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Behavioral finance: Its history and its future

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Abstract

The field of behavioral finance has attempted to explain a litany of biases, heuristics, and inefficiencies present in financial markets since its creation in the 1980's. This paper is structured as a comprehensive literature review of behavioral finance, and includes both the seminal works as well as more recent papers. The various subtopics of behavioral finance will also be analyzed, which include loss aversion, corporate finance, and momentum/contrarian investing. Finally, this paper will draw unique conclusions across behavioral finance and hypothesize about what topics within behavioral finance are likely to yield the most interesting research in the near future.

Keywords: behavioral finance, sentiment shifts, pricing inefficiencies, biases, momentum investing, contrarian investing, loss aversion, corporate finance.

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Introduction

The field and study of finance has long been based around the idea of “efficient markets.” This term may mean different things to different people, but the Efficient Markets Hypothesis (EMH), which classical finance theory is built upon, states that at any given moment in time the price of any and all assets and securities being traded is correct and reflects all available information. The EMH also includes the law of one price, which means that there is only ever one price for an asset at any moment in time. The idea of correct prices is a neat and clean way of thinking, but the real question that begs answering is whether or not the law of one price actually exists.

First off, if truly efficient markets exist, how can there be “bubbles” in stock markets? Let alone the number and severity of bubbles that we have recently endured. In addition, how reasonable is it that all people are 100% rational decision makers as the EMH posits? Basic logic should throw this idea out the window as there should be absolutely no way that a casual investor, or even further yet a novice investor, will ever trade and invest at the same level of rationality as a professional trader for an investment bank. Traditional theory argues that “smart money” investors, or those with the highest level of knowledge about financial markets, will counteract any noise caused by those that are trading “irrationally” through arbitrage, however over the past few decades there has been a mounting amount of evidence against the idea of complete arbitrage.

Beginning in the 1980’s, finance theorists first began to consider the idea that the laws of investing were not quite as clean as they had originally theorized. And, as computers have become more powerful it has become possible to analyze the mountains of data to prove these thoughts true. From the collective messiness in breakdowns of traditional finance theory a new

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field within finance has sprung up. This new field has been named aptly named behavioral finance.

In the following pages, this paper will synthesize the feats and discoveries of behavioral finance and its researchers into a comprehensive literature review. This review will begin with a review of the history of the field so as to give the reader a more complete context for the events that are unfolding in the news. Another significant portion of the literature review will comprise of seminal works in the field, several of which have been cited by articles numbering in the thousands. The third part of the literature review will include new articles published in the last few years to in the hopes of providing the reader an idea of where the research in behavioral finance is focused today. The second and third parts of the literature review will be presented with each other, and be structured according to the appropriate subset of behavioral finance. This comprehensive literature review will then be used to form an opinion about the current state of finance theory. This conclusion will shine light onto the future of behavioral finance, and discuss a prediction for the future direction of behavioral finance as a field of study.

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Research Questions

The research questions for this paper are as follows:

- How did behavioral finance begin, and what path has it taken to get where it is today?
- Where does the field of behavioral finance stand at the present time?
- Where is the field of behavioral finance going in the future? And, what specific areas within behavioral finance are likely to produce the best and most intriguing research?
- Are there any discoveries that can be formed across academic articles and subtopics within behavioral finance that have yet to be made in the field?

Literature Review

History of the Field

To fully understand behavioral finance as it is today, one must first learn how it came to be. Shiller (2003) helps readers take this first step as the author offers a great overview of the behavioral finance's evolution through the decades. In the 1980's, the consistency of the efficient markets model was starting to be challenged. One issue that troubled the efficient markets complete acceptance was the problem of excess volatility. Several theories were formed to describe the wide swings in stock prices, however it proved challenging to reconcile the idea that a stock price was the present value of all future dividends (as most finance theorists would argue) with the volatility observed in stock prices. This meant that finance was either completely wrong about what made up the value for a stock, or investors were not fully rational. Following this revelation, Shiller pushed the idea that markets might be efficient on the micro level, but wildly inefficient on the macro level. In summary, this means that individual stock movements make more sense than the movement of the entire market. In the 1990's, the amount of evidence contrary to efficient markets had become so much that behavioral finance started to gain traction as a legitimate field.

Shiller then goes on to list several concepts that behavioral finance attempts to explain. The first of which are feedback models. Feedback models attempt to show that when investors trade they actually often trade based off of other investors rather than off new information. This can lead to inefficiencies and bubbles that traditional theory cannot explain. Another of Shiller's main concepts is the differentiation of smart money and ordinary investors. In the Efficient Markets Hypothesis (EMH), it is assumed that smart money can fully offset any noise caused by sub-optimal decision making, however according to Shiller this is not the case in application. In

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the conclusion of his piece, Shiller stresses that the field at the time of his writing (2003) was far from fully researched, but that there is more than enough evidence to validate its existence and justify future research.

Complementing to Shiller's piece Heukelom (2014) provides a comprehensive account of how behavioral economics and finance were founded on the personal level. Behavioral economics (which by many definitions includes behavioral finance) began largely as the result of prospect theory as developed by Daniel Kahneman and Amos Tversky. Interestingly, Kahneman and Tversky were both psychologists with no or little training in classical finance. Prospect Theory proved useful to economics however, because it attempts to model the way people actually make decisions as opposed to simply relying on the utility decision-making strategies that made up finance theory . As Heukelom goes on to write, prospect theory argues that people make decisions based on the potential value of gains and losses rather than the utility of the decision. Richard Thaler, who was already a finance theorist at the time added the economic and finance theory necessary to apply prospect theory to financial markets. All three of these men, Amos Tversky, Daniel Kahneman, and Richard Thaler, are today considered to be among the founding fathers of behavioral finance.

After the creation of several foundations and think-tanks, behavioral psychologists and finance theorists began to join forces to research anomalies in financial markets as Tversky, Kahneman, and Thaler were doing, and the result of this research was the creation of the field of behavioral finance. Today, behavioral finance researchers are questioning even the most basic of finance laws as researchers attempt to find out how investor biases and the limits of arbitrage affect the efficiency of capital markets.

Pricing Inefficiencies

At its core, behavioral finance is about identifying and explaining inefficiencies and mispricing in financial markets. No article shows this better than the seminal work of Lamont and Thaler (2003). In their paper, the authors explore equity carve-outs of tech sector companies and their inherent mispricing following the Initial Public Offering (IPO) of the newly formed firm. The biggest example of this was Palm's carve-out of 3Comm. In the carve-out, 3Comm issued an IPO of a small stake in Palm and promised to distribute the remaining stake to 3Comm shareholders at a future date. Given the small supply of shares, it is easy to see how a share of Palm might be highly coveted. In fact, the price of Palm went up so high that it was actually priced higher than 3Comm after the closing bell on the first day. The authors do point out that there was very little ability to short Palm's stock early on, however, this does not explain why Palm's share price exceeded 3Comm. The pricing of the stocks effectively meant that investors valued 3Comm's non-Palm assets at less than \$0. Even more surprising, the mispricing continued for much of the time that passed until the ultimate distribution of shares to 3Comm shareholders. The authors also identified several other carve-outs that resulted in so called "negative stubs," or the parent company being valued at less than \$0.

One of the core ideas surrounding the equity carve-outs is that the textbook definition and application of arbitrage simply does not hold in the real world. Shleifer and Vishny (1997) discuss this topic in their seminal work "The limits of arbitrage." In it, the authors point out that limited capital, agency problems, and other constraints hinder the ability of arbitrageurs to correct inefficient prices. One of the biggest limits of arbitrage derives from situations when the arbitrageur is managing other people's money. This causes the arbitrageur to not take as highly leveraged positions, because he could be forced to close out his positions at a loss if investors

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want their money back. Further, most arbitrage occurs in foreign exchange, bond, and futures markets where there is a set payoff at sometime in the future. In other markets the uncertainty makes arbitrage much more difficult. Shleifer and Vishny's work must absolutely be regarded as seminal as 3,390 subsequent works have cited the content.

Chen and Lai (2013) focus not on arbitrage and inherent mispricings, but rather on how the framing of a company can impact expected returns. The authors focus on the effects that a reclassification can have on a company. In their paper, the authors look at 352 Taiwanese companies that had their Standard Industrial Classification (SIC) code changed as the result of a government initiative or because the nature of their business changed. Theoretically, this reclassification should have had absolutely zero impact on the stock prices as nothing in the underlying companies had changed. However, the framing changes caused significant price changes both 10, 20, and 30 days after the new classification system was implemented. Also of note is that the returns included both negative and positive results.

Similar to a Standard Industrial Classification number, a stock's ticker symbol also deals with the framing of a company and its stock. As one can see from perusing any list of stocks and their symbols, some companies have symbols that make complete sense and almost form the company's name, while others have less descriptive ticker symbols. Peterurgsky (2014) researched stock ticker symbols in an attempt to determine whether or not the fluency (ability to make a word or sound) from the letters in a stock ticker impacted the attractiveness of the corresponding stock as an investment. After conducting a survey of college students, the author was able to conclude that there was no discernable difference between the attractiveness of stocks with fluent names versus those with influent names. What this means is that companies should not lose sleep over an influent stock ticker. That said, there is still evidence, notably Head

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et. al. (2009), that suggests companies with clever tickers actually perform better than those that do not. Some of these clever tickers include a veterinary services company with the symbol WOOF and a casino companies with the symbols ODDS and SLOT. Perhaps as Peterurgsky argues in her article the excess returns of stocks with clever nicknames is because it shows a more clever and competent management team, but regardless stock ticker symbols seem to play at least some role in the framing and subsequent returns of a company.

Given the totality of the evidence against EMH and the traditional finance paradigm, it is hard to argue against the developments in behavioral finance. This is the crux of Olsen (2008) as Olsen discusses how cognitive dissonance is the biggest problem between behavioral finance and traditional financial theory. Cognitive dissonance is the resistance of holding two ideas that are in conflict with one another, and accurately describes the problem of ascribing to traditional finance theory while also believing in the proven facts of behavioral finance. Because of its longevity and the fear that finance will regress to not being sound scientifically if behaviorists have their way, traditionalists cringe at much of what behavioral finance has argued about market inefficiencies. However, the fact of the matter is that work in many fields has shown that many of the principles of traditional finance theory are not nearly as concrete, as many would like them to be. Olsen argues that several broad themes of traditional finance create the most cognitive dissonance. Among these is the idea that “the human mind is a problem solving device like a computer,” and that “emotions have a negative influence on decision making because emotion is the antithesis of rationality.” Overall however, what Olsen concludes is that the amount of dissonance created from these two separate but competing worlds of finance must be solved in one way or the other. He also argues that the best chance for a resolution will likely

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come with the help of scientific peer review and those just starting their careers as they have not yet been marred by what “always has been” with regards to traditional theory.

Soufian, Forbes, and Hudson (2014) attempt to shine light onto an alternative to the Efficient Markets Hypothesis because of the latter’s reliance on completely rational investors among other things. This alternative is the Adaptive Markets Hypothesis, or AMH, which has been gaining steam since its creation in 2004. One of the benefits of the AMH is its ability to describe complex trading environments. Specifically, AMH is able to explain loss aversion, overreaction, and behavioral biases. This is because it centers on trading strategies that can come or go instead of purely rational investors making optimal capital allocations. AMH also views finance theory as an “engine rather than a camera.” This means that instead of providing a single look at how the economy functions, finance theory and its application instead drives much of the economy and a change in financial theory can change the actual economy. The practical result of this is that trading strategies based on finance theory can end up with horrible outcomes, but because the environment is ever changing it is impossible to test a strategy in the world it will ultimately be applied. The authors present an excellent example of this in the meltdown of the entire financial system in 2008 lead by the default of sub-prime housing loans. However, as the hypothesis would predict, in the years following 2008 the markets appear to have learned from their mistakes and adapted in wake of the failure.

Biases

In the end, the reason behavioral finance exists is because not every person can possibly have and invest upon the same amount of information. Every person will read and observe different things, and every person will view the things they see differently. This is the crux of a series of works done on behavioral biases in investing. This issue is approached directly in Rieger (2012). In his work, Rieger looks at the complex framework of structured financial products and how investors view them. He concludes that several behavioral biases lead investors to make bad estimates on the probability of various outcomes tied to the payoff of the structured financial products, but that there may be ways to frame information on the products so as to not mislead investors.

Taking the idea of biases one step further, Sahi, Arora, and Dhameja (2013) attempted to list the missteps investors tend to make in their piece “An Exploratory Inquiry into the Psychological Biases in Financial Investment Behavior.” The authors came up with a host of different biases. These include the tendency to:

- Prefer known risks over unknown risks
- Rely on a point of reference
- Make investment decisions based on easily available information,
- Play it safe with regards to risk,
- Invest differently based on income source,
- Invest with a view of social responsibility,
- Invest in instruments which are familiar,
- Feel that past decisions could have been better or were inevitable,
- Be averse to losses,
- Feel regret,
- Be confident in one’s own ability,
- Rely on family and friends,
- Follow trends.

The article is important because it provides a comprehensive list of biases observed from the interviewing of a diverse group of people that had significant experience in investing.

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If behavioral biases as shown above are as prevalent as they seem to be in developed markets, an interesting question is how do emerging markets fit into the fold? Speidell (2009) addresses this question as the author attempts to describe the limits of investing in emerging markets and how best to combat them. As it turns out, many of the same biases that are present in the developed world are present in emerging markets and then some. As the result of the familiarity bias that many investors have (seeking out things that are comfortable) most are hesitant to invest outside of their home country. Even those that are willing to take the leap often fall into what the author terms the “tyranny of the media” and are easily susceptible to thinking that the way the media might portray a certain part of the world is indicative of that entire region as a whole. In fact, as the article states some funds limit their emerging markets exposure to countries that fit the mold of “stability”, but what this type of strategy fails to recognize is that instability is a large driver of the profits available to be had by investors. This is because it is the fixing of this instability that leads to real change for a country and for investors, returns. If there was no more instability or uncertainty in emerging market, then there would be no reason to reward investors at a higher rate than in developed markets.

This article not only chronicles the problems foreign investors face, but also of local investors. According to Speidell, while foreign investors are present in certain countries, local investors account for the lion share of trading in many emerging markets such as Bangladesh and Kenya. In these countries, investors are extremely prone to feedback trading, or trading based off the trades of others. Another curiosity is that locals often much prefer to buy low- priced stocks because they get a better “bang for their buck” even though in reality the value of the stock is much better reflected in something like the P/E ratio. Along the same lines, locals appear to be enamored with stock dividends even though they actually do not increase the portion of the

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company that an investor owns. Speidell finally states that if investors can navigate in between the pitfalls of foreign and local investors alike while understanding the uncertainty that is in place, there are significant profits to be made.

In the larger picture of behavioral finance, what Spiedell's article shows is that markets undergo a transformational life cycle. Emerging markets as their name suggests are just beginning and have not necessarily shown high returns in the past. Along with this, these markets are riddled with inefficiencies and biases and massive bid-ask spreads. On the other hand, the modern markets of the developed world still have biases and inefficiencies but on a smaller level compared to many other countries. What this disparity shows is that there must be a growth in the markets of a country in order to reach true efficiency and clearly no markets have reached that point yet. However, with the development of high frequency trading, markets are pushing closer and closer to that line, and investors looking to profit on behavior will be forced to work harder to find bias and inefficiencies as markets become more developed.

Momentum Investing

One of the phenomena that behavioral finance has uncovered is the presence of momentum in stock markets. Daniel, Hirshleifer, and Subrahmanyam (1998) created a theory to explain momentum through market over and under reactions based on many of the psychological biases identified by various academic works. The theory the authors provide to describe these biases is one based on investor overconfidence and biased self-attribution. Overconfident investors in the model overweight the information they receive and cause stock prices to move far from its fundamental value. As time goes on, more information comes out and the stock will move closer to its fundamental value. However, with the addition of biased self-attribution the

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results are not that simple. Self-attribution is tendency for investors to too strongly attribute things aligned with their thinking to their own skill, while attributing things not aligned with their thinking to mere chance. With the addition of self-attribution, public information can cause even more overreaction from a previous private signal. In conclusion, the authors determined that their two-factor model was able to accurately describe patterns that have been discovered empirically in stock market research. This research is seminal to the field and is some of the first work done to create a theory on why there are under and overreactions in the stock market.

Jegadeesh and Titman (2001) serves as an update to their seminal 1993 paper. In their 1993 work they created an investment strategy based on the idea that stocks exhibit momentum in the market to see whether one could make profits based off of momentum. In their 2001 update, the authors first preformed an out-of-sample test on the 8 years following the publication of their original paper and found that their momentum strategy (buy stocks that had good results over the last 3 to 12 months and sell stocks with bad performance over the same period) yielded similar results to what it did in the original set of years. This out-of-sample test further validated the 1993 results. Also, the authors looked at portfolio performance 13 to 60 months after portfolio formation and found that returns were negative, which showed that momentum has a finite shelf life. The identification of these negative returns gave rise to the idea of contrarian investing.

George and Hwang (2004) took momentum investing a step further by choosing to form momentum portfolios based off of 52-week highs rather than solely recent performance. By buying stocks close to but just below their 52-week high, and shorting stocks that were close but just above their 52-week low the authors found extremely positive results. The returns of this strategy were far larger than the returns that came from using the past trading strategies such as

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the one used in Jegadeesh and Titman (2001). In theory, this strategy is successful because traders hesitate to push prices above or below these benchmarks even though the information on the company warrants it. However, eventually the market overpowers the resistance and pushes the prices past the threshold.

Contrarian and Value Investing

Lakonishok, Shleifer, and Vishny (1994) researched the opposite side of the spectrum in their paper on contrarian investing. The idea of “value investing” or buying beaten down stocks and betting on them to rebound is certainly not a new idea. However, the cause for the success of this strategy has long been debated. In their paper, the authors find that for nearly every time period a contrarian portfolio with a time horizon of over one year is hugely profitable. Because the results were so dramatic the authors were able to largely breakdown the idea that value stocks are inherently more risky, but rather linear extrapolation of past results leads to momentum stocks going too high and value stock prices going too low.

Magnuson (2011) also tackles the question of whether the high returns of value firms are a factor of increased riskiness or of something else. Magnuson’s research centered on what happened to stocks after they suffered a bad earnings announcement. The author found that when glamour stocks (stocks with large growth rates) suffered an earnings miss their stock price predictably went down. However, when value stocks suffered the same scale of miss, the stocks on average went up. Moreover, the author found that if a value company’s fundamentals weakened (their riskiness went up) the stock still went up on average. The most logical explanation for this is that the market had already priced in the bad results and had actually overreacted on how bad the result might be. Also, because glamour stocks usually trade on large

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P/E ratios, a large portion of their price is derived from future growth rates. So, if the company revises down growth targets or misses their current quarter or annual target then the company's stock will be hit quite hard.

The debate on the riskiness of growth stocks continues to this day and will be revisited again later in this paper, but the preceding three articles paint a much different picture of value stocks than traditional finance theory does. At the least, it is clear that investing in glamour stocks is actually inherently risky. This is because while glamour stocks may have solid growth and fundamentals, their valuations are built on aggressive growth targets that can send their stock tanking if missed.

Combining multiple elements of time trending prices into one, Hong and Stein (1999) attempted to come up with a model that could unify under and overreactions as well as short-term momentum and long-term reversals. The model the authors created is built upon the idea that there are two types of investors, news watchers and momentum traders. The distinction between the two is that news watchers only reacted to privately held slowly diffusing information on stock fundamentals, and momentum traders could only trade on movements in short-term stock prices. The result was a model that created an under reaction from news watchers followed by a round of arbitrage from the momentum traders that brought the price to its fundamental level (intrinsic value without speculation). However, the model departs from pure market efficiency after that, because the first round of momentum traders initiate a second round and so on and so forth until the price has significantly deviated from its underlying value leading to an inevitable price shock that brings the value of the stock back down. Next, the authors added more complexity to their model and determined that even when adding smart money and contrarian investors their results still held. The authors finally made several

predictions about what one should find in analyzing stock returns based on their model, and hypothesized that momentum strategies should be the most profitable for the longest time in the smallest and most thinly covered stocks. They also suggested that public information should generate different stock price movements than private information because it is available to the mass public quicker. Researchers have subsequently confirmed both of these assertions in peer-reviewed works.

Analysts: Smart Money or Just as Dumb as Everybody Else?

Also on the topic of momentum, De Bondt and Thaler (1990) ask the question of whether or not security analysts also contribute to overreaction in the stock market. Most finance theorists would hold that securities analysts are part of a group of so called “smart money” and should reign in overzealous investors by maintaining fully rational price targets. However, De Bondt and Thaler find that the same pattern of overreaction found in naïve undergraduates is present in the forecasts of trained security analysts. This conclusion casts further doubt onto the idea that smart money will arbitrage noise away from the stock market.

Going further, Corredor, Ferrer, and Santamaria (2013) examine analysts to see if they really are in fact “smart” at all. The first thing the authors note is that analysts are historically very optimistic. This means that they offer many more positive ratings than negative ones. In order to find out whether analysts are in fact smart, the researchers attempt to find out if this optimism was simply the result of modeling investor sentiment or something else. To run their analysis, the authors gathered returns from a database in several countries from 1994 through 2007 and attempted to see how analyst recommendations matched up with the investor sentiment of that period. After running their analysis, the authors concluded that there is significant

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correlation between analyst recommendations and investor sentiment. Furthermore, the authors also concluded that the impact was more pronounced in stocks with low volatility, low B/M, and high dividend yield. What this means is that securities analysts do not appear to attempt to balance out the market. Instead, they move along with the markets encouraging optimistic investors to continue to bid up stocks. Going further into this thought, Jones and Johnstone (2012) found that upon analyzing analyst recommendations of companies just before declaring bankruptcy that two-thirds of analysts had a buy or hold rating on the stock at the time of failure. Also, the disparity was more pronounced in America where 73% of analysts rated the stock as a buy or hold. This goes to further prove the presence of optimism and overreaction by analysts.

Another problem with securities analysts are that they sometimes have more skin in the game than one might think. Mola (2013) looks at the initiation of analyst coverage on IPOs and noticed several interesting things. First, Mola finds that often analysts will downgrade a “seasoned” stock just prior to beginning to cover an IPO. This is significant given the relatively small amount of downgrades analysts tend to issue. The second, and more troubling finding is that from 1997 to 2001 before rules were adopted to prevent the process analysts were likely to “downgrade a seasoned stock prior to promoting a cold IPO underwritten by their investment bank.” This finding is obviously troubling even if the problem has been stopped, because it shows that analysts are not out to be “smart money” but rather to do their job, which on occasion may be to go against what their true judgment as an analyst might be.

Loss Aversion and Diversification Heuristics

Benartzi and Thaler (1995) address causes for a historically high equity risk premium. The authors analyzed possible causes of an inflated risk premium and were able to come up with a combination of factors to explain it. The authors concluded that a reasonable explanation for the high equity risk premium was a combination of loss aversion and short evaluation periods. Loss aversion is the tendency to react more strongly to losses than gains, and the authors set that level at 2.5:1. This means investors feel equally negative about a \$1.00 loss as they feel positively about a \$2.50 gain, or put another way feel 2.5X as bad about a \$1 loss as they feel good about a \$1 gain. Although EMH would argue that people weight gains and losses equally, the reality of the matter is that people hate to lose money. Also, the authors determined that for the math to work investors would have to have evaluation periods of 1 year, which goes right along the lines of logic as 1 year is a reasonable time to rethink investing decisions and meet with one's financial advisor.

Interestingly, Benzion, Krupalnik, Shavit (2013) added to Benartzi and Thaler's piece to show that the addition of a high-risk stock fund option to the original experiment reduced the effect of myopic loss aversion because of the subject's tendencies to diversify equally to all investment options.

The first article to identify the type of diversification mentioned above was Benartzi and Thaler (2001). In the article, the authors gave out questionnaires to see how people with knowledge of investing were likely to invest their money. Benartzi and Thaler found that investors have a tendency to invest an equal portion of their savings into all options provided by their employer or plan provider. They termed this extreme form of diversification the "1/n heuristic," and while not bad in and of itself, it leaves investors extremely susceptible to having

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riskier or safer portfolios than intended based solely on the composition of funds that a company offers.

Adding to the work of Benartzi and Thaler, Mauck and Salzieder (2015) attempt to answer the question of why high cost index funds exist. An index fund attempts to mimic a financial index such as the S&P 500. Interestingly, there are many funds that attempt to do this, but many have widely different fees (some upwards of 5% and some near 0%). If all of the funds do what they are designed for (which many do), then the expected payouts of all of the funds should be the same. As a result, the only rational motivation for investors should be to find the cheapest fees and invest their money in that fund. However, the researchers were able to conclude that as the result of a diversification bias investors are still driven to put portions of their money in funds that they know have higher fees, the same expected payouts, and the same historical success as a different fund. As Mauck and Salzieder point out, this is a clear violation in the Law of One Price.

Continuing with the idea of framing in investment accounts, Anagol and Gamble (2013) investigated the effect that the presentation of results has on equity allocation. For their experiment, the authors presented subjects with data about how investments had preformed in the past and then asked them to choose an allocation going forward. The only difference between the two test groups was that one group's read out was asset by asset and the other group's read out only listed the return of four portfolios of similar assets. The authors found that even though the "asset" subjects could have easily calculated the data that the "portfolio" subjects were given, the subjects given the returns of each asset had equity allocation nearly 10% lower than those who only saw the portfolio charts. This is interesting for several reasons and one of which is because

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it directly challenges the idea of full rationality like many of the other articles in this paper. Also, these results back up several aspects of models derived from prospect theory.

Like past performance or total fees, dividend yield can be extremely important for some investors in their selection of mutual funds. Unfortunately, some mutual funds attempt to artificially inflate yields through “juicing” as Harris et. al. (2014) shows. Juicing as described by the author is the buying and selling of stocks close to their ex-dividend date to artificially inflate the dividend yield that a fund advertises. Equally as unfortunate as the fact that mutual funds engage in juicing, is that as a result of juicing funds are rewarded with greater capital inflows from investors even though they are hurting investors with increased transactions costs and lower overall returns. Also, stocks have been shown to have negative returns just after their ex-dividend date, so any theory of increased returns through increased dividends does not hold water. Also, even if this strategy breaks even, there is a disadvantage tax wise to paying out dividends to investors instead of returning capital from gains. In conclusion, because investors contain a biased predisposition to want high dividend yields in funds, some mutual funds have created a juicing strategy that increases trading costs, taxes, and decreases returns. However, as long as the “fake” high yielding funds are rewarded with increasing amounts of capital the problem is surely to persist.

Predicting Future Prices

One concept behavioral finance has been particularly successful to explain is bubbles in stock markets. Shiller (1998) used the foundations of behavioral finance to predict a large collapse in stock prices that became known as the tech bubble. Shiller wrote a follow-up piece along the same lines in 2001 and accurately predicted the impending doom and collapse of the stock market. Shiller's use of Dividend/Price and PE ratios took a significant chunk out of the armor of the Efficient Markets Hypothesis, because EMH argues that valuation ratios cannot predict future changes in prices.

While he did not predict one of the largest stock market collapses in modern times, Vasiliou et al. (2008) looks at how behavioral finance can be used to predict future prices. In their paper, the authors analyze the returns on the Athens Stock Exchange in Greece from 1995-2005 of large cap stocks to see whether a combination of technical analysis and behavioral finance can create profitable trading strategies. As is mentioned elsewhere, EMH argues that all information available at any given moment in time is completely priced into the stock at the moment it becomes available, and as a result no profit can be made through analyzing trends, or anything of the sort. On the other hand, the strategy of technical analysis argues that one can make profits because the stock market moves in trends and will behave in the future as it has in the past. This kind of strategy lends itself quite nicely to behavioral finance theory around feedback theory and momentum observations. In their paper, the authors employed the use of short and long-term moving averages to predict the future prices of stocks. The authors then either bought or sold the stock depending on whether the model suggested it was a buy or a sell. The authors concluded that under the examined trading rules the strategy was "highly profitable" and as a result confirmed the presence of behavioral phenomenon in the Athens Stock Exchange.

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Interestingly, just as the rise of technology has brought behavioral finance to the forefront, it also stands as its greatest opponent. Automated trading has been expanding exponentially over the past several years as engineering has caught up with finance. Large institutions are running entire funds that trade on automated algorithms. This is the topic of Kumiega and Vliet (2012) as they attempt to initiate academic research into this new tool in finance. In the article, Kumiega and Vliet discuss automated trading and the behavioral aspects surrounding it. Obviously, there is very little sub-optimal behavior in a machine if the programming is done well, but there is behavioral component in the actual management of the program to design the machine itself. In general, it has been shown that managers are more apt to throw money at a project rather than shut it down even if it's a financially poor decision. Also, the authors postulate that that this may be pushed even further because of the financial incentives surrounding automated trading development. Despite the high startup costs of an automated trading system, the authors conclude that given its rise in popularity, there must also be a sufficient behavioral component in the stock market to justify its existence. Interestingly, if true this argument about the usefulness of automated trading both confirms the validity of much of the work in behavioral finance and simultaneously threatens to end it by fully exploiting or "arbitraging" the behavioral component of the stock market away. However, it is likely that with the vast amount of people and interactions in the stock market that the days of behavioral inefficiencies in the stock market are still large and many.

Application In the Real World

Much of finance theory is created in laboratories of sorts where authors control the rationality of investors and their choices through complex mathematical equations. However, the true test of a financial theory is how it can be applied in the real world. Kahneman and Riepe (1998) detailed several biases and general characteristics that investors may possess. The authors also describe what they believe to be the best way to work around them as a financial planning professional. These biases and characteristics include:

- Overconfidence
- Over-optimism
- Hindsight bias
- Overreaction to chance events
- The use of a purchase point as a benchmark
- Short and long views
- The ability or lack thereof to live with the consequences of decisions
- Regrets of both omission and commission.

Like Kahneman and Riepe, Doviak (2015) approached behavioral finance from the point of view of a financial planner. In her paper, Doviak attempts to hone in on the advisor side and provide readers with strategies for applying behavioral finance to one's practice. Doviak stresses that while incorporating behavioral strategies is not for everyone, analyzing a clients tendencies and discussing the reasons behind their biases as well as ways to get around them can lead to increased success in the planning field. The fact that a financial planner is writing about applying behavioral finance to a practice shows that behavioral finance has truly reached the level at which it is applicable to everyday professionals, which is a big step for any theory. Also, differently than Kahneman and Riepe, Doviak is sensitive to the fact that the application of these strategies is not for everyone.

Similar to Doviak's work, Bucciol and Zarri (2015) analyzed large amounts of data on the personalities and subsequent allocation of investment dollars of individuals to find out if

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there is any discernible connection between personality and the way someone invests their money. Interestingly, the authors found that those who scored low on tests for agreeableness or high for cynical hostility were significantly more likely to take greater risks with their investments. This is a significant advance in the understanding of investors, because before this work finance theory has assumed that investors decide on where to put their money in roughly the same way. However, what this article shows is that the way one sees their life and the world can actually have a sizable impact on their investments. As these ideas become more researched, professionals will be able to incorporate them into their work and help investors make more optimal decisions despite their predispositions to act otherwise.

Aside from financial planning and advising, the largest application of behavioral finance in investing is in investment decision-making and securities selection. Wright (2008) looks at 16 self-proclaimed behavioral mutual funds to see whether applying behavioral finance to investment decision-making is profitable one, and if there is anything not yet discovered about its success. Also of note, one of the main funds discussed in the article is actually managed by Richard Thaler and Daniel Kahneman sits on the board of the company who runs it. These names should seem familiar, because they are both fathers of behavioral finance and authors to several papers quoted in this paper. Nonetheless, Wright found that the behavioral funds experienced an above average flow of dollars into the behavioral funds. Also, these funds generally beat S&P 500 index funds on a raw basis, but their risk-adjusted returns were more or less the same. The author also concluded that this increased risk comes from the so called “value factor”. Because their excess return came from the value factor, the author argues that behavioral funds at their core are simply value funds with better marketing. This marketing is why they attract higher inflows of capital not because they are actually better funds.

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The reasoning behind this argument is mostly sound, and it would be remiss to suggest that a behavioral fund is remarkably different than a simple value fund, but there is one difference. In a value fund, the manager is using any different number of tools to come up with what they believe is a “cheap” asset. In a behavioral fund, the manager should be locked on to the under and overreactions of the market specifically. The difference is small, but it is a difference nonetheless. Also, regarding the “value factor” as is discussed in other places in this paper finance theory argues that it is a multiplier of returns because it shows inherent risk in the asset Fama and French (1992). However, many in behavioral finance reject this underlying assumption. If one throws out the value factor as an increase in risk, then behavioral funds that have outperformed the S&P 500 on a raw basis also outperform on a risk-adjusted basis, and as a result should look much more attractive to investors.

Asness et al. (2015) also looks at value investing. However, instead of looking at whether value returns are a compensation for risk, Asness and his co-authors instead address the best ways to successfully avoid what they see as several misconceptions surrounding the topic. First, the authors define what the essence of value investing really is to them. At its core, the authors define value investing as buying “cheap” assets and shorting “expensive” ones. From this definition value investing can go several different ways. One of the misconceptions about value investing that the authors try to dispel is that in order to be profitable in a portfolio that someone has to be a great stock picker like Warren Buffet. And while Warren Buffet has been extremely successful using a value investing approach on a very few number of undiversified investments, however all the academic research done on the matter suggests that by using a diversified portfolio investors can still make significant profits. Another main point in the article was that value strategies are even more effective when implemented with quality measures such as

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profitability, and the strategies can also be used to generate returns by benchmarking some measure of value for different asset classes such as currencies, commodities, and bonds. The authors also mention as has been touched on earlier in this work that it has yet to be proven whether value stocks provide excess returns because of a higher risk than other stocks, or because of a behavioral abnormality. Nevertheless, this article shows there is money to be made if value investing is done the right way.

Given the totality of biases that are present in investors it is obvious that it is easy to make mistakes when investing. Because of this, Fromlet (2001) created a checklist of sorts for defensive behavioral finance, which he defines as doing just enough to ensure you do not make mistakes. The checklist Fromlet created is a list of questions and reminders for one to ask himself before acting on a decision. The checklist is as follows:

- Check the source of your information.
- Try to get exclusive information
- Make sure to not make the wrong conclusions in fundamental analysis
- Are your advisors overconfident?
- Are you yourself overconfident?
- Speak with your strategic opponents.
- Compare positive and negative views
- Be careful of anchoring to an expectation
- How old is the information or forecast?
- How strong is the herd mentality?
- Consider how important messages are being reported (positive/negative)
- Is this the latest news in line with my strategy?
- Understand the numbers
- Dare to question recommendations
- See behavioral finance as a strategic tool
- Does it look irrational?

This kind of a checklist is valuable to an individual investor for multiple reasons. First, if an investor is considering an investment idea they came up with, then this checklist can serve as an initial screen for investors to make sure that they are looking at the idea from all angles.

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Secondly, if an investor is considering an idea given to them by an advisor the investor still needs to be able to do their own due diligence and make sure that is a good strategy. This list gives investors in the second category the right questions to look into and to ask.

Corporate Finance and Capital Budgeting

One part of behavioral finance that is overlooked at times is its effect on corporate finance and capital budgeting. On this topic, Stein (1996) tackles the question of how finance managers should tackle capital budgeting in light of information brought to the forefront thanks to behavioral finance. Specifically, how should companies calculate required rates of return if a beta is not predictive of future results, and therefore the Capital Asset Pricing Model (CAPM) is rendered useless? Stein offers two ways for capital budgeting if CAPM is thrown out. The first is a model that attempts to project future stock returns. If this is the goal of the manager, then something closer to the Fama-French three factor model should be used. However, it can be argued the required returns calculated by the Fama-French model have relatively nothing to do with risk. So, if the goal is to accurately model the risk of the asset, one needs a model that will more accurately capture the real risk of the asset. Ironically, CAPM, or something like it may be one of the best options if this is one's goal. This is because CAPM theoretically factors in the risk of the stock with a company's beta. The trouble with only using this however is that normal CAPM betas are subject to considerable noise, and therefore may not be a great measure of fundamental risk. So, there is still room for discussion as to what the best model to use for capturing asset risk. Also, Stein concludes that a company's choice on whether to use either approach should lie in whether the company is short term or long-term focused, and whether or not the company has financial constraints. If the company is short term focused it should use

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models that most closely model future prices, but if it is long-term focused and does not have financial restraints use of the asset risk model is likely to be more advantageous.

Also on the topic of corporate finance, Heaton (2002) looks at managerial optimism and how free cash flow can both help and hurt companies with overly optimistic managers. In the article, Heaton finds that managers who are overly optimistic over-estimate the NPV of company's projects and also believe that a firm's risky securities are undervalued. This premise has two results. The first is that the manager will tend to take projects that are actually Net Present Value (NPV) negative, because they are overly optimistic about the project's true worth. In this sense free cash flow (FCF) is a bad thing because it makes it easier to accept bad projects. On the other hand, if a manager views a company's securities as undervalued, then he will be less likely to want to issue new securities to fund NPV positive projects. This combination leads to significant loss for the company. In this sense, FCF is a good thing, because a manager will be able to accept NPV positive projects without issuing new securities.

Another application of behavioral finance to corporations is through prospect theory. Prospect theory, as mentioned before in this paper was created in Tversky and Kahneman (1979) and departs from traditional theory because it argues that subjects evaluate the potential value of losses and gains rather than the utility of the final outcome. Also, subjects evaluate these values using certain mental strategies, or heuristics, which may not be fully rational. Kliger and Tsur (2011) take prospect theory a step further by applying it to troubled corporations. The authors looked at companies from the Compustat database, and attempted to find out if a company's reference point of loss aversion on the prospect theory curve changed in correspondence with its business performance. The authors were able to conclude that the better a firm's results were, the more loss averse the firm was likely to be. Also, the exact opposite was true for firms that had

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recently suffered bad performance. Firms that had suffered bad performance were less loss averse and more willing to take risks. While it may seem like common sense that a struggling firm would take more risks to get back on top, a change in investing strategy based off recent performance is a meaningful departure from traditional finance theory. In the end, the authors were able to show that recent performance was a very large factor in future risk vs. return capital budgeting.

Sentiment shifts

Traditional theory holds that investors will behave the same regardless of market conditions, however simply thinking about how scared some people still are to invest after the financial collapse in 2008 shows that this cannot possibly be the case. Livanas (2011) tackles this issue as he attempts to find out how far away from fully rational utility investors really are. Livanas studied 236 Australian pension investors to determine what their risk aversion and time horizons were. He also looked at how the changes recently made to their portfolios changed their assumed risk levels. The conclusion of the analysis was that as sentiment changed to the negative, risk aversion levels increased. Along with many of the other ideas discussed, this concept should make sense. As sentiment surrounding the market becomes negative, or investors are pessimistic about stock returns, it would make sense that investors would be more averse to taking on risk.

The practical application of this is that if investors act as this model predicts the effects of a collapse will be essentially compounded by changes in investor sentiment and risk aversion. This is because as markets turn to the negative there are people that want to sell their securities or assets, however in order for investors to take on risk and buy the stock in question from the

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seller they will demand a more discounted price than they previously would have. This causes the problem to compound and the result is a steep financial downturn and very discounted prices. In the larger picture, this type of argument fits nicely into the idea that the stock market moves in bear and bull cycles.

Another great view at how investors behave when pressured is presented in Hu and McInish (2013). In the article, the authors look at spam e-mails relating to stock recommendations in order to see how investors react towards them. Specifically, the authors looked at a sample of 580 different spam e-mail campaigns for different stocks, and analyzed returns from before and after the emails were sent to see if they caused an abnormal spike in trading. It is also of note that the sample of spam e-mails for this study had previously been used in several other scholarly articles. Many of the stocks being spammed were “pink sheet stocks” meaning that they were penny stocks and not traded everyday. However, the researchers noted large increases in trade volume after the spam e-mails were sent. In addition, there were qualities of several of the e-mails that seemed to work better than others. The authors discovered that when the message from an “analyst” contained a price target there was much more likely to be a change in the price of the stock. This points to an uncertainty bias in investors. Also, Hu and McInish found that the e-mails that caused the biggest reaction on average called for the price of the stock to multiply by 53 times! This is a perfect example of an overweighting bias, or a person’s tendency to overweight a small likelihood of success even when there is a very low probability it will happen. In the end, the researchers were able to conclude that spam e-mails do in fact move the market. In addition, the authors also discovered that the more specific and outlandish the predictions in the e-mails were, the more the market moved.

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As shown above, sentiment is key to the way investors allocate their money. Wang, Keller, and Siegrist (2011) looked at the way someone's knowledge about a financial product affects its assumed riskiness. After collecting surveys and running correlational analysis, the authors determined that investors attributed significantly less risk to investments they have knowledge of regardless of the underlying riskiness of the investment. Also, not only was there a correlation as a whole, but there were several micro trends as well. Included in these was the tendency to perceive domestic investments as safer than foreign ones. While this article at its core is about sentiment, its practical application is very similar to the work previously discussed on diversification. If investors consider investments they know as safe, then that might lead to very inefficient and potentially overly risky portfolios. A great example of this is an investor who invests the lion's share of his investments in his company's stock while thinking he is investing in a "safe" asset. While individual exposure to a stock can lead to riches, it can also lead to rags and it is most certainly never a safe investment. One only needs to ask investors in Enron to find a first hand example of this point.

Usually in behavioral finance the only reference points used in the analyzing of a bias are the buying price and the selling price. In other words, when it comes down to it behavioral finance often doesn't address how a stock got to where it's priced. Grosshans and Zeisberg (2015) attack this exact idea by testing how investors react to different price paths of a security. The authors found that by far the path that left investors feeling the best was a path that first went down significantly and then came back up. This was compared to a price that went up then down, and a security that slowly only moved up. To ensure that all basis were covered, the price of all three paths started and ended at the same price (\$60 and \$65 respectively). Also, the authors performed the same test except where the stock as a whole dropped from \$60 to \$55.

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Surprisingly, the data showed that investors felt almost as positive when the stock went from \$60 to \$55 but went way down first before coming up as they did the stock that went way up before coming down and finishing at \$65 even though there was a \$10 difference between the two alternatives. This shows the power that the path that a price takes can have large impacts on the mentality of an investor. The authors also were able to confirm the presence of the disposition effect in their study. The disposition effect, or the tendency to hold losing stocks while selling winning stocks is present in this work as investors were shown to judge their investments that were above their purchase price at the current price level, but still value a stock that has gone down at the purchase price and as a result hang on to the losing stock.

Taking a step away from the tightly controlled experiments usually performed in academic finance, Kranner et. al. (2015) chronicles the behavioral finance implications of a ten year study done on the portfolio management program (PMP) in Vienna, Austria in which students run funds and compete against each other as everyday portfolio managers would. The authors capitalized on this setting to test two behavioral theories of portfolio management. These two theories were the disposition effect, which was covered above, and the tournament effect. The tournament effect occurs when those leading a competition attempt to maintain their lead while those behind take escalating amounts of risk to catch up. The tournament effect was confirmed in the PMP as the incentive to beat one another lead laggards to take aggressive risks to catch up. However there was actually no disposition effect found in the study, and in fact the opposite was found. This means that the fund managers were more likely to sell losing stocks and hold on to winning stocks than vice versa. As the authors point out, much of this likely comes from the finite window of time for the funds (1 school year) and the fact that the only way capital can be raised for a new idea is by selling a current investment. While the study done on

the students in this setting should not be extrapolated to describe fund behavior in the marketplace, this article serves as an interesting microscope to examine possible behavioral patterns and how they might manifest themselves in actual portfolio managers nonetheless.

Where Are We Headed

After covering what can be conservatively called a massive amount of information, it is still important to note that it is impossible to incorporate every aspect of a field especially a field like behavioral finance into one coherent paper without boring even the most respected reader to tears. However, just as important as covering as much about the current state and history of a field is projecting where it is going. With regards to this there are likely several different areas of behavioral finance that will shine in the coming years.

The first area is wealth and investment management. As stated in the paper, investment advisors must take on behavioral finance on two fronts. Advisors must be able to both understand the behavioral phenomena present in prices as well as the behavioral biases and heuristics present in their clients. As a result, I believe that there is likely to be increased research done on individual investor biases until there is the creation of a somewhat standard test for investor biases.

Hirshleifer (2014) also discusses what he believes behavioral finance will focus on in the future and came up with a similar thought process. Hirshleifer argues that more research into the attitudes and motivation surrounding decision-making needs to be done. Specifically, this would include one's choice to borrow vs. save, risk tolerance, and willingness to exploit other participants. Also, as this paper does, the author suggests that behavioral finance needs to move towards the analysis of particular biases and the grouping of biases for research. This is similar

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to the point made above about the formulation of a test for biases. Finally, Hirshleifer argues that behavioral finance needs to shift into social finance. Hirshleifer defines social finance as studying how “social norms, moral attitudes, religions and ideologies affect financial behaviors.” Also important in social finance is, “how ideologies that affect financial decisions form and spread.” The idea of social finance is an intriguing one, and if researchers are successful in researching the way these social constructs affect investment decisions it will be a significant achievement.

While financial advisors have much to look forward to in behavioral finance corporate finance will also benefit. This is because even though the CFO's and managers in charge of capital budgeting are professionals, overconfidence is still very prevalent in businesses. Also, because of the high arbitrage costs for outside investors these problems are much more likely to go unaddressed. Particularly interesting research in the future may include the degree to which activist campaigns from hedge funds e.g. Starboard and Olive Garden help to correct the behavioral mistakes of managers. Also, future corporate finance research should focus on the creation of a replacement to or more accurate version of CAPM that still measures asset risk.

Finally, there are two more areas that behavioral finance should look to in the future. First, researchers need to commit to and get behind a replacement for the Efficient Markets Hypothesis. This may be the AMH as discussed in this paper or a related theory. If this is done, then behavioral finance will have a firm footing and a clear position on how it believes markets truly work. Secondly, it will be interesting to see if researchers can come up with a structure for a market life as mentioned in the previous review of Speidell (2009). What this means practically speaking is that research should be done to see if there is a consistent pattern of behavioral biases or mistakes that investors in emerging markets exhibit that gradually become less and less

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prevalent as the market becomes more developed, or does each economy develop independently based on the population and its unique elements.

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