

Test of a Theory: An Empirical Examination of the Changing Nature of Investor Behavior

Amanda L. Smith
Ashland University

Thomas W. Harvey
Ashland University

This study accomplishes four objectives. First, it supports the behavioral finance literature as to how investors make decisions. Second, we hypothesize that investors utilize technical and fundamental analysis in their investment decisions which are also influenced by economic conditions. Third, we test that assertion empirically and find that there is less reliance on fundamental analysis and that investors are using past stock prices as the dominant criteria for investment. Fourth, our results suggest that investors rely most heavily on economic factors and stock price trends for making their decisions. The influence of cable television and the Internet is also explored.

INTRODUCTION

At the conclusion of the book *The Myth of the Rational Market*, Fox (2009: 308) writes that “the rational market theories have fallen apart” and “financial markets have fallen apart.” During the 20th century, the Dow Jones Industrial Average provided an average return of 11% per annum with only one decade, the 1930’s, showing a loss. The market continued to increase in the first decade of the new millennium, but then something changed. The Dow Jones Industrial Average plunged from 14,164.53 on October 9, 2007 to 8,451.19 one year later and to 6,594.44 on March 5, 2009, a decline of 53.44% (<http://finance.yahoo.com>) Further, on October 19, 2008, a record 11.5 billion shares were traded as opposed to the average daily volume of approximately 5 billion shares. On that day, and others in mid-October, 2008, investors were desperate to get out of the market which caused a selling panic and the equity markets went into a drastic freefall. Traditional financial theory said that these phenomena should not have happened, but they did.

All of this was the result of the bursting of the subprime lending bubble in the summer of 2007 which ravaged housing prices and caused the failure of Bear Stearns, Merrill Lynch, Washington Mutual, Lehman Brothers, Wachovia, and numerous commercial banks. It was very reminiscent of the bank failures of the Great Depression of the 1930s. Not only was something different from the majority of the 20th century, but also something was definitely wrong. Fox (2009) was right: the theory of finance had fallen apart, and the financial markets were broken. Yang and Lester (2008) suggested that the entire system had become irrational, fueled by the impulsive behavior of investors. In this paper, we examine that behavior.

The failure of the financial markets and the irrationality that caused it did, in fact, suggest that

traditional finance theory with its emphasis on rationality did not hold anymore. This may have been a new thought in many academic and practitioner circles at the time, but Kahneman and Tversky (1979) had challenged the tenets of traditional finance when they offered an alternative to expected utility theory thirty (30) years ago. Expected utility theory had been the most common way of thinking about economic and financial decision-making in the latter half of the 20th century and had maintained that those decisions were made with total logic and rationality as investors sought to maximize their wealth (Friedman & Savage, 1948).

Bernstein indicated that “there has been no meaningful addition to the theory of finance since 1973” (2007:1). We would contend, in response, that a major advancement in financial theory occurred in 1979 with the publication of Kahneman and Tversky’s seminal paper on prospect theory and has continued into the new millennium. Kahneman and Tversky (1979) had presented results of laboratory studies that contradicted the principles of traditional finance theory and suggested that asset allocation decisions are made on the basis of subjective choice and not the objective analysis and decision-making of expected utility theory. That is, financial decisions come down to a choice between competing alternatives which people weight by their perception of the probability of risk. What makes it subjective is that different people have different perceptions of risk even when looking at the same data set. Some investors are risk takers while some are risk averse. Thus, Kahneman and Tversky (1979) presented a logical alternative to expected utility theory by advancing prospect theory in which financial decisions are understood to be choices about potential returns modified by perceived risk. Those choices are personal, being influenced by investors’ emotions, experiences, backgrounds, and biases. Mood enters into the process as well. However, we do not believe that prospect theory or other theories of behavioral finance apply to every financial decision that is being made.

Our contribution may be new, but also it may simply be obvious. What financial theory says should happen does not happen in practice. And, it has always been that way, since the tulip bulb craze of the late 1500s. Smith (1994) wrote of the psychology of markets and acting in one’s own self-interest 240 years ago. Thus, human nature being what it is suggests that there does not appear to be a theory of investor behavior that can be applied consistently all of the time to every circumstance and every decision.

Thus, this paper pushes the field of finance toward the behavioral side, as it is also our contention that the many of the elements of traditional finance such as the capital asset pricing model (CAPM), arbitrage pricing theory (APT), the efficient market hypothesis (EMH), and beta may not be as applicable as they have been in the past. We come to this conclusion because many of the assumptions upon which they were constructed, such as the notion that financial transactions do not have a cost to them or that there are no taxes, are incorrect. And, beta, the most common measure of risk, has been shown to have only a minimal relation to price movements. Further, in the observation of investor behavior, as evidenced by the market crash of October, 1987; the illogical behavior of the late 1990s in the run-up of the NASDAQ market; in 2005 - 2008 with the pricing of Google; the significant escalation of oil prices in 2008; and the drastic decline of the Dow Jones Industrial Average in 2008 - 2009, it appears that there is a significant amount of emotion in the financial markets as evidenced by the volatility that characterized these events. And, this does not even consider the impact of the hedge funds with the subprime debacle or that of high frequency trading and front running which has been in the headlines recently.

If, then, many of the traditional elements of finance have been rendered obsolete, we must find theory to fill that void and have concluded that the advancement of behavioral finance is an answer to that question, but not a definitive one. Behavioral finance suggests that human decision making is far more complex than expected utility theory would have us believe and that financial decisions are not always logical or rational. Whether we believe in the firm-foundation theory of the firm or the theory of the random walk (Malkiel, 2003), it is our contention that investors react to various forms and amounts of data and then make subjective decisions about where to allocate their resources. But, here is the problem. Because investors make different decisions for very different reasons, there may be no single theory of behavioral finance that is applicable to all of them. If that is the case, and theories of rationality do not hold, perhaps all the field has are the theories of irrationality that can be found in the psychology

literature.

Nofsinger (2002) provided insight into the human traits that may affect the resource allocation decision process, including:

- Overconfidence
- Illusion of knowledge and control
- Disposition effect
- Pride and regret
- House money effect
- Risk aversion
- Mental accounting
- Representativeness
- Familiarity

We contend, however, that not all of these apply to all investors all of the time, but that there may be elements of them present in the resource evaluation process at times and not at other times.

The results of our study, and the volatility of the market in recent years, support the departure from traditional finance and expected utility theory, as we suggest that investors make subjective judgments about future equity prices based upon a variety of subjective, personal criteria. But, as noted before, not everyone subscribes to the same criteria. Different investors react differently to the same financial data and do not make objective decisions as expected utility theory and other theories of rationality suggested.

In this paper, we examine the differences between traditional finance, based on expected utility theory, and behavioral finance which brings psychology into the conversation about financial theory and investor decision-making. First, we propose that behavioral finance is a more appropriate way to approach the field of investment management, especially with the increased availability of information that has come with the advent of the Internet and cable television. Second, we examine the ways in which investment decisions have been made in the past in relation to information that is disseminated about investment opportunities. Third, we offer a model of this decision-making process and present hypotheses that we studied empirically. Lastly, we present results of that study of investor decision-making in which we determine the information that investors use most in making their resource allocation decisions. Based on those results, we conclude that even with the use of fundamental and technical analysis, most investors are not totally rational in their decision making.

In other words, traditional finance says that investment decisions are always based on past performance that is analyzed carefully, the result being a logical and rational decision. We do not believe that this is the way decisions to invest are really made in the 21st century, but there is no other financial theory to explain that behavior other than those of irrationality. So, the question becomes how investors make those asset allocation decisions and what information is most usually considered when making them.

The next section of this paper advances our theory in terms of the previous work that has led us to it. Following that, in Section 3, we present our model the investor decision-making process and develop four hypotheses that we test. The results of those tests are the subject of Section 4 with Section 5 being an analysis of those results. Section 6 contains our interpretation of those results, and we conclude with the limitations of the study and a short summary of what we have proposed and what we found.

BEHAVIORAL FINANCE AND TRADITIONAL FINANCE

Olsen (1998) suggested that the discipline of behavioral finance originated in the early 1950s which is consistent with the assertion of Shefrin and Statman (1984). Olsen (1998) advanced the idea that the subject may have been first discussed by Burrell (1951) and was followed by Bauman (1967) and

Slovic (1972). He indicated that there is renewed interest in the field because of empirical studies that suggest that traditional theories of finance have become deficient and because of the work of Kahneman and Tversky (1979) in the area of prospect theory as an alternative to expected utility theory. Behavioral finance, in his view, tries to understand, and then to explain the ways in which investors make decisions as opposed to the way in which traditional finance sought to demonstrate it. That is, traditional finance was based on the concept of *homo economicus* who, in Olsen's view, was a decision maker who processed all financial information completely logically and rationally in the attempt to maximize his/her utility.

Ackert and Deaves (2010:4 - 5) suggest that "utility is the satisfaction received from a particular outcome." They present the neoclassical economic assumption that our preferences are complete; that is, we always know what we want. However, we do not believe that this is accurate. Further, they also assume transitivity which suggests that if one prefers A over B and B over C, one will also prefer A over C. Perhaps that is the case, but we do not believe that happens consistently or all of the time, either.

Statman (1995) provided a relatively simple distinction between behavioral finance and traditional finance. Traditional finance is based on the assumption that investors are rational while behavioral finance assumes that investors are just normal. Barber and Odean (1999), Baker and Nofsinger (2002), and Curtis (2004) agree that traditional finance is based on how human beings should behave while behavioral finance focuses on how people actually do behave, raising the possibility that people are not always rational. If they were, and we can return, again, to the tulip bulb craze in Holland in the late 1500s or and the escalation of the NASDAQ in the late 1990s (Malkiel, 2003), or the real estate/subprime run-up of 2003 - 2007, these "bubbles" surely would not have occurred. But, they did, even as the field continued to cling to the tenets of the traditional theories of finance.

DeBondt, Palm, and Wolfe (2004) added clarity to the debate by saying that behavioral finance addresses financial matters with the help of ideas and theories from the psychology literature and called for new financial theory based on these psychological concepts. At the same time, he suggested that heuristics, defined by Fromlet (2001) as the use of experience and practical efforts to answer questions or to improve performance, need to be considered as well. But, that raises the issues of the differences in the experience of individual investors and the psychological reaction to those experiences. Those, in turn, shape, or bias, thinking about opportunities that might be available in the market. In sequence, two investors with different experiences and reactions to those experiences might view the exact same opportunity totally differently because of their biased views. Fromlet (2001) concluded that the use of heuristics is a significant departure from the models based on *homo economicus* that were developed in the 1950s and 1960s. And, it is here that we introduce possible reasons for that departure.

Fromlet (2001) raises the matter of the speed of investor decision-making, as it has increased to the point where investors do not take the time that they used to take to conduct the relevant fundamental research and to make a rational financial decision based on that research. With the advent of the Internet and all of the financial web sites/programs on cable television that are available, it may not be possible to gather all of the relevant information and data which results in decisions being made on the basis of incomplete information and "gut feel" as investors just do not take time to be perfectly rational, i.e., they may not take time to "do their homework." They may just hear commentators on CNN, CNBC, MSNBC, BIT, or Fox Business talk about a stock and simply react because they trust those whom they see on television. Or, they may see news about a stock on a financial web site and have a similar reaction.

Peters (2003) concurred by suggesting that people do not always use statistics when making decisions. Instead, they rely on their personal decision-making criteria, based on their own background and experience even if they have relevant data. Based on those experiences, different investors may have different criteria (i.e. P/E ratio, 52 week high, intrinsic value, etc.) for basing a decision to allocate their resources which explains why those 5 billion shares of publicly-traded companies are exchanged every day on the New York Stock Exchange. Buyers and sellers simply have different opinions about stock prices. Buyers think the price will appreciate; sellers think the price will depreciate. It is all a matter of interpretation which is, in and of itself, subjective in nature.

Ritter (2003) provided evidence from the psychology literature that people make systemic errors

in the way that they think as they are typically overconfident in their own abilities, place too much emphasis on recent experiences, and allow their personal preferences to shape their thinking. Statman (1999) had suggested previously that decision makers are susceptible to frames and other cognitive errors, differing attitudes toward risk, aversion to regret, and lack of continuous self-control. Anyone who has seen the action on the floor of the various commodity exchanges could verify that emotions are highly evident among the traders.

Frankfurter and McGoun (2000) and Frankfurter, McGoun, and Allen (2004) provide some specificity regarding the differences between behavioral finance and traditional finance. Even though we can trace behavioral finance to Adam Smith, it is considered a relatively new discipline that is based on experimental psychology which can produce explanations rather than predictions. We agree, as it is our intent in this study to see if we can explain the behavior of investors as proxied by movements in individual stock prices. The primary reason, they say, for us to view behavioral finance as different from traditional finance is that behavioral finance challenges the efficient market hypothesis (EMH) which has theorized that there are no undervalued or overvalued stocks in the market which is populated by investors who are perfectly rational. In our opinion, there are, indeed, undervalued opportunities that can be found by being more rational than the majority of the market's participants. Lowenstein (2006: 66) called it being rational in "a perfect storm."

Frankfurter, McGoun, and Allen (2004) take the matter a little further as they suggest that there is a vast literature that has addressed the idea that there are significant differences between traditional economic theory, the assumptions upon which it is based, and the way in which choices are made in real life. They explain that, for some reason, finance has only considered *homo economicus*. The discipline has resisted any new alternative explanation or theory of financial phenomena since Markowitz' (1952) presentation of modern portfolio theory which was expanded by Fama (1965, 1970) into the efficient market hypothesis. Bernstein (2007) maintained that all of the elements of traditional financial theory were developed between 1952 and 1973 as complex mathematical formulas became the focal point for the field of finance. But, as suggested by Michael Gelband, a bond trader at Lehman Brothers, human behavior cannot be modeled in that way (McDonald, 2009).

Frankfurter, et al. (2004), agreeing with Olsen (1998), suggest that EMH and the capital asset pricing model (CAPM) of Sharpe (1964), Lintner (1965), and Black (1972) became the two mainstays of finance, even though they are based sets of unreasonable assumptions. As such, *homo economicus*, CAPM, and EMH became the underpinnings of traditional finance. Jensen, in 1978, proclaimed, "I believe there is no other proposition in economics which has more solid empirical evidence supporting it than the Efficient Market Hypothesis" (Fox, 2009: 107) only one year before the work of Kahneman and Tversky of prospect theory appeared.

So entrenched were the financial models, even if research proved that they were falsifiable, that significant empirical evidence was discarded, starting with Banz (1982). But, Fama (1998) continued to suggest that not only were EMH and CAPM were still valid, but further that they were inseparable. The thinking became, if people do not behave according to the theory, something is wrong with the people, and not with the theory (Frankfurter, et al., 2004).

This reliance on rationality and *homo economicus* was the centerpiece of traditional finance which postured that markets are efficient and that prices reflect all available information making it impossible to beat the market. However, Graham and Dodd (1934) and John Burr Williams (1997) had introduced the concept of the fundamental, or intrinsic, value of the firm. In their view, once investors understood the intrinsic value of the firm, they would bid the price up if the intrinsic value was greater than the current price or bid the price down if the intrinsic value were lower than the current price. In other words, asset prices always approach their fundamental, or intrinsic, value (Baker and Nofsinger, 2002). Therefore, investors can beat the market, only with a healthy amount of research to find undervalued companies which the efficient market hypothesis said cannot happen. There are numerous examples of investors such as Benjamin Graham, Warren Buffett, and Peter Lynch who did, or have done, just that. The trick was to find those undervalued companies first.

Thus, traditional finance failed to consider that there are some investors who will not do their

homework and will not recognize intrinsic value, therefore making errors in judgment for a variety of psychological and emotional reasons. On the other hand, there will be others who will conduct the requisite research and who will take advantage of those errors. As such, the field has concentrated on the ways in which people should behave and ignored the way that people actually do behave. It remained fixed on Markowitz' (1952) presentation of modern portfolio theory which assumes continuous pricing, free markets and societies, and rational investors (Curtis, 2004). Fromlet (2001) advised that classic and neoclassical western economic literature posed human beings as rational, always making the right decisions and succeeding in optimizing the benefits that they perceive.

Perhaps the view that traditional finance took with respect to *homo economicus* was relevant at the time at which Markowitz, Lintner, Merton, Fama, and Sharpe developed their theories in the mid-20th century. Perhaps markets were completely efficient back then and perhaps the capital asset pricing model held, although we are certain that transactions had costs to them and that there were taxes. But, as Lewis (2004) instructed, in the early 1980s, the financial markets in the United States underwent an astonishing transformation as new markets were created in which options and futures were traded. These derivative instruments could be used, and were used, as a hedge to eliminate risk. There was a realization that there was a connection between inefficiency and opportunity which rendered the efficient market hypothesis obsolete. There were undervalued stocks in the market. All that the intelligent investor had to do was find them.

Accordingly, we would offer the following observation. Theoretically, investors make subjective judgments about future equity prices, using a set of criteria (fundamental analysis and technical analysis) with which they are comfortable. If a security meets those chosen criteria and, if they think there is a reasonable prospect for acceptable return, they will make the investment. We will also submit that those criteria may be different for different investors. And, the criteria of an individual investor may change at any time due to changing circumstances and objectives. As reasonable as that might be, from a practical perspective that theory does not explain the volatility in the capital markets that was experienced in 2007 - 2009. Perhaps theories of fear should be explored, but that is outside the scope of this study.

The Basis of Decision-Making

The decisions that investors actually make are influenced by many factors, one of the most important of which is news about the company's past, present, and future performance. Earnings forecasts issued by management impact both analyst reports and the decisions about stock prices by individual and institutional investors. However, varying factors exist that determine to what extent the projections affect them.

There are many reasons for disclosure, when it takes place, how the information is presented, and then how analysts and, subsequently, investors react to what they hear and see. Different investors react in different ways to those forecasts with the extent of the reaction depending on the firm's prior forecasting behavior and the investor's own experience. The accuracy of previous forecasts along with the form of disclosure chosen impact the forecast's influence, as an analyst or investor is not likely to react to a forecast of a firm with a history of skewed projections (Hirst, Koonce, and Venkataraman, 2008). Furthermore, the forecast's horizon and timeliness along with the type, whether it be good or bad news, are other factors that vary the influence of the disclosure.

Hutton and Stocken (2007) concluded that investors react more to good-news forecasts when a firm has reputation for accurate projections. However, investors react more negatively to bad news than positively to good news. According to Hirst, et al. (2008), "This result suggests that bad news is inherently credible, whereas managers have to expend greater effort to make good news credible" (329). Much of the impact that forecasts have on the market can be linked to analyst behavior. Cotter, Tuna & Wysocki (2006) concluded that a large proportion of analysts change their projections within a few days of management's guidance. Thus, investors hear or see one forecast today and another one in a week. No wonder they find it difficult to be logical and rational in choosing which one to believe.

Chang, Ng, and Yu (2008) found that analyst forecasts affect investment decisions more than management forecasts. That is, investors believe that analysts more than the management of the firm

which may or may not be a rational choice. Negative information provided in an analyst forecast caused stronger reactions than positive information. Disposition effect, which causes investors to hold losers too long and sell winners too soon, is reduced by analyst forecasts. In contrast, negative management forecasts increase the disposition effect while positive forecasts lessen it. This is explained by the perceived credibility of the source. Investors are able to recognize the motivations behind the information, especially those of management, and they react to it. Analyst reports were more influential than management reports, suggesting investors were skeptical of management reasons for forecasting. Being skeptical is a human emotion, and there are various degrees of skepticism which influence investor decision-making.

It should be noted that daily market fluctuations do correlate with the magnitude of news items and the types of news items. The speed and level of impact that the news has on market fluctuations has become more pronounced since the growth of the Internet. Goonatilake and Susantha (2007) studied the effect of different types of news on the DJIA, S&P500, and NASDAQ for a 10-week time period. In the study, they weighted the type of news based on the category in which it fell. News falling under the category of global stability was weighted the highest with economic data, world business, and social-cultural changes following, each being weighted less and less (55). Each piece of news was also noted as good, bad, or neutral. The results of the study show that a relationship does exist between the number of news items and the market's movement (63). In addition, if one of the three markets (DJIA, S&P500, and NASDAQ) experienced an upward trend, so did the other two and vice versa.

Furthermore, and perhaps most important, the way in which that news is delivered impacts the way investors react to it. While 83% of Americans have a favorable view of cable television news broadcasts, 46% think that is skewed politically and 49% believe that the facts are not reported accurately (The Pew Center for the People and the Press, 2007). Thus, these viewers have a predisposed bias to what they see and hear about news and forecasts from various firms and analysts.

Additionally, the explosion of the Internet since 1994 plays a role as well. 71% of surveyed Americans use the Internet for financially-related tasks with 51% obtaining financial news online (Investment Company Institute, 2008). We question the validity of that news as it may be exacerbated by chat rooms and blogs which are populated by the opinions of those who choose to use them but may have no real expertise. It is very possible that bloggers incited the run on Bear, Stearns which could be the root cause of its demise (Cohan, 2009).

Now, we even wonder about the impact of Facebook, LinkedIn, and Twitter. In the extreme, investors may have entirely false information about companies and their stock prices based on the opinion of people who are posting their comments on the basis of what they see others, who may even know less than they do, have written. We contend that this kind of behavior is most irrational.

In the 21st century, news is updated and presented instantaneously and constantly with various commentators trying to inform the investing public about the reasons for market and price movements. We are interested that in most cases, there is little agreement among them. While we believe that investors should conduct fundamental and technical analysis in their resource allocation decisions, we also suspect that many of them simply react to what they see and hear on the cable television and the Internet as they make those decisions, regardless of the risk. As the markets started to decline in 2007, the volatility and speed of the freefall was only made worse by the media causing what could be called the Panic of 2008.

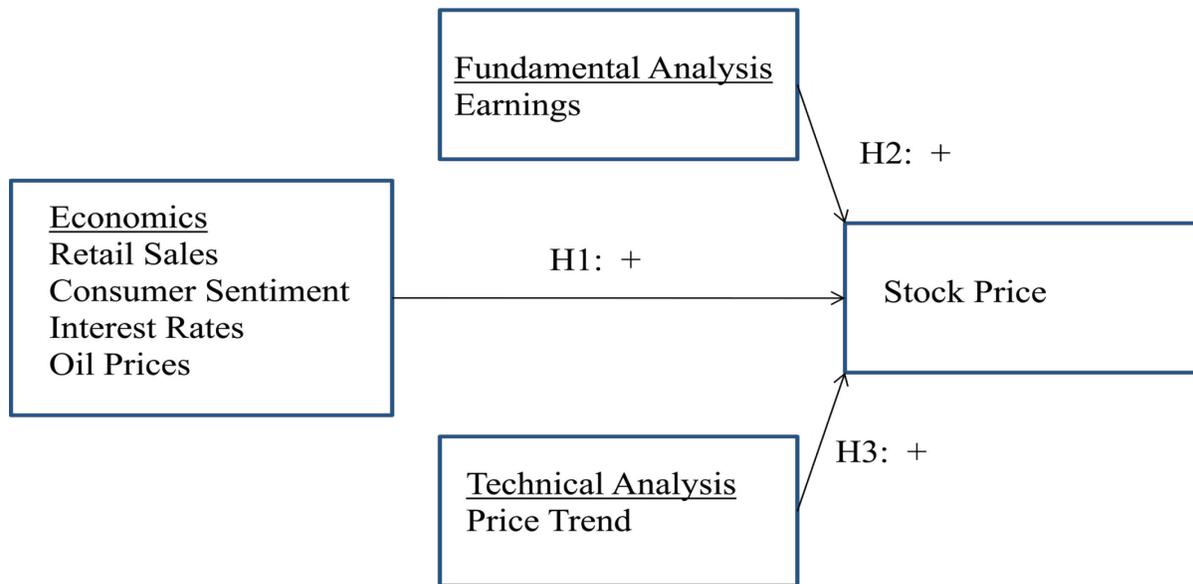
MODEL AND HYPOTHESIS

In consideration of the impact of information about the company and the way in which it is made public, there are three schools of thought with respect to investor decision-making: fundamental analysis about the company, technical analysis about the trend of the stock price, and no analysis at all. We also understand that in the decision-making process, investors are influenced by the current economic environment as well. But, we have seen a change in investor behavior as exemplified by the significant increases and decreases in the market indexes, the huge amount of volume being traded on a daily basis,

and the shortened amount of time for holding equity securities, not to mention the explosion of the cable television networks and the Internet.

The model depicted in Figure 1 is designed to identify how investment decisions are made. Based on the literature as presented in previous sections of this paper, it is reasonable to project that investors use both fundamental and technical analysis in their decision-making processes. It is also reasonable to assume that economic conditions come into play, especially with institutional investors and hedge funds as well as with individual investors. And, it is reasonable to assume that investors are influenced by the presentation of financial news, including earnings guidance, by the cable television stations and on the Internet. Additionally and practically speaking, it is very conceivable that no analysis is being done as investors simply react impulsively to what they hear and see.

FIGURE 1
A Model of Investor Decision-Making



Individual investors invest when retail sales are positive and consumer sentiment is high and will sell when those conditions are not present as was seen in the current economic environment in 1st quarter, 2009. Likewise, institutional investors and hedge funds will react to changes in interest rates and commodity prices. When interest rates and commodity prices are decreasing, they will add to their holdings, but in an increasing rate environment, they will sell. But, they, too, are influenced by what they see on their Bloomberg terminals and by what they hear from other traders which is reminiscent of the panic in the selling of the Blue Star stock in the movie *Wall Street*. Therefore, we hypothesize that:

H1: Investor decisions are influenced by conditions in the economy, notably the ability to consume, interest rates, and commodity prices and how those conditions are presented by the media.

Fundamental Analysis

Graham and Dodd (1934) maintained that the true value of any company could be derived by discounting its future earnings at some agreed-upon rate. This calculation depended on a significant amount of research into the past financial performance of the company and an educated projection of those results into the future. Graham and Dodd understood that they would have to make assumptions

about future growth rates, notably sales growth, and they would have to arrive at a mutually-acceptable discount rate, but they argued that reasonable assumptions could be made. Unless the business model of the company in question changed, it was very reasonable, for example, to project sales growth at a rate equal to the sales growth during some previous period.

Once that fundamental, or intrinsic, value was computed, the intelligent investor would compare it to the current price in the market. If the current price was less than the intrinsic value, the theory suggested the market would discover the disparity and would bid the price up to it. If, on the other hand, the current price was greater than the intrinsic value, the market would bid it down. Graham and Dodd (1934) based their interpretation of market behavior of the neoclassical economic laws of supply and demand made popular by Smith (1994).

Some of the most successful investors, notably Warren Buffett and Peter Lynch, adhered to the practice of fundamental analysis. Prior to investing, they would conduct thorough financial research about the company, would talk to customers and suppliers, would interview management, and would study the news. Only when they were confident that they had developed a comprehensive understanding of the firm's future prospects would they make the investment decision.

In that investors are purchasing the future earnings of the firm as presented by Graham and Dodd (1934) and others, we hypothesize that:

H2: Investors study the past earnings of the firm in making their decisions about their investments.

Technical Analysis

Technical analysts believe that fundamental analysis is a waste of time in that the assumptions upon which it is based are not reliable. Rather, these "chartists" believe that they can discern future price movements based on previous ones, as suggested by Charles Dow early in the 20th century (Schanep, 2008). In other words, they do not believe that the future prospects of the company matter at all, as they maintain that stock prices are set by the market. They believe that investors react to all sort of information, and so all they have to do is spot the trend of investor behavior and move quickly either on the "buy" side or the "sell" side as suggested by Keynes (1938). All that they look for is the trend as they seek to understand the strength of its momentum.

Whether the technical analysts look at bar charts, oscillators, moving averages, or any of the other charts, all they are looking for is an indication of the behavior of the market. Earnings results, management forecasts, and analyst estimates are of no value. Taking the time to research and evaluate them will cause the technical analyst to miss great investment opportunities.

Schwager (1999) suggested that investors should, indeed, use technical analysis in their investment decisions. But, he also said that there was room for the analysis of the firm's fundamentals as well. His point was that the more information an investor had about future firm performance and past price movement, the better that investor would be.

As such, it is reasonable to conclude that they are looking at the momentum of the stock price in terms of the trends up and down. As such, we hypothesize that:

H3: Investors look at the trends of stock prices before making their decisions to allocate their resources.

Regardless of the analytical tools that are being used in the investment decision process, it is very evident that the stock market is far from rational which has led to the popularity of behavioral finance theory and investors' reaction to what they see and hear in the media. As fundamental analysts are studying the company's past performance and are making assumptions and projections about the future, they are making subjective judgments which are based on their own experiences, education, biases, and assumptions. Understanding that, it is entirely possible for an investor to form one opinion about the company on one day and to have a different opinion another day. Thaler (1999) maintained that investors do not make their decisions on the basis of traditional financial theory as was the behavior during most of

the 20th century; nor do they make unbiased decisions about the future. We have all heard about “irrational exuberance” as the Dow Jones and NASDAQ enjoyed their run-up of the late 1990s. And, we experienced “irrational panic” as it has come crashing down in the latter part of the first decade of the 21st century.

However, the technical analysts are not immune from bias and heuristics either. They will look at the charts, and perhaps, devoid of complete logic and rationality, they may infer future price movements that the charts really do not suggest. They, too, may overreact to a price swing as has happened in 2008 and 2009, or they may not see an opportunity that really is there. Traditional finance, which assumed investor logic and reason, maintained that investors were rational. Behavioral finance, which brings emotion into the equation, just assumed that investors were normal. The significant increase in the number of transactions being processed on the New York Stock Exchange and the NASDAQ and the wild price swings that have been evident since the late 1990s certainly support the notion of investor irrationality.

The commentators on the myriad of cable television shows that are concerned with business and investment and the Internet with its instant updates on the financial web sites and the blogs and chat rooms that are frequented by investors has a significant influence on investor behavior. The advances in technology have changed the way investors behave than in previous times. Thus, the model shown in Figure 1 is designed to isolate those differences.

DATA AND METHODOLOGY

This paper is aimed at the obsolescence of traditional finance theory and issues a call to initiate conversation for theory to replace it. As such, we need to examine the practicality of the market to draw on events which may not be in the tradition of academic research. We will present our data, methodology, and results but realize that our analytical testing is not as sophisticated as that many scholars have done. At this point in our research, we are simply concerned about keeping it simple as we try to understand the basics of investor behavior.

We return to the observation of Michael Gelband, the bond trader at Lehman Brothers, who said that human behavior cannot be modeled with mathematics. He was referring to the deteriorating situation at his firm when the collapse of the subprime market was being ignored by the senior management who continued to leverage the acquisition of assets when that was the wrong thing to do (McDonald, 2009). He was also referring to the fall of Long Term Capital Management in 1999 whose traders continued to pursue what their econometric models told them, when, if they had looked at the market, would have seen that they should have been doing the exact opposite of what the models prescribed (Lowenstein, 2001).

Even with that understanding, we offer some basic empiricism to test our hypotheses. The economic variables that were selected to test the model and hypothesis were retail sales, consumer sentiment, the fed funds rate, and oil prices. For each of them, we were able to download monthly data for the period 1999 – 2008 from the Federal Reserve Economic Data database (FRED). In that timeframe, the stock market rose in 1998 – 2000, fell in 2000 – 2002, rose again sharply from 2003 – 2007, and collapsed in 2008. These fluctuations will provide a good test of the model both in time of expansion and in time of contraction.

Retail sales, which includes all retail sales excluding food services, is reported monthly by the U.S. Department of Commerce: Census Bureau. This variable provides a good prediction of consumer behavior. Retail sales figures are often used to predict the next five to nine months of retail economic activity, according to Ogg (2009). From this data, analysts and businesses gain an idea of consumers’ “overall consensus and outlook” (Ogg, 2009: 1). It is generally understood that if retail sales are increasing, there is optimism about the state of the economy and that investment in securities will occur as well. Similarly, if there is pessimism, there will be a selling mentality.

The Survey Research Center at the University of Michigan reports the levels of consumer sentiment by conducting monthly telephone surveys on expectations concerning the economy in general.

This data indicates consumer willingness to consume. As with retail sales, if consumers are optimistic, they will invest, but if they are pessimistic, they will divest.

The federal funds rate is the interest rate that depository institutions charge other depository institutions for overnight loans. The Effective Federal Funds Rate is determined by the Federal Reserve System's Board of Governors and can be modified by at any meeting of the Open Market Committee. This rate is dependent on the monetary policy and objectives of the Federal Reserve. It is understood that traders gauge future economic activity by looking at the fed funds rate. If the rate is lowered, it is assumed that banks will be more inclined to lend to one another which should result in increased consumer and business lending which spurs economic activity and future firm earnings. However, the reverse is also true.

With the volatility oil prices over the past decade, we decided to see if there was any relation between them and stock prices. It is generally understood that stock prices and real estate prices move together (Kindelberger 2005), but we were curious about the relationship of commodity prices, such as oil, and stock prices. Oil prices are reported monthly by the Dow Jones & Company and released by *The Wall Street Journal*. Oil prices impact consumer confidence levels as was seen in the summer of 2008. When oil prices are high, gasoline prices are high which may have a negative impact on consumer confidence. However, as with other economic variables, the reverse applies as well.

The fundamental variables provided more of a challenge because publicly-traded companies only have to report their results to the Securities and Exchange Commission quarterly. Accordingly, we downloaded the quarterly results for the companies in our data base for the same period as for the economic variables from advfn.com. This may be a flaw in the research design, but it is the best that can be done.

The fundamental variables were return on equity, return on assets, and earnings per share. Return on equity (ROE) is calculated by dividing a firm's net income by its total equity. This ratio represents a company's net profits generated from shareholders' equity. ROE is a prominent piece of fundamental data used to compare a firm's profitability with its competitors and the industry average. This ratio is also used as an indication of management effectiveness.

Return on assets (ROA) is calculated by dividing net income by total assets and represents a company's net profits generated from assets. ROA is also a factor of fundamental analysis used for comparison with competitors and industry averages. Like ROE, ROA is considered a determinant of management effectiveness.

Earnings per share (EPS) is calculated by dividing net income by the number of shares outstanding. As a factor of fundamental analysis, EPS describes a company's profitability and influences decisions about the price of a share of common stock.

For technical analysis, we were able to download from yahoo.finance.com monthly closing stock price data for those 500 companies for the same time period as for the economic variables and fundamental variables. We created a "dummy" variable based on the movement of the price during the previous month to represent the trend of stock price movement. As explained previously, market participants often look at past price movement to predict future movement. For example, if the stock price closed with a gain the last three days, they will bet that the stock will continue to see upward price movement. If the stock price failed to meet the expectation and declined, then many believe it will fall again the next day. Investors who trade daily rely heavily on the trend of the stock price movement. Accordingly, we assumed that if the price was up on Day 1, it would be up on Day 2. If it were down on Day 1, it would be down on Day 2.

All of the data was entered into SPSS from several Excel worksheets so that the testing of the model could be conducted. The model indicates that the stock price ("Price") is the dependent variable. The economic factors that we believe have a bearing on investor decisions are retail sales ("Retail"), consumer sentiment ("Consent"), interest rates ("Fedfunds"), and commodity prices ("Oil"). The fundamentals that should have an influence on these decisions are clearly the earnings of the firm as represented by return on equity (ROE), return on assets (ROA), and earnings per share (EPS). Finally, we believe that the price trend ("Trend") is considered when investors make their decisions.

RESULTS

The correlations of the variables are contained in Table 1. As suspected, the stock price is highly correlated with the economic variables of retail sales, consumer sentiment, the fed fund rate, and oil prices. Price is also related to ROA, but not the other two fundamental variables, and it is not correlated with the price trend which is somewhat surprising.

Return on assets is highly correlated with earnings per share but not with return on equity which we expected with the fed funds rate highly correlated with return on assets and return on equity, but not with earnings per share. However, earnings per share and retail sales are correlated. As seen in the eighth row, the trend of stock price movement is not correlated with any other variable.

The first test was to run ordinary least squares regression on the variables, setting “price” as the dependent variable. Guidance for this testing came from Hair, Anderson, Tatham, and Black (1998). The results of the first regression test are contained in Tables 2 and 3. Given those outcomes, it appears that stock prices are a function of the economic variables, the fundamental variables, and the technical variable.

The large F statistic leads to the acceptance of the hypotheses as written and to conclude that the model in Figure 1 is, indeed, valid but perhaps with some modification.

**TABLE 1
CORRELATIONS**

	1	2	3	4	5	6	7	8	9
Retail	1								
Consent	.720**	1							
Fedfunds	-.217*	.510**	1						
Oil	.900**	-.741**	-.109	1					
ROE	-.238	.272	.505**	-.074	1				
ROA	.286	.179	.490**	.182	.116	1			
EPS	.447**	-.138	-.118	.307*	-.140	.405**	1		
Trend	.100	.044	.057	.024	-.167	.173	-.195	1	
Price	.897**	-.430	.284**	.854**	.005	.413**	.287	.170	1

** Correlation is significant at the .01 level.

* Correlation is significant at the .05 level.

TABLE 2
ANOVA

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	2422.500	8	302.812	79.077	.000
Residual	118.710	31	3.829		
Total	2541.210	39			

Table 3 contains the impact of the various variables in the model. Clearly, the economic variables have the most significant impact on the resource allocation decision while the fundamental and technical ones do not appear to be significant. That says that investors may be reacting to what they have heard and seen about the economy and are not doing much research at all with respect to their decisions.

It is also evident in Table 3 that there are two negative variables, ROE and EPS. The negative sign suggests that as ROE increases, the stock price decreases which is not the case. Similarly, the test suggests that as EPS increases, the stock price decreases which does not happen either. Thus, we removed these two variables to see what effect it would have on the model. Table 4 contains that model summary which appears stronger than the one contained in Table 2.

TABLE 3
COEFFICIENTS

Model	Beta	T	Sig.
(Constant)		-5.679	.000
Retail	.861	7.503	.000
Consent	.232	3.262	.003
Fedfunds	.264	4.116	.000
Oil	.267	2.286	.029
ROA	.043	.816	.421
ROE	-.040	-.681	.501
EPS	-.059	-1.162	.254
Trend	.053	1.219	.232

TABLE 4
ANOVA

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	2411.435	8	401.906	102.199	.000
Residual	129.775	31	3.933		
Total	2541.210	39			

The t statistic for ROA in Table 5 is not significant (Sig. = .429) in this model which led us to consider if the fundamentals about publicly-traded companies mean anything at all. In other words, it may be that investors do not care about the intrinsic, or fundamental, value of the firm and that they just react to what is happening in the economy and in the stock markets themselves. It may be that they are just looking at price trends, listening to what is being said on CNBC, MSNBC, or BIT; reading what various Internet sites are posting; and making instantaneous decisions about the stocks to buy or sell, hardly

rational and logical behavior. There is also the impact of the hedge funds, day traders, and high frequency trading which we are having difficulty quantifying. The variable “Trend” is close to significance at the .10 level (.134) which suggests that it may have some impact. So, we thought it would be interesting to remove ROE to see what that result might be.

**TABLE 5
COEFFICIENTS**

Model	Beta	T	Sig.
(Constant)		-5.349	.000
Retail	.773	7.455	.000
Consent	.205	2.918	.006
Fedfunds	.251	4.439	.000
Oil	.306	2.635	.013
ROA	.043	.800	.429
Trend	.064	1.536	.134

Removing ROA from the model yields the results in Tables 6 and 7. However, the F statistic jumps in magnitude which suggests that this last model is the strongest of the three. In this model, Hypothesis1 would be confirmed as would Hypothesis 3. However, Hypothesis 2 in which fundamental analysis was said to influence investor decisions does not appear to hold.

**TABLE 6
ANOVA**

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	7207.613	5	1441.523	408.503	.000
Residual	402.282	114	3.529		
Total	7609.896	119			

Thus, we may conclude that economic factors and current stock price trends have the most influence on the resource allocation decisions of investors. With these results, the idea that investors are not studying company fundamentals gains credence as does the impact of cable television, the Internet, the hedge funds, and day traders. The “buy and hold” strategy of Graham and Dodd (1934) may, then, not apply in the current economic environment.

**TABLE 7
COEFFICIENTS**

Model	Beta	T	Sig.
(Constant)		-5.349	.000
Retail	.779	15.434	.000
Consent	.174	4.341	.000
Fedfunds	.264	9.365	.000
Oil	.269	4.937	.000
Trend	.063	2.489	.005

So, while the model in Figure 1 does appear to be representative of market behavior, the impact of fundamental analysis needs to be debated. It is interesting to note that the fundamental variables are not significant in the testing and removing them from the model increases its explanatory powers. These results led to the conclusion that investors may not be studying the fundamentals prior to making their resource allocation decisions. When combined with other information, it may just be that the final model without the fundamental variables is the most accurate.

We posited that something may, in fact, be different in the stock market. Our results, combined with the data about market behavior as presented elsewhere in this paper, confirm that behavior of investors is different as there is question about the value of fundamental analysis.

DISCUSSION

A primary topic in the world of finance has been what makes the U.S. financial markets move, that is, what factors most influence investor behavior? A variety of theories exist to explain the behavior of market participants. Economic variables are a significant representation of overall market conditions. Hedge funds and other institutional investors are understood to react to changing economic environments. The managers of these large funds react to commodity prices, interest rates, and measures of consumer confidence. Individual investors typically imitate the actions of the larger market participants. For these reasons, our first hypothesis was that investor decisions are influenced by conditions in the economy, notably the ability to consume, interest rates, and commodity prices which the results support.

Traditional finance attributes market movement to the research and analysis of the quality of available investments. This theory was grounded on the work of Graham and Dodd (1934), and has been practiced for decades by many successful investors. Investors are expected to choose investments once they have conducted fundamental analysis and have obtained a comprehensive understanding of the firm's long-term growth potential. Our second hypothesis was that investors study the past earnings of the firm in making their decisions about their investments which does not appear to be the case.

Investor behavior may also be guided by the principles of technical analysis. In contrast to the practitioners of fundamental analysis, technical analysts do not believe that the future prospects of the company are a significant determinant of future movement. Instead, stock prices are believed to be set by the market as investors react to a variety of information. A successful technical analyst only has to spot a trend of investor behavior and act on it. Our third hypothesis was that investors look at the trends of stock prices before making their decisions to allocate their resources which is supported as well.

The results of the testing procedures prove that fundamental data is not a significant determinant of price movement. Very few modern investors are taking the time to conduct thorough research on potential investments. This conclusion corresponds with the current economic crisis. For example, the fundamentals of many large, solid public companies have not changed. However, the market value of these stocks has dropped significantly over the last twelve months. Between the dates of January 2, 2008 and January 2, 2009, Microsoft's stock price fell from \$34.35-\$20.19, IBM from \$102.33-\$86.90, 3M Co. from \$79.57-\$58.55, and EMC Corporation from \$18.02-\$10.86 and Citigroup, Inc. from \$27.34-\$7.12 (<http://finance.yahoo.com>). It is apparent, then, that investors are reacting to general market conditions instead of relying on fundamental data.

Some investors do make investment decisions based on the stock price trend, but it appears that the majority of the market's participants respond to news. As of 2005, 91.1 million individuals owned stocks in the U.S. compared to just 42.4 million in 1983 (Investment Company Institute and the Securities Industry Association 2005). This growth has been stimulated by the availability and convenience of online accounts and is evidenced by the large increase in transaction volume which increased 290% between October 2007 and October 2008 (<http://finance.yahoo.com>). We attribute this to the institutional investors and hedge fund managers who first react to the economic variables. As the actions of these big market players are publicized and discussed at large, the massive population of amateur individual investors follow suit. It is in this manner that the media has such a noticeable impact on the direction of the market. The media's power, however, is no secret. According to a January 1, 2009, survey, 77% of

Americans believe that the U.S. media is making the economic situation worse by projecting fear into people's minds (Opinion Research Corporation). The media directs much of its content at the emotions of its audience, including those of fear, hope, and greed.

Cable television reaches over 100 million households in this country as of December 2009 (<http://tvbythenumbers.com/2010/01/21>, with news prime time news viewership increasing by 224.8% between 1998 and 2008 (<http://stateofthenewsmedia.org/2009/>). It should also be noted the number of Internet brokerage accounts increased from 7.3 million to 53.1 million between 1995 and 2004 (Vakil and Lu, 2005), and we suspect it is much higher now. Vakil and Lu (2005) also found that there is a high correlation between the number of on-line accounts and the volatility of the Dow Jones Industrial Average. As there are more on-line accounts, we can expect to see increased volatility.

The contribution of this paper is a validation of behavioral finance as psychological influences have undeniably been a factor in the movement of the financial markets. Investor mood is one of the psychological influences on investors. Negative data such as a declining GDP or job cuts will cause investors to react by selling their holdings. On the other hand, investors will be upbeat about the market as long as the value of the indices continued to increase throughout the late 90s and early 21st century. Their optimism was derived from the rising levels of consumer confidence and retail sales, causing them to keep bidding up the price of stocks. This behavior moved the prices of equity instruments to unsupported levels.

As the market continued to rise, investors' risk tolerance increased. Many investors succumbed to the practice of mental accounting, a stalwart of behavioral finance. That is, investments are often separated based on the objectives of that particular account. Some investors will view gains as extra, causing them to neglect any predetermined set of investment standards. Throughout the extended upswings, riskier endeavors became the norm, such as securitized mortgages and complex derivative products.

Investors have always been human as they react to information prior to making their resource allocation decisions. They have been biased in those reactions, but traditional financial theory ignored that and held to the idea that investors were perfectly rational. We know that human beings are not rational, causing investor behavior to always be at odds with traditional financial theory. Because of this flaw in traditional finance, we need new theory. The tenets of behavioral finance fulfill this need, which assumes that investors are not rational, but just normal. The theory then mirrors actual human behavior, but not always. We do not believe that stock prices are completely random, but, in all reality, they may be, at least in the short term.

Prior to the advent of the Internet and cable television, we submit that investors were probably more rational, and they spent more time conducting fundamental and technical analysis. However, the Internet and cable have brought instantaneous news about the markets into everyone's homes. The results of this study illustrate that rational study is not being done as in prior decades. Fundamental analysis is not being done. Instead, investors are reacting to the economic variables and prior prices that they see and hear about through the media and the Internet. We would also submit that the traders at the big investment houses (MorganStanleySmithBarney, etc.) are entering into transactions on the basis of what they see on their computer screens. Both small and large investors are making quick and unfounded decisions as they follow the instant updates on the financial web sites and cable television programs.

The current market environment is evidence of the modern retreat from the traditional concepts of buy and hold strategies into a day-trading mentality. Indeed, a variety of factors still determine the direction and magnitude of market movements. However, the existence of rational decision-making has decreased dramatically, leading to financial markets with unprecedented volatility and unpredictable market movements.

LIMITATIONS

The data in this study and that found in the supporting literature, including the tremendous increase in the number of individual investors and trading volume, strongly support the hypothesis that

investor behavior is, indeed, changing. This study has provided significant statistical evidence that investors have become less rational, thus shying away from the principles of Graham and Dodd (1934) and the role of fundamental analysis in the resource allocation decision. We also have evidence that there is some reliance on the movement of the stock price trend (Schwager, 1999) as prior prices seem to have an impact on investor decisions and, thus, current prices. It is also apparent that economic forces are the most important factors in stock price movements, but it is doubtful that individual investors have the education and training to consider them. While the hedge funds and other institutional investors watch these indicators very closely and move massive amounts of stock accordingly, my contention is that the individual investor is not that savvy and, therefore, relies, in “trusted” television commentators and financial sites on the Internet.

A second limitation concerns the data for the fundamental analysis. Since publicly-traded companies only have to report their results monthly, we may not have enough data on return on assets (ROA), return on equity (ROE), and earnings per share (EPS). Since the Securities and Exchange Commission (SEC) only requires quarterly reporting, that may be the best that can be done. And, we have seen fraud and deception in the financial statements of some companies that were required to report, so that may be a limitation as well.

However, with those limitations, the contribution remains. With more Americans in the market, more transactions being completed, significant swings in prices and indexes, and shortened holding periods, our results suggest that investors are not doing the requisite amount of research, are listening to the cable television and the Internet, and are making choices on what they see and hear, rather on what the data about the company tells them. Hence, we see great confusion in the financial markets which is caused by the change in behavior of the investors.

Behavioral finance is, by definition, an inexact science, but our results stand and further the understanding of the ways in which investors make their resource allocation decisions but we still do not have any concrete theory as to why they make them. Thus, modern portfolio theory, arbitrage pricing theory, and capital asset pricing model, and the efficient market hypothesis do not appear to hold in the new financial environment. The challenge for scholars of finance, investment management, and psychology is to replace them. We need to initiate the conversation about the irrationality of the market and to try to find theory to understand it. Behavioral finance does assist in the explanation of market phenomena but does not help predict it.

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