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Technical Analysis: The Interface of Rational and Irrational Decision Making

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ABSTRACT

Individual and institutional investors share a common goal, that is, the pursuit of profit. It is the underlying assumptions about investors and the market as well as the approach to achieving this common goal is where there is a divergence of perspectives. It will be argued that investors act rationally and irrationally. It will also be asserted that since financial markets represent the exchange of investors that financial markets can be characterized as behaving rationally and irrationally. Depending upon the underlying assumption of investors, the approach to generating a profit differs. Fundamental analysts de facto assume that investors are rational and financial markets are efficient. In contrast, technical analysts tend to believe in both the irrationality and rationality of investors.

INTRODUCTION

The ideological debate between fundamental analysis and technical analysis continues to be waged in the trading pits, electronic trading labs, proprietary trading firms, investment management companies, and the halls of the academy. This debate largely hinges on whether investors, both individual and institutional, make rational and/or irrational decisions. In essence, the foundation of this debate focuses upon what it means to be a decision maker and how decisions are made when seeking rewards and mitigating risks. Gencay (1997) argues that the acid test for any investor is to earn a profit.

This ideological debate cannot be fully appreciated without first defining two terms-technical analysis and fundamental analysis. According to one of the most widely recognized investment textbooks, technical analysis is defined as "...the search for recurrent and predictable patterns in stock prices (Bodie, Kane, & Marcus, 2005, page 373)." Fundamental analysis is defined as the use of "...earnings and dividend prospects of the firm, expectations of future interest rates, and risk evaluation of the firm to determine stock prices (Bodie, Kane, & Marcus, 2005, page 377)."

Technical analysis consists of a school of practitioners who rely primarily upon charts and another school of practitioners who rely basically upon technical indicators like moving averages and volume indicators. Pruden (2007) posits that technical analysts fall along a continuum ranging from discretionary trading to mechanical trading. Discretionary analysts rely more upon their experience, intuition, and perception. In contrast, mechanical analysts rely more upon a common set of rules developed around technical indicators that signal entry and exit points. These models are often based upon computer programs using quantitative financial algorithms. Clearly, there are technical analysts that use both discretionary and mechanical approaches to trading.

The aim of this paper is to apply the emerging discipline of behavioral finance to explore the decision making process and the utility of technical analysis when making investment decisions and allocating investment capital. This paper is organized into four sections. The first section succinctly traces the historical development of technical analysis. The second section highlights the major theoretical underpinnings of technical analysis with a focus on behavioral finance. The third section critically reviews the empirical literature regarding the efficacy of technical analysis. The fourth section outlines recommendations for individual and institutional investors regarding the usefulness of technical analysis and behavioral finance.

Historical Development of Technical Analysis

Charles Henry Dow, the founding editor of *The Wall Street Journal*, is credited with establishing technical analysis based upon the development of Dow Theory. One of Charles Dow's protégés was William Peter Hamilton who assumed both editorial responsibilities for *The Wall Street Journal* and advanced the early theoretical foundation of technical analysis in a widely acclaimed book published in 1922 entitled The Stock Market Barometer. Andersen, Gluzman, and Sornette (2000) assert that technical analysis involves the "...study of the relationship between price, volume, and other variables from trading (page 580)." Technical analysis is more often utilized for short time horizons of a week or less compared to fundamental analysis (Neely, 1997). In practice, technical analysis and fundamental analysis complement each other (Neely, 1997).

During these pioneering years, concepts like bull and bear market trends were born and techniques like charting. Technical analysis uses charts and the use of charts has been described as a gateway to human perception (Phillips and Todd, 2003). Following William Peter Hamilton's early theoretical work, Robert Rhea decomposed Dow Theory into three dominant market movements: primary trend, secondary trend, and tertiary trend. Rhea (1932) incorporates psychological concepts as illustrated below in a description of the three stages of the bear market:

“...the first represents the abandonment of the hopes on which the stocks were purchased at inflated prices; the second reflects the selling due to decreased business and earnings, and the third is caused by distress selling of sound securities, regardless of their value (page 13).”

Rhea's above description highlights both the rational (e.g. selling due to declining business and earnings) and irrational (e.g. abandonment of hopes, distress selling of sound securities) elements of financial decision making and trading.

Technical analysis has also been referred to as market timing. This term is generally considered to be less than flattering. Dating back to 1934, Cowles (1934) empirically tested the informational efficiency of the market and concluded that market timing results in less than profitable returns. Since that landmark study, numerous other studies have been conducted (Roberts, 1959; Brown, Goetzmann, and Kumar, 1998; Metghalchi and Glasure, 2007) and the results neither conclusively support nor disconfirm the Dow Theory or technical analysis.

Technical Analysis: In Search of a Good Theory

What is the market? Philosophers caution researchers not to reify constructs. Markets are socially constructed. Before exploring the question of the theoretical underpinnings of technical analysis, a brief discussion of the theory of market efficiency is in order because the two constructs are related. Fama (1970) made a distinction between three forms of efficient market hypothesis: (a) the weak form, (b) the semi-strong form, and (c) the strong form. The weak-form efficient market hypothesis holds that stock returns cannot be predicted based on past price behavior (Fama, 1970). Therefore, any study that attempts to present the existence of abnormal returns based on information obtained from past prices is at odds with even the weakest form of the efficient market hypothesis. Accordingly, technical analysis is largely theoretically inconsistent with the Efficient Market Hypothesis (EMH).

Russell and Torbey (2008) list several factors which challenge the validity of the efficient market hypothesis including but not limited to the following: the January effect; the weekend effect; other seasonal effects; small firm effect; the P/E ratio effect; S&P index effect; the weather effect; and the over/under reaction of stock prices to earnings announcements. Beyond the efficient market hypothesis, there are alternative theories seeking to describe and explain how the market works ranging from the Dow Theory described above, complexity theory (Samuelson, 1972; Sornette, 2003), applied physics (Andersen, Glutzman, & Sornette, 2000) and behavioral finance. This paper will explore the contributions of the Dow Theory, complexity theory, and primarily behavioral finance to technical analysis.

Dow Theory

One of the alternative theories of technical analysis is the Dow Theory the Dow Theory was defined by Russell (1958) as follows:

“...a system based on the premise that the closing prices of the Dow Jones Industrial Average and Rail Averages give us a complete index of all the knowledge, hopes, and fears of everybody who knows anything about financial matters (page 3).”

As such, the Dow Theory “...is a completely technical approach to the market (Russell, 1959, page 26).

The Dow Theory has been empirically tested and one research team (Brown, Goetzmann, and Kumar, 1998) made the following conclusion:

“...the Dow Theory, as applied by Hamilton over the period of 1902 to 1929, yields positive risk-adjusted returns (page 1311)... The basis of this track record seems to have been his ability to forecast bull and bear market moves (1998, page 1330).”

To be fair, this research team did not establish causation between technical analysis and the positive risk-adjusted returns (Brown, Goetzmann, & Kumar, 1311). Only a randomized trial can provide the data required to establish causation.

Complexity Theory

Sornette (2003) argues that financial markets are complex systems and that "...many complex systems are said to be computationally irreducible (page 17)." Chaos theory asserts that technical analysis has the potential to generate net profits due to the reaction of prices to chaos (Clyde & Oster, 1997). The federal government bailout of AIG insurance following the failure of Lehman Brothers, the acquisition of Merrill Lynch by Bank of America, and the infusion of federal dollars to buoy Freddie Mac and Fannie Mae portrays how complexity theory is apropos in describing the capital and financial markets. To this point, T.J. Marta, a fixed-income strategist at RBC Capital was quoted in the *The Wall Street Journal* article saying, "These markets are unhinged... This is like a fire that has burnt out of control (2008, page A5)."

Behavioral Finance

Brunei (2007) writes about the value of behavioral finance in working with high-net worth clients, "Behavioral finance teaches us that individual investors do not follow the precepts of financial theory (page 19)." Shiller (2003) asserts that behavioral finance offers an alternative explanation to the efficient markets theory as illustrated below:

"Some very recent research has emphasized that, even though the aggregate stock market appears to be wildly inefficient, individual stock prices do show some correspondence to efficient markets theory (page 89)."

As it relates to the price of individual stocks, some evidence suggests that "...changes in prices occur for no fundamental reason at all (Schiller, 2003, page 84). One of the explanations is the influence of mass psychology (Schiller, 2003). Some have even posited that "all economic movements, by their very nature, are motivated by crowd psychology (Menschel, page 37)."

Not only does behavioral finance seek to explain and predict behavior based upon mass psychology principles but also individual psychology principles. For example, Tversky and Kahneman (1992) found that individuals value a loss to a greater degree than a gain which is referred to as loss aversion. Another individual psychological principle found in the empirical literature is the disposition effect in which individuals tend to sell winners too soon and hold onto losers too long (Shrefrin and Statman, 1995). The disposition effect has also been found to occur among professional traders (Garvey and Murphy, 2004). Despite the disposition effect among professional traders, it was found (Garvey and Murphy, 2004) that they were still profitable as described below:

"Nevertheless, because they carried out more winning than losing trades overall, the traders were still profitable—earning more than \$1.4 million in intraday trading profits over a 68-day trading period in a downward-trending market. The traders minimized their loss exposure by trading few shares, trading low-priced stocks, or trading during times of low market activity. Yet, they exhibited risky behavior by holding their losing trades too long even under these conditions (page 42)."

Technical analysts utilize the central tenets of crowd psychology and behavioral finance to search for opportunities in the market to generate a profit. This is based upon the assumption that markets are a reflection of "...people's opinions and expectations (Brown, 2003, page 22)" and the fact that to date there is no equation to "...quantify fear or greed (Brown, 2003, page 22)." The CBOE Volatility Index (VIX) is one measure of investor sentiment and market volatility in the near term. Furthermore, in keeping with psychological feedback theory, the emotions of fear and greed which Lo (2005) categorizing as "extreme emotional reactions" dampens our ability to reason and respond rationally.

In short, Pruden (2007) writes, "Behavioral finance and technical market analysis are two sides of the same coin (page 35)." As such, technical analysis offers a time-tested approach to capture market sentiment qualitatively, using charts and pattern recognition, and quantitatively, using oscillators.

Convergence: Behavioral Finance Meets the Efficient Market Hypothesis

Technical analysis has long drawn upon theories of human behavior. Most recently, technical analysis has applied the emerging theories of behavioral finance. According to Vasiliou, Eriotis, and Papathanasiou (2008), the convergence of technical analysis and behavioral finance can be described as follows:

"In the behavioral finance model it is observed rational and irrational expectations about returns like technical analysis. In behavioral and in technical theory we observe a combination of fundamental and psychological-emotional factors (page 108)."

This aforementioned point of view expressed by Vasiliou, Eriotis, and Papathanasiou (2008) are affirmed by others (Pruden, 2005). To this end, Pruden (2005) commented that technical analysis and behavioral finance are "...one and the same in their roots (page 39)."

Momentum trading can be explained with a behavioral asset pricing model (Grinblatt & Keloharju, 2001). Sirri and Tufano (1998) refer to the inflows of investment dollars into well-publicized, high-performing mutual funds as herding. Sornette (2003) posits that market prices consist of two types of information: publicly available information and "...subtle information formed by the global market that most or all individual traders have not yet learned to decipher or use (page 279)."

Sornette (2003) allude to the innovation in trading strategies resulting from the convergence of different explanations of how markets work and often competing approaches to generating a profit in the financial markets. Specifically, Sornette (2003) writes about this innovation below:

"Understandably, traders regard their trading systems to be proprietary and are reluctant to disclose them...Recent theoretical studies indeed suggest that new strategies coevolving with older ones may surpass them if used only by a limited number of players (page 354)."

Lo (2005) agrees with the basic premise of Sornette (2003) regarding the convergence of a number of disciplines to explain how markets work. Lo (2005) also makes the case for the adoption of The Adaptive Market Hypothesis. The Adaptive Market Hypothesis posits that market ecology, the number of market competitors, the magnitude of profit opportunities, and the adaptability of market participants using the tenets of behavioral finance determine some degree of market efficiency. The key difference between The Efficient Market Hypothesis and The Adaptive Market Hypothesis is the assumption regarding the rationality of investors. EMH assumes rational investors in contrast to The Adaptive Market Hypothesis which does not make that assumption in all cases.

The Efficacy of Technical Analysis: The Proof is in the Pudding

The results are equivocal regarding the relative efficacy of technical analysis versus fundamental analysis in making a profit. There are numerous critics of technical analysis because it challenges the efficient market hypothesis which has become the gold standard in academia. In fact, some have equated technical analysis with astrology (Neely, 1997). Fama (1970) asserted that after factoring in transaction costs that technical trading was not profitable.

There are several empirical studies showing that technical analysis is efficacious in generating a trading profit (Gencay, 1998; Austin, Bates, Dempster, Leemans, & Williams, 2004; Metghalchi & Glasure, 2007; Vasiliou, Eriotis, & Papathanasiou, 2008). One of the limits to technical analysis is the high transaction costs which can potentially offset any gains (Stone, 2007). In one empirical investigation exploring the role of volume as a market statistic, technical analysis was found to be "...valuable because current market statistics may be sufficient to reveal some information, but not all...sequences of market statistics can provide information that is not impounded in a single market price (Blume, Easley, & O'Hara, 1994, page 177)." In this study, the authors demonstrate that "...traders who use information contained in market statistics do better than traders who do not (1994, page 153)." To this point, Malkiel (2003) argues that the unequal access to fundamental information may explain why technical analysis works.

The influence of technical analysis can have both positive and negative outcomes. Shiller (1989) asserts that technical analysis was a catalyst to the stock market crash of 1987. In short, the results are equivocal at best.

Recommendations: Applied Behavioral Finance and Technical Analysis: Where Theory Meets Strategy

The behavioral finance discipline emerged after technical analysis. However, the early founders of technical analysis realized that the foundation of their trading strategies was based upon human behavior. Faith (2007) writes, "Price movement is a function of the collective perception of buyers and sellers in a market." This has also been referred to as the Life Cycle Model of Crowd Behavior (Pruden, 1999). Vasiliou, Eriotis, and Papathanasiou (2008) describe technical analysis as seeking "...understand the emotions in the market by studying the market itself (page 100)."

The recommendations that follow for individual and institutional investors recognize the fact that many traders use both fundamental and technical analysis (Lui and Mole, 1998). It has also been empirically demonstrated that technical analysis is practiced to a greater degree among foreign exchange traders in shorter time horizons [intraday, 1 week, 1 month] than fundamental analysis which is practiced more so in longer time horizons beginning with 6 months (Lui and Mole, 1998).

Trend Analysis: Tapping the Power of Fundamental and Technical Analysis

It is recommended that a trend be analyzed using techniques from both fundamental and technical analysis (Tilkin & Epstein, 2007; Zacks, 2003). Kaufmann (2003) identifies four factors that create trends: government policy; international trade; expectations; and supply/demand. Bollinger (2002) refers to this as rational analysis. This is based upon the observation by Shefrin (2000) that fundamental analysis cannot detect changes in market sentiment with absolute certainty which thus provides a role for technical analysis which relies upon market sentiment as an indicator of changes in market prices. To be fair, there are critics of the model which advocates mixing technical and fundamental analysis (De Grauwe and Dewachter, 1990).

Price Forecasting: Monitoring Mass Psychology

It is recommended that individuals remember that “when the collective perception changes, the price moves (Faith, 2007, page 8).” Furthermore, markets are “...comprised of individuals with hopes, fears, and foibles (Faith, 2007, page 13) and traders “...are seeking out opportunities that arise from these human emotions (Faith, 2007, page 13).” Another factor which has an impact on the profitability of trading is the bid-ask spread which influences transaction costs. Cheung, Chinn, and Marsh (2004) found that there are underlying behavioral factors which determine in part the bid-ask spread in the FX market.

Align Time Horizon and Type of Market with Type of Analysis

It is true that both fundamental and technical analysis have their critics and that both can be used as a way to predict price movements to generate a profit. It is also true that technical analysis is more appropriate for shorter time horizons of less than 3 months (Taylor and Allen, 1992) and technical analysis is more appropriate for specific markets. Cheung, Chinn, and Marsh (2004) note that “...the majority of traders close out positions by the end of a working day, horizons of 6 months are of only academic interest to most traders (page 290).” Pruden (2007) asserts that technical analysis and the use of the Life Cycle Model of Crowd Behavior is more appropriate for shorter time periods. On the other hand, fundamental analysis has been proven to be more appropriate for the “...big-picture, long-horizon outlook (Brown, 2003, page 22).

Which markets are most appropriate for technical analysis? Speculator driven markets are the most appropriate (Faith, 2007). Examples of such markets include coffee, precious metals, and even oil. In short, commodities. Commodity markets have always consisted of two types of traders: physical commodity consumers and speculators. According to Michael W. Masters of Masters Capital Management, LLC who testified by before the *Committee of Homeland Security and Government Affairs of the U.S. Senate*, he offers the following distinction regarding commodity speculators in general and Index speculators in particular:

“One particularly troubling aspect of Index Speculator demand is that *it actually increases the more prices increase*. This explains the accelerating rate at which commodity futures prices (and actual commodity prices) are increasing. Rising prices attract more Index Speculators, whose tendency is to increase their allocation as prices rise. So their profit-motivated demand for futures is the inverse of what you would expect from price-sensitive consumer behavior (page 6).”

This effect occurs in part because of the psychology of a specific crowd, that is, institutional investors and those that seek to follow this trend. Barron’s described these institutional investors as “...a new breed of speculator (September 1, 2008, page 16).” Given that this particular approach involves trading an index, then transaction costs are less, thereby addressing one of the hallmark criticisms of technical trading.

CONCLUSION

Given the long-standing debate and equivocal statistical evidence regarding the relative theoretical rigor and empirical support for technical analysis and even fundamental analysis, it might be wise to conduct a randomized trial. There are two distinct benefits to randomization. First, causality can be determined. Second, the influence of confounding variables can be mitigated statistically (Ayres, 2008).

In the interim, it is likely that the convergence of behavioral finance and technical analysis will continue as innovation in the financial markets continues to accelerate along with growing complexity and chaos. Pruden (2008) posits that the understanding and application of human behavior in general but “...pattern recognition, intuition, judgment, and a feel for markets and people” will represent the critical success factors for technical traders in the 21st century.

CASE STUDY

An illustrative example of the convergence of behavioral finance and technical analysis is what took place on September 8, 2008 when United Airlines’ stock dropped more than 75 percent on Monday, September 8, 2008 due to a

nearly six-year old Chicago Tribune news report regarding the bankruptcy of United Airlines which was circulated on Bloomberg News Service. After being alerted to this issue on Monday morning, the Tribune Company removed the six-year old, online archived story. It all began when Income Securities Advisor, a Miama Lakes investment advisory firm, picked up the six-year old story which they believed to be a current story on SunSentinel.com the website of the South Florida Sun Sentinel.

United stock, which had closed on Friday (9/5/2008) at \$12.30 a share, hit a low of \$3 a share on Monday (9/8/2008) before the confusion was cleared up. The stock closed Monday (9/8/2008) at \$10.92. NASDAQ halted trading in UAL, the company issued a statement calling the bankruptcy talk “completely untrue” and lashing out at the “irresponsible posting” of an article published six years ago.

What accounted for the sudden decline and then sudden rise of United’ stock price in a single trading day?

It can be convincingly argued that the fundamentals of United Airlines did not change substantially in one day nor did the macro-economic forces in the airlines industry or the socio-political climate of the nations in which United Airlines is headquartered (Chicago, Illinois, USA) or the world. These sudden price changes cannot be explained by classical finance theory (Fama, 1970) which seeks to explain market phenomena using tools associated with fundamental analysis. Westerhoff (2004) argues that “[M]ost economists agree that prices do not always reflect their fundamental values (page 830).”

What might be an alternative explanation for these sudden price fluctuations? Wessterhoff (2004) posits that fear and greed account for sudden price fluctuations. As it relates to the drawdown of United Airlines on September 8, 2008, this explanation has some merit:

“The selling pressure due to a panic attack, triggered by a sharp price drop, may decrease the price so severely that the traders begin to panic again. Trend-extrapolating trading rules amplify this process. The dynamics of a crash are therefore at least partially endogeneous (Westerhoff, 2004, page 837).”

This phenomenon was also observed in the crash of October 1987 and partially explained “...by relying on psychological considerations, since the basic elements of the valuation equation did not change rapidly over that period (Malkiel, 2003, page 73).”

What are the lessons learned?

This case study also illustrates the BRSN (“buy on the rumor, sell on news”) phenomena which occurs in the financial markets and has been well documented by Peterson (2002). Information has a greater behavioral impact if it is about the near future, has a strongly positive or negative affective quality, is well-known, and has easily visualized potential consequences (Loewenstein, Lowenstein, Weber, and Welch, 2001). Given these criteria, it is evident that the declaration of the bankruptcy of United Airlines on Monday (9/8/2008) met the criteria of the near future, the affective quality of the impact of a bankruptcy on a stock price is clearly negative for those with long positions and positive for those with short positions, and it is clear to visualize the potential consequences of a bankruptcy of a major airline on the stock price of the second largest U.S. airline.

This case also illustrates how declining stock prices lead to anxiety and negative affect in investors, which accelerates risk-averse, protective behaviors. “The price pattern depends on both the information content of the news and the investor’s reference price relative to the current price (page 2038), according to Frazzini (2006). In the end, Malkiel (2003) discussing the integration of psychology and stock prices explore the role of psychological feedback mechanisms in short-run momentum.

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Figure 1: United Airlines Candlestick Chart from 8/20/2008-9/20/2008.



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