimation of its value. Firms classified as "not socially responsible" will experience a negative market reevaluation.

V. Summary and Conclusion:

In this paper we provide a model to illustrate that imposing a constraint in a non-monotonic function could lead to a higher maximum point if the constraint has the ability to also shift the objective function. Applying this concept to the issue of corporate profitability, we argue that imposing a "social responsibility" constraint could lead to increased profitability of the firm. We support this argument by introducing an

optimization model and a numerical example. In an empirical attempt to test this argument, we compare the characteristics of firms making up the DS 400 index with that of a control group of firms not included in the DS 400. We find that socially responsible firms are, at a minimum, are at par with their peer companies on the basis of return on equity (their return on assets is superior) and betas, but dominate their peers on the basis of their degree of unique risk. Our analysis also indicates that a socially responsible orientation does not come at a cost to shareholders. To the contrary, it appears that these firms provide their investors with risk/return opportunities that are at least equal to, and at times superior to, those provided by their peers. Further, we find strong evidence indicating that socially responsible firms employ significantly less leverage in their capital structure.

Using a 16-year data (1990-2005), we examine announcements of addition to or deletion from DS 400 index and their impact on the companies that are added or deleted. Our results indicate that firms that are added to (deleted from) the DS 400 Index experience a positive (negative) abnormal return upon the announcement. For firms that are added to the index, the three-day cumulative abnormal return surrounding the announcement (-1, 0, +1) is positive (0.67%) and statistically significant. In contrast, those firms that are deleted from the index experience a negative cumulative three-day abnormal return, in the magnitude of -1.22%, which is also statistically significant. This observation adds further weight to observations made elsewhere that it may be *reputation* for CSR, or good corporate governance that really matters to firm valuation regardless of the actual performance characteristics involved (Orlitzky et al 2003; Wheeler & Davies, 2007).

References:

Becchetti, Leornado, Stefania Di giacomo and Damiano Pinnacchio, "Corporate Social Responsibility and Corporate Performance: Evidence from a Panel of US Listed Companies" *CEIS Working Paper No. 7,* SSRN Working Paper Series, 2005.

Bello, Zakri, (2004) "Socially Responsible Investing and Portfolio Diversification" *Journal of Financial Research, Forthcoming*

Bodnar, G.M., Tang, C., and Weintrop, J., (1997) "Both Sides of Corporate Diversification: Value Impacts of Geographic and Industrial Diversification," NBER Working Papers, Working Paper 6224.

Friedman, M., "The Social Responsibility of Business is to Increase its Profits," *New York Times Magazine*, September 13, 1970.

Freeman R E (1984). *Strategic Management: A stakeholder approach.* Boston: Pitman.

Freeman R E and McVea J (2001). A stakeholder approach to strategic management. . In: Hitt MA, Freeman R E and Harrison J S eds (2001). *Handbook of Strategic Management.* Oxford: Blackwell, 189-207.

Freeman, R.E., Wicks, A.C. and Parmar, B. (2004). Stakeholder theory and "the corporate objective revisited." Organization Science 15(3), 364-369.

Goss, A., and G. Roberts, "The Cost of Virtue: Corporate social responsibility and the Cost of debt Financing," *Working Paper, Schulich School of Business*, York University, September 2006.

Jensen MC (2005). Value mazimization, stakeholder theory, and the corporate objective function. In: Chew DH and Gillan SL (2005). *Corporate Governance at the Crossroads. A book of readings.* New York: McGraw-Hill Irwin, 7 - 20.

Jensen M C and Meckling W F (1976). Theory of the firm: Managerial behavior, agency costs, and ownership structure. *Journal of Financial Economics* 3, 305-60.

Jensen MC and Meckling WF (2005). The nature of man. In: Chew DH and Gillan SL (2005). *Corporate Governance at the Crossroads. A book of readings.* New York: McGraw-Hill Irwin, 87-102.

Margolis, JD and Walsh, JP (2001). *People and Profits? The Search for a Link Between a Company's Social and Financial Performance.* Mahwah, NJ: Erlbaum.

Milevsky, M., A. Aziz, A. Goss, J. Comeault, and D. Wheeler, "Cleaning a Passive Index," *The Journal of Portfolio Management*, Spring 2006, 110-118.

Orlitzky M and Benjamin JD (2001). Corporate Social Performance and Firm Risk: A Meta-Analytic Review. *Business and Society* 40: 369-396.

Otlitzky M, Schmidt FL and Rynes SL (2003). Corporate social and financial performance: a meta-analysis. *Organization Studies* 24(3), 403-441.

Roberts, John, (2004), *The Modern Firm*. Oxford: Oxford University Press

Roman R, Hayibor S and Agle B (1999). The relationship between social and financial performance. *Business and Society* 38(1), 109-125.

Statman, Meir, "Socially Responsible Indexes: Composition and Performance" SSRN Working Paper Series, 2005

Waddock SA and Graves S (1997). The corporate social performance-financial performance link. *Strategic Management Journal* 19, 303-317.

Wheeler D (2003). The successful navigation of uncertainty: Sustainability and the organisation In: Burke R & Cooper C (eds) *Leading in Turbulent Times* Oxford: Blackwell, 182-207.

Wheeler D and Davies R (2007). Why corporate governance rankings do not predict future value: Evidence from Toronto Stock Exchange listings 2002-2005. In Benn S & Dunphy D (2007). *Corporate Governance and Sustainability: Challenges for Theory and Practice*. London: Routledge.

Table 1: Definition of Characteristics Used to Create the Control Group Firms

Control firms are screened out of the universe of publicly traded firms that are (1) in the same line of business (two-digit SIC code) as the Domini firms and (2) are the closest in size (market cap.) to the Domini firms as possible.

Variable	Definition
Market to Book	The Fiscal Year-End close price/ ((Total assets – Total Liabilities)/#shares)
ROA	Net Income/Total Assets
ROE	Net Income/ stockholder's equity
ROS	EBIT/Sales
Leverage Ratio	(Long-Term Debt + Current Liabilities) / Total Assets
CapEx to Sales	Capital expenditures / Sales
R & D to Sales	Research and Development Expenditures / Sales
Advertising to Sales	Advertising Expenditures / Sales
Excess Equity to Sales	(Market Value of Equity – Book Value of Equity) / Sales
Tobin's Q	Market Value of Assets / Total Assets

Table 2: Comparison of Firm Included in the Domini Index with their Control Group with regard to:

I. Market to Book Ratio

Year	Mean of Domini Companies	Mean of Control Companies	Standard Deviation of Domini Companies	Standard Deviation of Control Companies	t-value	Pr>|t|
1990	1.0550638	0.9513670	0.9250071	0.9335211	1.69	0.0927
1991	0.8964885	0.7954807	0.8180624	0.8393508	2.16	0.0313
1992	1.1815660	1.2028052	1.3968726	1.7176394	0.08	0.9380
1993	1.1750595	1.2839703	1.1898937	1.5407070	-1.02	0.3062
1994	1.1089877	1.3601867	0.9304682	2.4199247	-1.84	0.0670
1995	0.9876253	1.0020734	0.8738460	1.1345612	0.06	0.9533
1996	1.0923785	1.4329814	1.0898711	2.1982894	-2.59	0.0099
1997	1.1808613	1.3229807	1.1082267	1.4560499	-1.34	0.1822
1998	1.3602025	1.2543764	1.1900774	1.2478261	0.85	0.3955
1999	1.4804359	1.5064421	1.5442897	2.1392374	-0.71	0.4803
2000	1.8357651	2.5182584	3.5147504	4.6933028	-2.35	0.0191
2001	1.5813634	1.9467298	2.1110166	3.0948840	-2.28	0.0233
2002	1.4309256	1.5537581	1.3740055	1.7497751	-1.07	0.2835
2003	1.0573805	0.9630336	0.9717072	1.1089068	1.43	0.1537
2004	1.2955015	1.2606577	1.1383645	1.2761321	0.49	0.6275
2005	1.3673209	1.4706542	1.2705945	1.7594411	-0.29	0.7696
1990-2005	1.2546177	1.3651121	1.5058442	2.0947096	-3.32	0.0009

II. ROA

Year	Mean of Domini Companies	Mean of Control Companies	Standard Deviation of Domini Companies	Standard Deviation of Control Companies	t-value	Pr>|t|
1990	0.0567792	0.0452249	0.0676256	0.0824743	2.22	0.0269
1991	0.0497819	0.0441951	0.0686619	0.0873086	1.31	0.1906
1992	0.0425857	0.0226986	0.0756419	0.1298993	2.68	0.0078
1993	0.0437789	0.0284256	0.0816462	0.1436798	1.87	0.0621
1994	0.0563317	0.0590054	0.0706573	0.1856074	-0.60	0.5521
1995	0.0533388	0.0446479	0.0731512	0.0967610	1.31	0.1916
1996	0.0514819	0.0423047	0.0852920	0.1115491	1.39	0.1654
1997	0.0503245	0.0496262	0.0839312	0.0805931	-0.01	0.9948
1998	0.0451680	0.0390048	0.1128787	0.0942605	0.38	0.7038
1999	0.0633048	0.0372997	0.0642071	0.1578737	2.75	0.0063
2000	0.0595084	-0.0087795	0.0726321	0.2842129	4.64	<.0001
2001	0.0282247	-0.0405650	0.1284949	0.4189544	3.30	0.0011
2002	0.0243001	-0.0126959	0.1319392	0.2337214	2.92	0.0038
2003	0.0449174	0.0358508	0.0785744	0.1117968	1.59	0.1116
2004	0.0547148	0.0529787	0.0702853	0.0931454	0.47	0.6392
2005	0.0643477	0.0520309	0.0636922	0.1058483	1.72	0.0867
1990-2005	0.0492044	0.0304464	0.0863236	0.1782224	7.57	<.0001

III. ROE

Year	Mean of Domini Companies	Mean of Control Companies	Standard Deviation of Domini Companies	Standard Deviation of Control Companies	t-value	Pr>|t|
1990	0.1180840	0.1078263	0.1613116	1.2006047	0.19	0.8482
1991	0.0779940	0.1056119	0.4162830	0.8128213	-0.57	0.5677
1992	0.0722372	0.0062757	0.2709574	0.9300122	1.32	0.1886
1993	0.6726616	0.0141155	11.1868248	1.0492090	1.15	0.2489
1994	0.1567074	0.1113235	0.2732779	1.3676843	-0.99	0.3238
1995	0.2393071	0.0510813	2.3056882	0.9318670	1.42	0.1553
1996	0.0798862	0.1569967	0.9135009	6.2433710	-0.24	0.8123
1997	0.0711252	0.1204384	1.0083757	0.3341395	-0.96	0.3400
1998	0.1397219	-0.0892932	0.4903028	2.2521418	1.83	0.0682
1999	0.1695202	0.4742966	0.2876090	5.9794146	-0.97	0.3321
2000	0.1905915	0.0068453	0.7225693	1.2674081	2.47	0.0139
2001	0.0573099	-0.1578607	0.4848529	2.8767153	1.45	0.1471
2002	0.1223019	0.0467256	1.0147027	1.2217247	1.04	0.2984
2003	0.0387169	0.2814981	1.5626202	3.3276972	-1.23	0.2186
2004	0.1349291	0.0579121	0.3526366	1.5849063	0.96	0.3372
2005	0.1877736	0.3027186	0.4529380	2.7590164	-0.68	0.4992
1990-2005	0.1581958	0.0984420	2.9562073	2.7116458	1.11	0.2690

IV. ROS

Year	Mean of Domini Companies	Mean of Control Companies	Standard Deviation of Domini Companies	Standard Deviation of Control Companies	t-value	Pr>|t|
1990	0.1290961	0.1959347	0.1140479	1.4977689	-0.86	0.3909
1991	0.1228549	0.1184918	0.1162219	0.1734370	-0.19	0.8495
1992	0.1282426	0.0701523	0.1201439	0.7042087	1.61	0.1077
1993	0.1346777	0.0293660	0.1330672	1.1702127	1.68	0.0936
1994	0.1394018	0.1266737	0.1242017	0.2134118	0.53	0.5939
1995	0.1406118	0.1374294	0.1192244	0.1643787	0.05	0.9564
1996	0.1364664	0.1252148	0.1258790	0.2588664	0.35	0.7296
1997	0.1413446	0.1401890	0.1254844	0.1586200	-0.31	0.7551
1998	0.1285905	-0.7113294	0.1530055	12.5914620	1.27	0.2059
1999	0.1438535	0.0761246	0.1300256	0.6715664	1.95	0.0523
2000	0.1503284	-0.9837710	0.1403495	11.6552519	1.86	0.0633
2001	0.1214678	-0.1496340	0.1490841	2.2201142	2.40	0.0167
2002	0.1360028	-0.1277045	0.1545850	3.3980559	1.52	0.1298
2003	0.1481995	0.1174672	0.1549193	0.2838364	2.07	0.0394
2004	0.1627728	-0.0951232	0.1474960	5.0601968	1.01	0.3137
2005	0.1715339	0.1385120	0.1452973	0.2133736	2.48	0.0136
1990-2005	0.1396791	-0.0497770	0.1357805	4.6065870	3.12	0.0018

V. Leverage Ratio

Year	Mean of Domini Companies	Mean of Control Companies	Standard Deviation of Domini Companies	Standard Deviation of Control Companies	t-value	Pr>|t|
1990	0.1799361	0.2027913	0.1624310	0.2128397	-1.42	0.1564
1991	0.1748604	0.2062450	0.1579371	0.2043200	-2.19	0.0289
1992	0.1720135	0.1939950	0.1553919	0.1905987	-1.94	0.0534
1993	0.1624754	0.1903127	0.1497896	0.1915715	-2.61	0.0093
1994	0.1640801	0.1897212	0.1487931	0.1772559	-2.03	0.0430
1995	0.1738371	0.2006649	0.1433845	0.1918733	-2.65	0.0084
1996	0.1752138	0.1958746	0.1390135	0.1828380	-1.80	0.0728
1997	0.1821699	0.1964653	0.1433371	0.1935798	-1.59	0.1117
1998	0.1975904	0.2274640	0.1589492	0.2022309	-2.37	0.0182
1999	0.1937145	0.2324062	0.1560145	0.2327719	-2.32	0.0208
2000	0.1870325	0.1952085	0.1458593	0.1917146	-0.41	0.6798
2001	0.1943040	0.2061705	0.1496916	0.1848758	-1.08	0.2820
2002	0.1883448	0.2071667	0.1496928	0.1864304	-2.20	0.0283
2003	0.1817000	0.2111835	0.1433301	0.1850453	-2.59	0.0100
2004	0.1723097	0.1887696	0.1438825	0.1756754	-1.69	0.0926
2005	0.1693626	0.1777884	0.1495274	0.1624098	-1.25	0.2105
1990-2005	0.1792028	0.2012255	0.1500809	0.1921711	-7.57	<.0001

VI. Capital Expenditures as a Fraction of Sales

Year	Mean of Domini Companies	Mean of Control Companies	Standard Deviation of Domini Companies	Standard Deviation of Control Companies	t-value	Pr>|t|
1990	0.0022373	0.0031618	0.0063269	0.0128007	-1.65	0.1001
1991	0.0020321	0.0018578	0.0053892	0.0059642	-0.07	0.9451
1992	0.0018032	0.0027453	0.0052140	0.0225265	-0.85	0.3971
1993	0.0014878	0.0050937	0.0048408	0.0528781	-1.29	0.1973
1994	0.0013705	0.0031275	0.0044655	0.0198975	-1.61	0.1081
1995	0.0016959	0.0028212	0.0059063	0.0140454	-0.82	0.4128
1996	0.0015514	0.0026024	0.0052710	0.0154820	-0.98	0.3282
1997	0.0012453	0.0028023	0.0036531	0.0191515	-1.50	0.1350
1998	0.0014636	0.0023701	0.0050912	0.0111442	-1.25	0.2123
1999	0.0017086	0.0020975	0.0082086	0.0138495	-0.21	0.8319
2000	0.0012530	0.0015644	0.0049089	0.0053692	-0.94	0.3480
2001	0.0011730	0.0011746	0.0047395	0.0045060	0.28	0.7788
2002	0.00086817	0.0011584	0.0034541	0.0049406	-0.76	0.4473
2003	0.000900864	0.000625653	0.0032840	0.0018560	1.80	0.0731
2004	0.000741708	0.000875159	0.0023547	0.0039685	-0.28	0.7827
2005	0.000838216	0.000865310	0.0026263	0.0030322	-0.45	0.6496
1990-2005	0.0013987	0.0021710	0.0049451	0.0179246	-3.01	0.0027

VII. R&D Expenditures as a Fraction of Sales

Year	Mean of Domini Companies	Mean of Control Companies	Standard Deviation of Domini Companies	Standard Deviation of Control Companies	t-value	Pr>|t|
1990	0.0363623	-0.0224112	0.0446126	0.7963084	0.85	0.3953
1991	0.0378657	0.0553305	0.0474715	0.1673509	-1.56	0.1224
1992	0.0374062	0.1507194	0.0453975	0.8897385	-2.24	0.0267
1993	0.0396960	0.2076874	0.0504335	1.4559757	-1.46	0.1465
1994	0.0417611	0.0611944	0.0538319	0.1784361	-1.68	0.0965
1995	0.0394125	0.0393686	0.0559828	0.0605494	-0.84	0.4040
1996	0.0420017	0.0785051	0.0590544	0.2194600	-2.01	0.0470
1997	0.0444206	0.0514355	0.0581471	0.0772410	-0.90	0.3712
1998	0.0473657	0.7355578	0.0656847	6.1943712	-1.47	0.1447
1999	0.0452931	0.1330099	0.0554354	0.8081076	-1.33	0.1867
2000	0.0490560	0.6033199	0.0598326	3.2644814	-2.07	0.0396
2001	0.0562275	0.3760892	0.0747084	2.1508784	-2.05	0.0419
2002	0.0674774	0.4335634	0. 1364374	3.7246768	-1.44	0.1510
2003	0.0652001	0.0976660	0.1273770	0.2504406	-1.71	0.0889
2004	0.0553545	0.4047717	0.0700479	4.8744062	-1.05	0.2951
2005	0.0528915	0.0878164	0.0696327	0.2066479	-1.87	0.0630
1990-2005	0.0482943	0.2299407	0.0747175	2.5123112	-3.65	0.0003

VIII. Advertising Expenditures as a Fraction of Sales

Year	Mean of Domini Companies	Mean of Control Companies	Standard Deviation of Domini Companies	Standard Deviation of Control Companies	t-value	Pr>|t|
1990	0.0491489	0.0344041	0.0123080	0.0346677	0.85	0.3961
1991	0.0373271	0.0374314	0.0422706	0.0510584	-0.51	0.6120
1992	0.0374777	0.0381527	0.0426763	0.0421093	-0.18	0.8594
1993	0.0395657	0.0368040	0.0458605	0.0371144	0.69	0.4950
1994	0.0461068	0.0383336	0.0472554	0.0395945	-0.51	0.6114
1995	0.0488156	0.0495636	0.0478002	0.0618200	-0.48	0.6377
1996	0.0444628	0.0484924	0.0421910	0.0524085	-0.88	0.3831
1997	0.0440815	0.0469252	0.0415934	0.0551912	-0.93	0.3590
1998	0.0443364	0.0432697	0.0427730	0.0557862	0.74	0.4646
1999	0.0421189	0.0426413	0.0431152	0.0552240	-0.21	0.8384
2000	0.0378048	0.0457937	0.0429219	0.0645905	0.56	0.5797
2001	0.0332276	0.0338326	0.0387458	0.0420445	0.18	0.8558
2002	0.0312814	0.0286268	0.0348390	0.0335634	0.87	0.3852
2003	0.0329809	0.0296984	0.0403353	0.0404882	2.26	0.0267
2004	0.0317050	0.0287434	0.0396368	0.0384245	1.69	0.0940
2005	0.0296557	0.0303129	0.0364705	0.0467266	0.22	0.8275
1990-2005	0.0378146	0.0366680	0.0420655	0.0464347	1.04	0.3008

IX. Excess Equity Value as fraction of Sales

Year	Mean of Domini Companies	Mean of Control Companies	Standard Deviation of Domini Companies	Standard Deviation of Control Companies	t-value	Pr>|t|
1990	0.5743226	0.6463566	1.0002277	2.5019440	-0.42	0.6723
1991	0.8298486	0.9394652	1.2401624	2.4037178	-0.66	0.5066
1992	0.8390163	1.8943805	1.1751653	9.1611416	-2.14	0.0329
1993	0.8864858	1.7800252	1.0754772	5.1323977	-3.29	0.0011
1994	0.7069791	1.1343205	0.8138042	2.3967822	-3.04	0.0025
1995	0.8621377	1.2399026	1.0472798	3.2462792	-2.03	0.0435
1996	0.9218585	1.7218837	1.0621322	4.3399676	-3.76	0.0002
1997	1.2107265	1.5336302	1.2799403	1.9754305	-3.01	0.0028
1998	1.3031333	22.2852023	1.6859118	360.1262909	-1.11	0.2671
1999	1.4833432	2.7451662	2.4518360	10.4820254	-2.23	0.0265
2000	1.6756690	19.9389083	2.8709277	175.5535314	-1.99	0.0472
2001	1.3997880	3.5741973	2.0344779	15.8702954	-2.66	0.0081
2002	1.0871109	1.0860144	1.6107477	2.1478503	0.08	0.9334
2003	1.5383952	1.5989698	2.2769644	2.8204826	-0.35	0.7279
2004	1.4804402	6.5639614	1.9828094	97.7825944	-1.02	0.3081
2005	1.3921243	1.6634032	1.8516634	2.5423392	-2.27	0.0237
1990-2005	1.1352345	4.3737899	1.7243592	102.5606279	-2.41	0.0158

X. Tobin's Q

Year	Mean of Domini Companies	Mean of Control Companies	Standard Deviation of Domini Companies	Standard Deviation of Control Companies	t-value	Pr>|t|
1990	0.0390880	1.4435291	0.0440725	1.6937635	0.30	0.7652
1991	1.2764824	1.1121993	0.9904867	1.2610521	1.56	0.1200
1992	1.6941371	1.8453856	1.7560525	2.9241417	-0.71	0.4753
1993	1.7455472	1.8383659	2.0109864	2.0087501	-0.70	0.4846
1994	1.6052566	1.8685855	1.3087864	2.2662488	-1.54	0.1257
1995	1.4145908	1.4617101	1.0804928	1.4487128	-0.19	0.8527
1996	1.6376914	2.1809537	1.5000133	3.6268269	-2.37	0.0185
1997	1.7687284	1.9451970	1.5917510	1.9265145	-0.89	0.3759
1998	2.0773980	1.9097394	1.8601131	1.6594065	1.72	0.0874
1999	2.3397777	2.3615257	2.6430480	2.8835983	-0.35	0.7232
2000	3.1111393	4.8101329	6.1513127	9.4328724	-2.92	0.0037
2001	2.6324126	3.3706063	3.4115840	5.2008387	-3.02	0.0027
2002	2.4721500	2.6607250	2. 5001377	2.9363442	-1.05	0.2929
2003	1.8117175	1.6289213	1.6432689	1.8102481	1.36	0.1734
2004	2.2411830	2.1344736	1.8173218	1.7727351	0.47	0.6365
2005	2.4227985	2.5632964	2.1153128	2.8341121	-0.46	0.6450
1990-2005	1.9896731	2.2048966	2.4861286	3.5770211	-3.93	<.0001

Table 3: Comparison of the Total Risk (Standard Deviation of Returns) of Firms Included in the Domini Index with those of the Control Group

Year	Mean of Domini Companies	Mean of Control Companies	Standard Deviation of Domini Companies	Standard Deviation of Control Companies	t-value	Pr>|t|
1990	0.0210786	0.0263288	0.0051509	0.0072011	-16.22	<.0001
1991	0.0215634	0.0239623	0.0038543	0.0038705	-11.21	<.0001
1992	0.0208363	0.0236993	0.0036531	0.0032172	-11.87	<.0001
1993	0.0196376	0.0248952	0.0025033	0.0066279	-11.93	<.0001
1994	0.0189513	0.0225098	0.0027024	0.0031787	-17.09	<.0001
1995	0.0190395	0.0230278	0.0041494	0.0050950	-10.30	<.0001
1996	0.0195261	0.0241707	0.0032259	0.0040634	-16.70	<.0001
1997	0.0203458	0.0243559	0.0040546	0.0046030	-13.38	<.0001
1998	0.0250177	0.0288743	0.0067615	0.0083245	-11.19	<.0001
1999	0.0270240	0.0310610	0.0045851	0.0056395	-13.03	<.0001
2000	0.0332584	0.0458608	0.0059895	0.0110450	-22.91	<.0001
2001	0.0279075	0.0369719	0.0074403	0.0102728	-20.89	<.0001
2002	0.0268655	0.0339471	0.0068719	0.0093574	-16.16	<.0001
2003	0.0195346	0.0210819	0.0039720	0.0044419	-6.29	<.0001
2004	0.0167832	0.0195436	0.0033152	0.0040306	-12.46	<.0001
2005	0.0157646	0.0189407	0.0034859	0.0045004	-11.35	<.0001

Table 4: Comparison of Betas of firms included in the Domini Index with that of the Control Group

Year	Mean of Domini Companies	Mean of Control Companies	Standard Deviation of Domini Companies	Standard Deviation of Control Companies	t-value	Pr>|t|
1990	1.0619951	0.8691810	0.4598639	0.5275240	6.03	<.0001
1991	1.0136125	0.8541262	0.4490522	0.5230134	5.16	<.0001
1992	1.0429253	0.9631679	0.5497720	0.6824146	2.12	0.0345
1993	0.9768522	0.9979216	0.5591633	0.6407043	-0.58	0.5632
1994	0.9618448	0.9944624	0.4531555	0.5416259	-0.97	0.3324
1995	0.9001040	0.9757674	0.6241551	0.7507515	-1.68	0.0931
1996	0.8875869	0.8974699	0.4067326	0.5389230	-0.33	0.7405
1997	0.8263969	0.7745547	0.4097112	0.4411178	2.00	0.0465
1998	0.9014177	0.9324106	0.3820609	0.4852344	-1.15	0.2508
1999	0.6604891	0.6147772	0.4412224	0.5095890	1.77	0.0779
2000	0.6453086	0.9218340	0.5197232	0.8347534	-7.51	<.0001
2001	0.8886698	1.0569948	0.6021466	0.8899527	-4.23	<.0001
2002	0.9790852	1.0395474	0.4202900	0.5463407	-2.14	0.0333
2003	1.0324505	1.0178383	0.4192433	0.4727041	0.56	0.5756
2004	1.1215086	1.1692195	0.4730536	0.5367160	-1.69	0.0909
2005	1.1142402	1.1235272	0.4357667	0.4725329	-0.37	0.7087

Table 5: Comparison of Daily Returns to the Shareholders of Firms Included in the Domini Index with those of the Control Group

Year	Mean of Domini Companies	Mean of Control Companies	Standard Deviation of Domini Companies	Standard Deviation of Control Companies	t-value	Pr>|t|
1990	-0.000384011	-0.000680299	0.0098212	0.0087392	1.51	0.1331
1991	0.0015254	0.0015386	0.0084635	0.0075076	-0.08	0.9347
1992	0.000716597	0.000599698	0.0061315	0.0059958	0.87	0.3845
1993	0.000630591	0.000638938	0.0050973	0.0055996	-0.06	0.9531
1994	0.000074033	-0.000127242	0.0057347	0.0061723	1.52	0.1301
1995	0.0010258	0.000844718	0.0044357	0.0051084	1.27	0.2050
1996	0.000796371	0.000695814	0.0062510	0.0066054	0.67	0.5009
1997	0.0012191	0.000867270	0.0084580	0.0081665	2.26	0.0244
1998	0.000651556	0.000189541	0.0113361	0.0122967	2.45	0.0149
1999	0.000421180	0.000423597	0.0078981	0.0076918	-0.02	0.9872
2000	0.000624201	-0.000090136	0.0115543	0.0152936	1.43	0.1525
2001	0.000653275	0.000274835	0.0128540	0.0152757	1.29	0.1970
2002	-0.000300369	-0.000708698	0.0154772	0.0167044	1.94	0.0531
2003	0.0014245	0.0015487	0.0105802	0.0105644	-1.11	0.2689
2004	0.000691481	0.000782110	0.0081043	0.0085612	-0.80	0.4272
2005	0.000334040	0.000253980	0.0073989	0.0075715	0.86	0.3912

Table 6: Comparison of Alphas of firms included in the Domini Index with that of the Control Group

Year	Mean of Domini Companies	Mean of Control Companies	Standard Deviation of Domini Companies	Standard Deviation of Control Companies	t-value	Pr>|t|
1990	-0.000161294	-0.000433609	0.0013153	0.0018549	2.35	0.0195
1991	0.000338980	0.000564614	0.0012814	0.0015508	-2.42	0.0160
1992	0.000353339	0.000236862	0.0011027	0.0014670	1.31	0.1926
1993	0.000196133	0.000201899	0.0011330	0.0013090	-0.07	0.9445
1994	0.000099504	-0.000075017	0.0010425	0.0013697	2.19	0.0292
1995	-0.000060565	-0.000296773	0.0013402	0.0017775	2.21	0.0280
1996	0.000104258	0.000020664	0.0010668	0.0014936	0.90	0.3673
1997	0.000331851	0.000040295	0.0011878	0.0015400	3.09	0.0022
1998	-0.000059527	-0.000568910	0.0017202	0.0017709	4.28	<.0001
1999	-0.000165184	-0.000072410	0.0017188	0.0019629	-0.79	0.4314
2000	0.000858826	0.000222565	0.0020116	0.0031545	3.51	0.0005
2001	0.000988523	0.000682894	0.0016916	0.0018266	2.63	0.0090
2002	0.000492957	0.000080537	0.0012316	0.0022158	3.24	0.0013
2003	0.000198750	0.000340083	0.000946380	0.0011853	-1.88	0.0605
2004	0.000118611	0.000181332	0.000940511	0.0011570	-0.85	0.3968
2005	-1.214428E-6	-0.000093417	0.000949844	0.0014377	1.15	0.2528

Table 7: Comparison of Sharpe Ratios of Firms Included in the Domini Index with those of the Control Group

Year	Mean of Domini Companies	Mean of Control Companies	Standard Deviation of Domini Companies	Standard Deviation of Control Companies	t-value	Pr>|t|
1990	-0.0383460	-0.0447261	0.4254044	0.3009570	0.56	0.5748
1991	0.0398944	0.0394569	0.3695271	0.2906636	0.05	0.9595
1992	0.0195549	0.0151147	0.2847784	0.2431931	0.65	0.5169
1993	0.0286264	0.0219512	0.2498115	0.2194477	1.02	0.3100
1994	-0.0035527	-0.0154342	0.2927974	0.2642784	1.74	0.0829
1995	0.0429830	0.0286359	0.2280668	0.2160777	2.06	0.0407
1996	0.0279946	0.0197922	0.3162629	0.2641690	1.09	0.2782
1997	0.0581994	0.0241790	0.3729233	0.3141639	3.76	0.0002
1998	0.0153081	-0.0065991	0.4054931	0.3694084	2.92	0.0038
1999	-0.0033481	-0.0025843	0.3009335	0.2586840	-0.12	0.9019
2000	0.0033059	-0.0156079	0.3250107	0.3037869	1.89	0.0598
2001	0.0070443	-0.0057861	0.4113711	0.3553444	1.56	0.1193
2002	-0.0269123	-0.0363750	0.5184519	0.4465960	1.06	0.2893
2003	0.0670152	0.0665891	0.5116310	0.4780404	0.06	0.9524
2004	0.0337083	0.0344402	0.4880312	0.4290184	-0.09	0.9318
2005	0.0205186	0.0136002	0.4521347	0.3970140	0.83	0.4078

Table 8:

Abnormal and Cumulative Abnormal Returns Experienced by the Shareholders of Firms Added to the Domini Index

Event	AR	CAR	Patell Z	Generalized Z
-5	0.28%	0.28%	1.297$	-0.194
-4	0.16%	0.44%	1.473$	0.396
-3	-0.17%	0.27%	-0.477	-0.587
-2	0.25%	0.52%	2.294*	1.575$
-1	0.14%	0.66%	1.511$	1.575$
0	0.43%	1.09%	4.342***	2.902**
1	0.10%	1.19%	0.514	-0.068
2	0.31%	1.50%	2.135*	1.22
3	0.08%	1.58%	0.481	1.121
4	0.11%	1.69%	1.06	0.13
5	0.09%	1.78%	0.409	0.13

The symbols $,*,**, and *** denote statistical significance at the 0.10, 0.05, 0.01 and 0.001 levels, respectively, using a 1-tail test. The symbols (,< or),> etc. correspond to $,* and show the significance and direction of the generalized sign test.

Table 9:

Abnormal and Cumulative Abnormal Returns Experienced by the Shareholders of Firms Deleted from the Domini Index

Event	AR	CAR	Patell Z	Generalized Z
-5	0.19%	0.19%	1.950*	0.391
-4	-0.10%	0.09%	0.648	0.391
-3	-0.22%	-0.13%	-0.503	0.292
-2	-0.08%	-0.21%	1.206	2.559**
-1	-0.36%	-0.57%	-2.060*	-0.2
0	-0.44%	-1.01%	-0.748	1.226
1	-0.42%	-1.43%	-1.22	0.776
2	-0.18%	-1.61%	0.316	-0.397
3	0.90%	-0.71%	3.428***	0.348
4	0.67%	-0.04%	3.793***	1.340$
5	0.12%	0.08%	1.937*	-0.775

The symbols $,*,**, and *** denote statistical significance at the 0.10, 0.05, 0.01 and 0.001 levels, respectively, using a 1-tail test. The ymbols (,< or),> etc. correspond to $,* and show the significance and direction of the generalized sign test.

Figure 1:

CAR During the Event Window for the Firms That Are Added to the Index

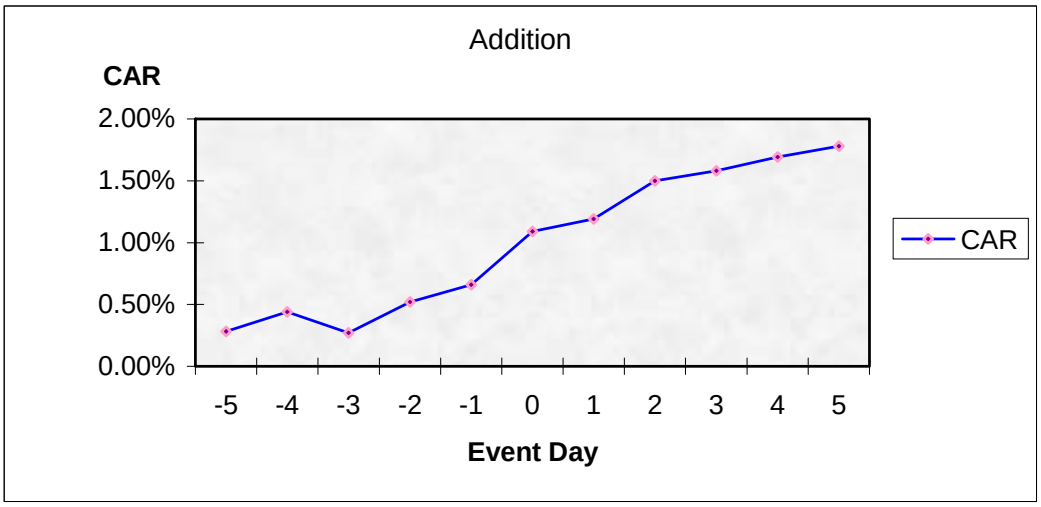
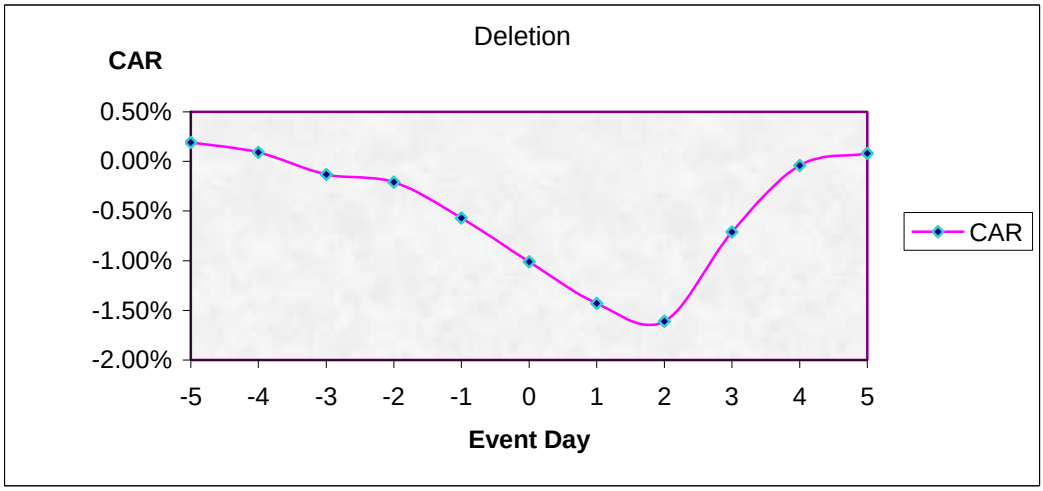


Figure 2:

CAR During the Event Window for the Firms That Are Deleted from the Index



APPENDIX

To expand on our discussion of Section II with a specific example, consider a farmer who is operating in perfectly competitive markets for inputs and outputs. Its production function can be displayed by $q = f(x_1, x_2) = 10x_1^{.25}x_2^{.5}$. Its output is sold for \$20/unit. The input variables, x_1 (fertilizer) and x_2 (labor), can be obtained at a price of \$1.5 (per 100 grams of fertilizer) and \$8 (per hour of labor), respectively. The profit function for this firm is $\pi = pq - C = \$20(10x_1^{.25}x_2^{.5}) - \$1.5x_1 - \$8x_2 - \$10,000$, where the \$10,000 is the fixed cost (say rent for the land). Maximizing this profit function with respect to x_1 and x_2 results in x_1 = 173,611 units of fertilizer and x_2 = 65,104 labor hours as the optimum combination of inputs. This combination will provide the farmer with \$250,416 profits.

Now suppose, there is an alternative production technique that uses a more environmental friendly input, x_3, (say green fertilizer) which has the same marginal productivity as x_1 but is 33% more expensive, \$2 per 100 grams. If this farmer (or another firm with the same characteristics) uses this input instead of x_1, the optimizing process will result in hiring 97,656 units of x_3 and 48,828 units of x_2, which in turn will result in \$185,312 profits.

Obviously, introducing the constraint to "go green" has reduced the profit for the firm. But what if, as a result of going green (producing organic food, for example) the demand curve for the product is shifted so that the product now could be sold at a 10% higher price (\$22)? In that case, by following the same optimizing procedure the firm

should hire 142,978 units of x_3 and 71,489 units of x_2, which will result in $275,957 profits, a $25,541 extra profit over the competitor firm that uses the “cheap and dirty technique.”