

Behavioral Finance and Its Impact on Investing

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Abstract

The field of behavioral finance has seen incredible growth over the past half century as it has explored the effect that cognitive psychological biases can have on investors' financial decisions. Behavioral finance stands in stark contrast to the efficient market hypothesis, as it attributes market inefficiencies to investors who are not perfectly rational human beings. It offers a solution to the observed 3.5% gap that active equity investors miss out on in the market compared to passive index funds, which it attributes to their emotions and psychological biases. These common human biases can be grouped into five major categories: heuristics, prospect theory, overconfidence, misperceiving randomness, and herding. This thesis will conclude with applications drawn from the field of behavioral finance that can be applied to both the individual investor and the financial advisor to help achieve better investment returns.

Behavioral Finance and Its Impact on Investing

Over the past three decades, the field of behavioral finance has grown immensely in its use to help people make better decisions about their investments (Hirshleifer, 2015). Simply put, behavioral finance adds a human element to investing in its effort to more accurately describe an individual's investment decisions (Thaler, 1999). It achieves this by applying the field of psychology to people's decisions regarding their finances with a focus on people's individual-level cognitive biases (Hirshleifer, 2015). Warren Buffett explained, "The stock doesn't know you own it. You have feelings about it, but it has no feelings about you. The stock doesn't know what you paid. People shouldn't get emotionally involved in their stocks" (Jordan, Miller, & Dolvin, 2015, p. 260). In order to take full advantage of the study of behavioral finance, one must understand its history, its specific psychological traps, and how to fully apply its strategies when making investment decisions.

The History of Behavioral Finance

The Efficient Market Hypothesis

In order to understand the beginnings of behavioral finance, one must first look at the efficient market hypothesis (EMH) proposed by Fama (1965), as behavioral finance later grew as a contrarian viewpoint to the EMH. Fama (1965) posited the idea that stocks operate in an efficient market where given the available information, stock prices very accurately display the intrinsic value of the stock, and once new information enters the fold, stock prices react almost instantaneously. One complementary proposition to the EMH was the random walk hypothesis (RWH), which speculated that the future price

levels of a stock were no more predictable than a series of random numbers (Fama, 1965). The major implication that Fama (1965) originally drew from the EMH and RWH was that the past could not be used to predict the future of a stock's price in any meaningful way. Thus, he deemed the investing discipline of "chart reading" and trying to predict future prices based off of past trends completely irrelevant (1965).

Fama (1970) continued his seminal work in the EMH with its core concepts that market prices fully reflect all available information, and as a result, stocks always trade at their fair value. Fama (1970) proposed a threefold approach to the EMH where each layer built upon the concepts in the previous layer to make a wider claim. The first form of the EMH was the weak form, which presumed that future stock prices cannot be predicted by analyzing past stock prices (1970). This was consistent with Fama's (1970) earlier works and he found very strong support for the weak form in his analysis of the stock market. The second form, the semi-strong form, proposed the idea that stock prices adjust rapidly to new information and in an unbiased manner, leaving practically no opportunity for the investor to beat the market (1970). Fama, Fisher, Jensen, and Roll (1969) supported this semi-strong form with their finding that information involving stock splits, such as future firm dividend payments, are already incorporated into the stock leading up to the split, reinforcing the idea that stock prices rapidly adjust to new information. The third and most audacious form of the EMH was the strong form, which posited the idea that stock prices not only reflect all public information, but also all private information, implying that there would be no competitive advantage to insider trading (1970). Fama (1970) found reasonable support for all three forms of the EMH,

and believed that the EMH model held up very well as a suitable description of the stock market.

Throughout the 1970s, the EMH, specifically its weak form and semi-strong form, was widely respected and taken for granted by most of the investment community (Shiller, 2003). At the core of the EMH laid the assumption that speculative asset prices of individual securities always incorporate the best information about the stock's fundamental values, and that all price changes are simply caused by this good information being digested by rational investors (Shiller, 2003). However, Kahneman and Tversky (1979) first challenged the EMH through their blockbuster report on prospect theory, which began to look specifically at how people choose between two different outcomes that involve risk, with the probabilities of the outcomes known. Specifically, their paper offered prospect theory as an alternative to the widely held expected utility theory as they found people often weight alternatives incorrectly when dealing with risk (Kahneman & Tversky, 1979). They found one common problem people have in their approach to analyzing risk is a propensity to be risk-averse in their financial decisions, with one example of this being the popularity of insurance (Kahneman & Tversky, 1979). This was one of the first studies that opened up the possibility of human psychological biases interfering with their financial decisions.

The 1980s

Thaler (1980) built upon the findings of Kahneman and Tversky as he critiqued the prevalent economic theory of his time that attempted to portray how consumers made their purchasing decisions. The prevailing theory of the time was the rational

maximizing model, which put forth the idea that consumers take all of the available information for a purchasing decision and make the most rational decision to best serve their interests (Thaler, 1980). In essence, the rational maximizing model described how customers should choose, and in Thaler's (1980) belief, falsely made the jump that this is in actuality how customers do choose in real life. Thaler (1980) identified several observable decision-making mistakes people make such as underweighting opportunity costs, failing to ignore sunk costs, and regret aversion. At this point, the field of behavioral finance was born.

Thaler and De Bondt (1985) partnered to look at whether the stock market overreacted, and hypothesized that an individual's cognitive bias could produce a predictable mispricing of equities in the New York Stock Exchange. They applied the field of experimental psychology's finding that people oftentimes overreact to unexpected and dramatic news events to portfolio returns (Thaler & De Bondt, 1985). Their findings supported their hypothesis with the discovery that portfolios of prior "losers" consistently outperform portfolios of prior "winners," indicating that people do in fact overreact to bad news, and let that overreaction greatly affect their investment decisions (Thaler & De Bondt, 1985). Psychologists Andreassen and Kraus (1988) further challenged the EMH by showing that when people are shown a sequence of historical stock prices, they tend to extrapolate past prices when a trend appears and let that have an impact on their investment decisions. For example, if the study preconditioned its subjects by showing them past bubbles of the value of an index, the subjects would then form an expectation of new repeating bubbles in the future

(Andreassen & Kraus, 1988). The 1980's were a very important time where several studies began to cause investors to question the prevailing certainty of the validity of the EMH.

The 1990s

The research constructed in the 1990s built upon the progress of the previous decade to bring behavioral finance into the mainstream, especially in academics. According to Shiller (2003), the academic discussion began shifting away from concepts such as time series on prices, dividends, and earnings, towards an analysis of how human psychology played a role in the financial markets. In 1991, Thaler and Shiller started the National Bureau of Economic Research conference series centered on behavioral finance (Shiller, 2003). The field of behavioral finance was progressing alongside the revolution occurring in psychology during the 1990s, which was bringing forth the central role that feelings play in the decision making process (Hirshleifer, 2015). This progress in psychology paired well with the developments in behavioral finance to help apply how feelings could impact individual investment decisions.

Thaler (1999) successfully applied the findings of behavioral finance to predict the collapse of the Internet stock boom at the turn of the century, and blamed the widely held EMH that credited all investors as being rational and making unbiased forecasts about the future. At the time, in reference to the lack of data on the psychological biases of investors, Thaler (1999) prophesied, "Until such data become available, we will never fully understand what I think will become known as the 'Great Internet Stock Bubble'" (p. 16). He believed that the market was 20-30% overvalued and the only reason that it

continued to rise was because the investors who were willing to bet on a decline had too few dollars to prevail and influence the market, since the masses were driving up the prices (Thaler, 1999). He also believed that one crucial mistake the largest investors made was using a rule of thumb, such as 60% dedicated to equities, for their asset allocation (Thaler, 1999). Thaler (1999) opined that they should have been adjusting their asset allocation based off of certain signs in the market that were indicating a potential crash. Sure enough, the tech bubble burst in 2000, and the DJIA at one point lost over 30% of its value. Shiller (2003) noted that emotions were clearly tied up in this rise and fall of the market as investor confidence rose dramatically during the period from 1989 to 2000. He held that the media was spreading a false sentiment that the market would continue to go relentlessly upward, which the public widely consumed and believed (Shiller, 2003). With the predictions of Thaler (1999) and retrospective analysis of the tech bubble (Shiller, 2003), behavioral finance had solidified itself as a legitimate tool to be used in investment theory.

The Current State of Behavioral Finance

Behavioral finance identifies the potential causes of the recent stock booms and crashes and how they have their roots in human mistakes (Shiller, 2003). Statman (2014) clarified that behavioral finance substitutes “normal” people for the perfectly rational people who are presupposed in standard finance. The issue is not that normal people are flat out irrational; it is just that they are not completely rational, since they can be swayed by cognitive errors such as hindsight and overconfidence (Statman, 2014). Thaler (1999) believed there needed to be a distinction between two types of investors: the perfectly

rational investor that does not exist, and the quasi-rational investor. The quasi-rational investor tries to make good investment decisions, but can be prone to predictable mistakes (Thaler, 1999). It is the quasi-rational investor that must be accounted for within behavioral finance.

Challenging the EMH

Behavioral finance stands in stark contrast to the EMH that puts forth the idea that the markets always work well and security price changes always reflect genuine information (Shiller, 2003). Behavioral finance offers an explanation for the observed market inefficiencies and cracks in the EMH (Baker & Ricciardi, 2015; Hirshleifer, 2015). Hirshleifer (2015) provided a good example of this by demonstrating that the stock price of the company EntreMed jumped 600% in a single weekend following the republication of news that had already been published and made available to the public five months earlier regarding a soon to be released new cancer drug. This seemingly violated the principles of the EMH, specifically the semi-strong form, that assumes prices rapidly adjust to new information and accurately reflect all the public information available (Hirshleifer, 2015). According to Shiller (2003), behavioral finance takes a step back from approaching finance from an efficient market framework and instead utilizes a broader perspective that incorporates the fields of psychology and sociology.

Statman (2014) drew a further distinction between what he called “standard finance” and behavioral finance (p. 65). He held that standard finance adherents assume that all people are rational, the market is efficient, and the expected return of different investments is determined by the standard asset pricing theory, where solely risk

determines the differences in investment returns (Statman, 2014). In contrast, he opined that behavioral finance theorists assume that people are normal, that the market is not entirely efficient, though difficult to beat, and that the expected returns of investments are best described by the behavioral asset pricing theory where the different returns of investments are determined by more factors than solely risk (Statman, 2014). According to Thaler (2016), economics should incorporate two distinct theories: normative economic models should show the optimal solution to specific problems, while descriptive models should capture how humans actually behave.

The Role of Emotions

Behavioral finance analysts look specifically at the role that moods and emotions can have on a person's financial behavior (Duxbury, 2015). There are several examples of people's emotions affecting their decision making process. Kuhnen and Knutson (2011) demonstrated that being in a good mood increases optimism and risk taking behavior. Also, Lerner and Keltner (2001) showed that people tend to be more pessimistic and risk-averse when they are experiencing the emotion of fear. Interestingly, psychologists have demonstrated that anger makes a person more optimistic and risk tolerant (Lerner & Keltner, 2001). Humans were created as emotional beings with one of the ramifications being that emotions play a large role in our decision making process.

Statman (2014) distinguished between what investors say they want versus what they actually want. He found that investors will say that they want high returns with low risk, but in reality they truly desire three different benefits: utilitarian, expressive, and emotional (Statman, 2014). A utilitarian benefit looks at the tangible benefit that an

investment gives to an investor. An expressive benefit is used to describe the impact an investment can have in conveying to others one's values and status (Statman, 2014).

Lastly, the emotional benefit from an investment answers the question how an investment makes one feel; for example, the difference in purchasing a socially responsible mutual fund versus a well-known hedge fund (Statman, 2014). The socially responsible mutual fund could make the investor feel good about themselves because they are abstaining from investing in unethical companies, while the hedge fund could make the investor feel proud because of the exclusivity perceived from that type of investment.

While there are many positive benefits towards the human aspect of emotions, they can have a devastating impact on one's investment decisions. Kliger, van den Assem, and Zwinkels (2014) found that an investor's over-reactive trading is strongly correlated with his level of surprise in hearing investments news. Hirshleifer (2015) gave the example of an investor's feelings short-circuiting and influencing him to buy a hot stock because of excitement surrounding the stock or selling off a stock because of panic. In both of these scenarios the dictating factor for his investment decision is his emotions, while the investor is neglecting to do his own critical evaluation of the stocks (Hirshleifer, 2015; Kliger et al., 2014).

Statman (2014) blamed fear for causing many investors to sell as the market bottoms out, because their perception of risk is at an all time high, while their perception of return is at an all time low. The role of emotions in investor's decisions is probably most evident during the peaks and valleys of the market. Another issue that may arise is an investor's hesitancy to sell a loss on an individual security because he does not want to

“lose” on that stock (Statman, 2014). A more rational approach that incorporates taxes would tell that investor the exact opposite, as they should be more inclined to sell a stock that has decreased in value to reap the benefits of loss realization, and hold onto their gains so that they can defer capital gains taxes (Statman, 2014). Hirshleifer (2015) summarized that there are many benefits for an investor if he realizes his own emotional inclinations in investing, and is instead deliberate in his attempts to make decisions analytically instead of letting his emotions get a say in the process. In order for an investor to fully capitalize on this analytical decision making process, he must be aware of the different traps that behavioral finance has found emotions and biases can have on one’s investment decisions.

Behavioral Finance Traps

Beyond just emotions, there are many psychological traps that behavioral finance has identified which can wreak havoc on investors. Thaler (2016) credited economic pioneer Adam Smith with first discovering key psychological concepts such as loss aversion and overconfidence. Since Smith’s original discovery, behavioral finance has radically evolved and built a framework to help classify predictable investor mistakes. Five of the major traps that investors can fall into include: heuristics, prospect theory, overconfidence, misperceiving randomness, and herding.

Heuristics

Heuristics are shortcuts that the brain creates in an effort to simplify the decision making process, and are increasingly prevalent in today’s fast paced society. These shortcuts can vary from being innate processes that the investor may be unaware of, or

consciously chosen rules of thumb to help aid in decision-making (Hirshleifer, 2015; Jordan et al., 2015). Greenwood and Nagel (2009) and Malmendier, Tate, and Yan (2011) proved that past life experiences can greatly affect investor decisions, and oftentimes these past influences can unconsciously seep into an investor's strategy by becoming a heuristic. Investors can also make the mistake of easily locking into certain habits and relying on them without giving them much thought (Hirshleifer, 2015). There are many practical benefits to using heuristics throughout life, but in the world of finance and investments they can have adverse consequences.

Thaler and Shefrin (1981) discovered one of the first heuristics when they observed that most people automatically consume only out of their dividends and interest, instead of the principle of an investment. In an effort to save time and stress on the brain, an investor will simply use this rule of thumb for what investment to liquidate and withdraw from, without giving any thought to all options at play through an analytical approach. Shefrin and Statman (1984) saw this as an explanation for why many investors prefer investments with cash dividends. The main cause of this can be traced back to their heuristics.

Currently, behavioral finance analysts have identified several specific heuristic biases that investors fall into. Andersson, Hedesstrom, and Garling (2014) found support for the consensus heuristic, in which an investor believes "the majority is always right" (p. 227). This shortsighted belief can cause an investor to fall into the trap of herding, which will be discussed in a later section. Samuelson and Zeckhauser (1988) brought to light the status quo bias, in which an investor will simply take the default option among a

list of different options. This topic will also be covered later in this thesis as it presents an opportunity for financial advisors to help their clients overcome this bias in their 401k allocations. Choi, Laibson, and Madrian (2009) showed that investors could over extrapolate their own past investment performance in making investment decisions. This causes the investor to comfort himself through naïve reinforcement that his past investment success will simply carry forward into his current investment decisions (Choi et al., 2009).

Hirshleifer (2015) also showed that professionals can even be susceptible to using heuristics. One prevalent example he drew from was a CFO using a naïve capital budgeting approach such as the payback criterion and a single discount rate while comparing two very different projects undertaken by the company (Hirshleifer, 2015). Everyone can be susceptible to different heuristics that they unintentionally institute, and by becoming aware of their own heuristics they can make more informed and accurate investment decisions.

Prospect Theory

Prospect theory lies at the heart of behavioral finance and is one of the main antagonists to the EMH. The EMH puts forth the idea that individuals receive utility from their final state of wealth, and are indifferent as to how they reached that final state (Duxbury, 2015). However, prospect theory flies in the face of the EMH in that its adherents stress that how an individual reaches that final point of wealth matters immensely, even if the final point of wealth is the same (Jordan et al., 2015). The main thesis of prospect theory is that people tend to focus on changes in wealth, rather than

their comprehensive level of wealth (Jordan et al., 2015). This can be seen by four main biases: anchoring, loss aversion, frame dependence, and mental accounting.

Anchoring. Anchoring occurs when an investor fixates on a certain reference point for his investments (Jordan et al., 2015). This investor then receives utility from gains and losses relative to that reference point, which oftentimes is the purchase price of the stock (Duxbury, 2015). The investor will feel rewarded or punished as he anxiously tracks his investment relative to the reference point (Hirshleifer, 2015). The problem here lies in the fact that the investor is paying too much attention to a superficial reference point, while neglecting to take into consideration the level of his entire wealth.

Sinha (2015) showed that people too often base the value of their stock off of the current asking price of their stock. Not only that, but people also fail to adjust from their anchor set price when evaluating their options (Sinha, 2015). This can be seen when an investor has held a successful stock for a long time and refuses to sell because he views it as a “winner” relative to the price he bought it for originally. However, the past purchase price of a stock is irrelevant, excluding its tax consequences, when trying to evaluate the current value of a stock. Kliger et al. (2014) offered further support by finding that reducing the prominence of a stock’s purchase price could have a substantial impact on an investor’s decision of whether or not to sell a stock.

Hirshleifer (2015) argued that an investor should be more concerned with where the stock value lies in relation to its current covariance with one’s portfolio than its marginal return in relation to its purchase price. From an emotional aspect, the investor may be trying to enhance his self-esteem by “winning” with a stock pick (Hirshleifer,

2015). There is a major jump in the investor's utility at zero relative to the reference point, and part of the reason why an investor may be so prone to anchor is because of his hard-wired tendency to be loss averse (Hirshleifer, 2015).

Loss aversion. Psychologically, people hate losing. In fact, it could be said that people hate losing even more than they enjoy winning. Doviak (2016) explained that when an investment is behaving as expected, an individual's satisfaction can be measured by a slow, gentle, upward curve. However, when an investment is not performing well, an individual's dissatisfaction can be measured by a sharp, quickly descending cliff (Doviak, 2016). Loss aversion is the idea that investment losses move an investor's emotional needle more than equivalent investment gains, making investors reluctant to sell any investment that could result in a loss (Doviak, 2016; Jordan et al., 2015).

Thaler (1999) called this myopic loss aversion. Myopic means that even investor's who have long term horizons appear to care too much about short-term gains and losses (Thaler, 1999). Thaler (1999) argued that losses hurt investors roughly twice as much as identical gains do. On top of losses hurting, the media often preys on this loss aversion by causing panic as seen on financial television shows when the market is going down (Doviak, 2016). Combining a short-term outlook on stocks with a focus on avoiding losses is a recipe for disaster in investing.

One ramification of this is that investors are often reluctant to sell losers and mentally declare those losses (Odean, 1998). Again, from a rational tax perspective this does not make sense as selling winners triggers a capital gains tax while selling a loser can help offset the tax. Not only does this impact average investors, but it has also been

shown that professional investors can exhibit loss aversion in their trading practices as they stay glued to a reference point for certain stocks (Hirshleifer, 2015).

Frame dependence. Frame dependence is the theory that how a problem is described, or framed, can have a sizable impact on how an individual chooses an answer (Jordan et al., 2015). Hirshleifer (2015) elaborated that two alternative descriptions of logically identical problems can produce two different answers from an individual. Oftentimes, simply highlighting a different reference point can cause an individual to change his answer (Hirshleifer, 2015). One component within the web of framing is narrow framing, which occurs when an individual approaches a decision while isolating some of the factors that are important to it (Hirshleifer, 2015). An example of this could be an investor looking at how a stock has performed relative to its purchase price, without taking into consideration the diversification it adds to his portfolio.

Researchers have often found within framing what they call the endowment effect. Kahneman, Knetsch, and Thaler (1990) discovered the endowment effect in play when an individual prefers retaining what he already has instead of exchanging it for a better alternative. One example they give is a person refusing to swap a lottery ticket for an equivalent lottery ticket plus some cash (Kahneman et al., 1990). People make the mistake of believing what they have is inherently more valuable than an equivalent item, especially when someone else desires their item. This coincides with the famous mathematical “Monty Hall” problem where a contestant is given three doors to choose from with a prize behind one of them. The game show host then proceeds to open one of the doors that does not have the prize behind it, and invites the contestant to change his

answer to the other door. Mathematically, the contestant has a 50% chance if he changes doors, but only a 33% chance if he keeps the door he previously chose (Robinson, 2013). However, most contestants go against rationality and keep the door they previously chose even though it has less of a chance of winning. Surely the endowment effect is at play here.

Another practical example of the endowment effect is an owner of an old bottle of wine refusing to sell it for \$200, but willing to only pay up to \$100 to replace it if it broke ("From Psychology," 2004). The change here lies in the owner's perspective of either getting the wine or giving it up ("From Psychology," 2004). A combination of the endowment effect and loss aversion causes the owner to mentally weight the prospect of giving up the wine more than twice as much as the prospect of getting an equivalent bottle.

Mental accounting. Jordan et al. (2015) defined mental accounting as the tendency of investors to separate their money into "mental buckets" while treating the values and risk tolerances of the buckets differently (p. 261). The critical mistake that too many investors make is that they fail to treat their money as fungible, and therefore end up violating rationality by failing to maintain a comprehensive view of all of their assets and desired outcomes ("From Psychology," 2004).

One example of mental accounting materializing in a real-life situation can be seen when comparing two practically identical scenarios involving a lost movie ticket. In scenario one, the moviegoer realizes she has lost her ticket upon arriving at the movie theater, while in scenario two, the moviegoer realizes that she has lost an amount of cash

equivalent to the value of her ticket at the door (“From Psychology,” 2004). Studies have shown that the woman who loses her actual ticket is very likely just to go home, as she presumably does not want to pay twice to see the same show (“From Psychology,” 2004). However, the woman who loses the equivalent amount of cash consistently proceeds to buy a ticket at the door (“From Psychology,” 2004). Seemingly, the first moviegoer placed the lost ticket in the movie theater mental bucket, and since that bucket had already been depleted, she was unwilling to buy another ticket. However, the second moviegoer seemed to charge the lost cash to a “general revenue” mental bucket, making it unrelated to the ticket purchase (“From Psychology,” 2004). This type of model has held true across many different platforms as people consistently treat equivalent amounts of value differently based off of which mental bucket they allocate that value to.

Thaler (1999) showed another example of this with the “house money effect,” where it has been proven that when gamblers are ahead and “playing with house money,” they become much more inclined to take more risks with their money (p. 15). Similarly, investors who have experienced high returns lately become much less risk-averse and more aggressive in their investment strategies (Thaler, 1999). The main reason for this is the individual’s failure to consider money as fungible and treating money differently based off of how it was earned or how it was lost. However, the way that an individual received the money has no effect whatsoever on the inherent value of that money, and therefore should not play a role in future decisions they make with that money.

Economists have tried to find a way to use this psychological bias towards people’s advantage. Das, Markowitz, Scheid, and Statman (2011) explained how this can

be applied through behavioral portfolio theory. Behavioral portfolio theory actually began over 60 years ago when economists Milton Friedman and Leonard Savage identified the simultaneous roles that people's desires for riches and protection from poverty play in people's behavior (Das et al., 2011). Friedman and Savage found that the same people who buy lottery tickets also buy insurance, indicating that people tend to be both risk-seeking and risk-averse (Das et al., 2011). When designing a portfolio, one can utilize different mental buckets by taking more risk with a portion of their money and less risk with another portion, provided they can take a step back beforehand and prioritize a comprehensive view of their total amount of assets. This thesis will cover this further in a later section on how financial advisors can best institute this practice when advising their clients.

Overconfidence

Another psychological mistake that investors frequently display materializes in an overconfident nature towards their own investment strategies and forecasts of the market. Kinari (2016) performed a study that polled investors for their forecasts of the NIKKEI 225 over a one-day, one-week, and one-month period. While investors varied in their degree of optimism or pessimism over the future of the market, the one thing that remained constant was their own overconfidence in their forecasts regarding where they saw the market going (Kinari, 2016). Thaler and Barberis (2002) performed a study that tried to comprehend why people were so certain about uncertain events. They found that certain events people believe will happen 98% of the time only end up happening 60% of the time (Thaler & Barberis, 2002). Also, events that people are practically certain will

never happen actually end up occurring 20% of the time (Thaler & Barberis 2002). The major implication that can be drawn from this is that one reason people may be overconfident is that they tend to push certain possibilities to the end of their probabilistic spectrums within their mind, when in reality they should be perceived as much closer to a 50/50 proposition.

Another cause of overconfidence is displayed in the mere exposure effect. Bornstein and D'Agostino (1992) found that repeated exposure to a certain stimulus could cause someone to like that stimulus more. Hirshleifer (2015) took this one step further by claiming an increased familiarity with a certain stock can cause an investor to like it more, because in their mind an understanding of the stock reduces risk. Weber, Siebenmorgen, and Weber (2005) agreed with this hypothesis by finding specific signs that an investor's familiarity with a stock reduces the perception of risk. Heath and Tversky (1991) found that people can end up betting on a matter for which they feel themselves to be an expert instead of taking an exactly equivalent gamble. Kahneman (2011) called this the WYSIATI effect, or "what you see is all there is" (p. 86). In reality, an investor's familiarity with a certain stock has no bearing on that actual stock's performance, and also does not imply that an unfamiliar stock would perform more poorly.

Odean (1998) found that this overconfidence can result in poor portfolio management. One way this surfaces is when investors begin trading too much within their portfolio because they are confident they can pick out the winners and losers of the market (Odean, 1998). However, oftentimes the stocks they end up buying do worse than

the stocks they sell, casting serious doubt on their investment abilities (Odean, 1998). Not only does overconfidence often result in poor returns, but it also reduces diversification, as overconfident investors are prone to place large bets on individual securities (Hirshleifer, 2015). On top of this, overconfidence usually creates more trading activity, which causes negative tax ramifications. Studies have shown that men, specifically, are susceptible to this, as they tend to be more overconfident in their trading abilities and trade one-and-a-half times more than women (Kliger et al., 2014; Liersch, 2015). When it comes to trading securities, almost all of the consequences of overconfidence are negative.

Misperceiving Randomness

Yet another mistake many investors make is reading too much into random events, and concluding that there are causal factors behind these random events, which Jordan et al. (2015) called the representativeness heuristic. Kahneman and Tversky (1979) were the first to find this representativeness heuristic at play as people tried to forecast future outcomes based off of mainly random past sequences. Shiller (2003) added that the human mind is a pattern-seeking device, and when it comes to this heuristic, the mind can work against itself. When forecasting future data based off of past data or graphs, the mind fails to account for the actual small probability that the current trend or pattern will continue (Shiller, 2003).

Investors also tend to put too much emphasis on recent events when forecasting data, which is called the recency bias (Sinha, 2015). Thaler and Barberis (2002) showed that recent events could distort investment estimates among both analysts and common

investors. This is especially true when good earnings news occurs and investors make the mistake of combining their emotions with the recency bias to invest more in the respective stock (Hirshleifer, 2015). Investors usually have some combination of a recency bias and a law of small numbers bias, which occurs when people overweight the significance of small samples when drawing conclusions (Tversky & Kahneman, 1971). Along with relying too much on small samples, people rely too little on large samples, creating the perfect environment for a recent stock surge to prey on their internal psychological biases (Hirshleifer, 2015).

Another psychological mistake that frequently creeps up amongst investment practices is the self-attribution bias (Daniel, Hirshleifer, & Subramanyam, 1998; Sinah, 2015). When things go well, people like to take credit for their talents and involvement in the success (Sinah, 2015). However, when things turn out poorly, people tend to blame their bad luck or outside forces, neglecting to take responsibility (Sinha, 2015). This was first observed by psychologist Daryl Bem (1965) as he found that people attribute events that confirm the validity of their actions to their own superior ability, but attribute events that disprove their actions to factors such as poor luck or sabotage. Applying this to investments, it is easy to see why investors often take personal credit for successful stock picks when the entire market is going up, while at the same time shift the blame to certain industries or companies for stock picks that go south.

Herdling

Investors fall into the trap of herding by simply following what those around them are doing with their investment decisions (Jordan et al., 2015). One example of this

appears in Jim Cramer's TV show *Mad Money*, where oftentimes he will recommend a stock, which subsequently sees a large gain the next day (Jordan et al., 2015). Rarely is Jim Cramer presenting new information to the market, but instead he is just reiterating information that was previously available, and investors are buying the stock because Cramer and those around them are buying it. Sinha (2015) affirmed that the main reason investors herd is that they assume that their own information is of low quality and that other investors have higher quality information and thus place less weight on their own opinions and more weight on others' opinions. Venezia, Nashikkar, and Shapira (2011) agreed that herding is mainly a result of information availability or the lack thereof, and an innate distrust in one's own information. There is also plenty of support that herding is a form of social influence in humans where people desire to find things in common with those around them and feel better about themselves when their decisions are in agreement with their companions (Andersson et al., 2014; Roider & Voskort, 2016; Spyrou, 2013).

Roider and Voskort (2016) ran an experiment to try to test the theory of herding behavior among investors by separating out a treatment group that was given the opportunity to herd and a sincere group that was not. In the treatment group, where investors were aware of the investment decisions of those around them, they found a higher inclination to herd and formulate common stock picks, compared to the group that was not aware of the stock choices of those around them (Roider & Voskort, 2016). Clearly, there is a psychological inclination for investors to give a large amount of weight to the opinions of those around them in their own investment decisions.

Unfortunately, as Venezia et al. (2011) pointed out, there is ample evidence that “herding behavior” exists not only amongst common investors, but also amongst professionals and analysts (p. 1,608). However, Venezia et al. (2011) did find that there was a lower propensity to herd amongst professional investors, which can be attributed to their financial training. Nevertheless, the tendency to herd still exists amongst professionals, and Andersson et al. (2014) broke this into two categories: indirect and direct influence. Indirect influence results from common knowledge, current stock-picking fads, or common investment styles, and is practically unavoidable (Andersson et al., 2014). Direct influence arises from the reputational costs to the professional if he deviates from the recommended choices by the consensus (Andersson et al., 2014).

There is plenty of evidence that analysts are influenced as they adjust their own forecasts to those around them, so that if they are wrong there is no damage to their reputation because everyone else around them was wrong, but if they deviate from the pack and are the only analyst wrong, they could lose their job (Roider & Voskort, 2016; Spyrou, 2013). Andersson et al. (2014) also proved that predictions by other analysts could cause analysts to make inaccurate predictions themselves. On top of that, herding behavior is not unique to American analysts and professionals, as Gavriilidis, Kallinterakis, and Leire-Ferreira (2013) found evidence that Portuguese fund managers herd when choosing their fund’s monthly portfolio holdings.

Economists believe that herding has an adverse effect on the market by destabilizing prices and causing bubble-like episodes (Andersson et al., 2014; Spyrou, 2013). If many investors are making decisions similar to each other, it can create a

sudden and volatile shift in prices if the herd changes its mind about a certain stock or their confidence in the market as a whole. Venezia et al. (2011) found that “herding behavior” is positively and significantly correlated with the level of volatility in the stock market (p. 1,608), which creates a bigger problem because Spyrou (2013) elaborated that investors often imitate the actions of others during times of crisis and uncertainty. This creates a never-ending cycle where herding and market volatility escalate simultaneously as investors panic.

Applications for Individual Investors

“Investing isn’t about beating others at their game. It’s about controlling yourself at your own game” (Baker & Ricciardi, 2015, p. 23). Too often, investors let the traps within behavioral finance manipulate them, instead of using behavioral finance to their advantage. This is especially apparent when looking at investor returns compared to the S&P 500 over the twenty-year period from 1991 to 2011. While the S&P 500 rose, on average, 7.8% per year, the average equity investor only achieved a 4.3% return per year over that same period (Liersch, 2016b). This leaves a considerable 3.5% gap, which can be largely attributed to investors falling prey to the traps of behavioral finance.

The first step in using behavioral finance to an investor’s advantage is to know all of the potential biases (Jordan et al., 2015). This thesis explains the major biases, which include heuristics, prospect theory, investor overconfidence, misperceiving randomness, and herding. By being aware of the different biases that investors have fallen prey to in the past, an investor can better guard himself against making the same mistakes. Also, investors need to be aware of the biases that those around them possess. Investors too

often are naïve of an equity analyst's monetary incentives to bias both forecasts and recommendations (Malmendier & Shanthikumar, 2007; Richardson, Teoh, & Wysocki 2004).

Another step investors need to take is to increase their awareness of the effect that the emotional roller coaster of the market can have on their investment decisions. Renowned stock picker John Templeton once said, "Bull markets are born on pessimism, grown on skepticism, mature on optimism and die in euphoria." (Brueckner, 2014, p. 31). When the market is peaking, investors experience the emotion of euphoria, and their confidence is at an all time high (Liersch, 2016b). However, this is the point of maximum financial risk, and the best time to sell (Liersch, 2016b). History is replete with examples proving this to be true, such as money pouring into equity-based mutual funds in late 1999 and the first quarter of 2000 right before the tech bubble burst (Malkiel, 2015).

On the opposite end, when the market is bottoming out, investors begin to experience the emotions of panic and depression and switch their allocations out of equities, even though this is the point of maximum financial opportunity (Liersch, 2016b; Malkiel, 2015). Investors demonstrated this by pulling out enormous amounts of money in the valleys of the tech and housing financial crises in 2002 and 2009 respectively, causing investors to miss out on the subsequent strong rebounds of the market (Malkiel, 2015). The key for an investor trying to control his emotions in volatile markets is to take an objective, contrarian mindset, and attempt to view stock prices through the lens of "expensive" or "cheap."

Several practical steps can be gleaned from behavioral finance that an investor can apply in his everyday trading habits. Jones (2012) recommended that investors stop chasing past performance, and instead start choosing investments based off of relevant, predictive information. Also, investors should purposely disregard the original purchase price of a stock when deciding whether or not to sell it, with the only exception being the consideration of its tax consequences (Jones, 2012). Additionally, investors should be more deliberate in basing their decisions off of checklists and rules, with less reliance on their own intuition or “gut feeling” (Jones, 2012). Jordan et al. (2015) suggested more practical steps such as creating objective investment criteria to guide the investment decision making process, diversifying one’s portfolio, and avoiding situations that can have an undue psychological influence, such as watching too much financial news television. By being aware of the different traps in behavioral finance, controlling the influence of one’s emotions, and taking practical steps to reduce biases, one can utilize the study of behavioral finance to make better investment decisions.

Applications for Financial Advisors

The study of behavioral finance is a valuable tool for financial advisors to better understand and implement recommendations for their clients. Understanding the behavioral pattern and psychology of a client can make the financial advisor more effective and strengthen the client-advisor relationship (Baker & Ricciardi, 2015; Pompian, 2012). Baker and Ricciardi (2015) found that understanding client factors such as personality traits, demographics, socioeconomic influences, religion, risk-taking

history, and cognitive and emotional biases could all affect a client's reasoning for financial and investing decisions.

Understanding the Client

Financial advisors can group their clients into three main types of behavioral tendencies to help customize their advice to the client (Pompian, 2012). A client who is a preserver is over occupied with trying to preserve his wealth, and can frequently fall into the trap of being risk-averse (Pompian, 2012). A follower easily falls into the trap of herding because of a lack of trust in his own opinions, and because of that, frequently gets in on investments late and has awful timing in the market (Pompian, 2012). An accumulator is a client who has had investment success in the past, and because of that, struggles with an overconfident, overly risky, approach to his retirement savings (Pompian, 2012). Each unique type of client provides the advisor with an opportunity to explain how their behavioral biases are hurting their investment philosophy.

Another key insight that advisors should consider is the effect that age has on a client's attitude towards money. In a survey conducted in 2011, Merrill Lynch separated out younger investors, ages 18-34, and older investors, ages 35-64, and polled them on their attitude towards risk (Liersch, 2016c). Surprisingly, 59% of younger investors reported themselves as conservative, while only 41% of older investors reported themselves as conservative towards their investments (Liersch, 2016c). If anything, these percentages should be flipped, as younger investors should be more risky in their investments since they have a longer time horizon until retirement, while older investors should be more conservative as they are closely approaching retirement. Part of the

reason for this lapse is that older investors have the hindsight to know that in the long run the market produces positive returns and is a good investment, whereas younger investors are too focused on the recent tech and housing market bubbles that led to market crashes (Liersch, 2016c). An advisor can provide value by guiding the client to choose investment allocations that are appropriate for their age, and helping the client realize his own biases that arise from his personal experiences with investing (Malkiel, 2015).

Advising the Client

As most advisors likely know, clients often struggle with falling prey to emotional investing during turbulent times in the market (Baker & Ricciardi 2015; Liersch 2016b). Malkiel (2015) showed that investors are most likely to stop their contributions to their 401k plans and IRAs during times of market pessimism. Here is where advisors can provide enormous value to their clients by helping to hold their hand through volatile times, and to help repress the tendency for clients to let their emotions dictate their investment decisions. Advisors should focus on supporting their recommendations with facts and evidence as they refocus their client towards an objective investment philosophy (Baker & Ricciardi, 2015). If this approach proves to no avail, another solution an advisor can provide is to share with the client past experiences with other clients who let their emotions get the best of them (Baker & Ricciardi, 2015). By helping clients overcome their emotions, advisors can help close the 3.5% investment gap too many investors miss out on (Liersch, 2016b).

Additionally, the general shift away from pension plans towards defined contribution plans provides another unique avenue for the financial advisor to bring value

to his client. With the shift away from pension plans, the employee now bears the responsibility for making decisions on how much to save for retirement (Thaler & Benartzi, 2004). Unfortunately, people usually display what Thaler and Benartzi (2004) called time-inconsistent behavior, as they weigh current or near term consumption much more heavily than long-term consumption. Advisors can help encourage their clients to max out their company matching policy on their 401k, and save more now so that they will have a better retirement.

Specifically with 401ks, one problem that frequently creeps up is the status quo bias, which is the preference for the default option amongst a set of options (Samuelson & Zeckhauser, 1988). There is a large body of evidence that investors too often will simply divide their retirement contributions evenly amongst the options given to them, without consideration for allocation and diversification (Malkiel, 2015; Thaler, 1999; Thaler & Benartzi, 2004). Thaler (1999) found that when a plan adds a stock fund, employee allocations towards equity rise, making their entire portfolio more aggressive. Thaler and Benartzi (2004) called this the 1/N rule, where the investor is using a heuristic of evenly dividing his funds across N- the amount of different options. The widespread use of 401ks gives the advisor a perfect opportunity to help explain to clients the status quo bias, and reallocate their 401k funds to better serve their retirement goals.

Constructing the Portfolio

One of the main jobs of a financial advisor is to help construct his client's portfolio. One common portfolio mistake most clients make is that they have too much of their retirement savings tied up in the stock of the company they work for without any

superior information for why they should be so heavily invested in their company, resulting in a lack of diversification (Benartzi, 2001). Investors also rarely update their portfolios as conditions in the market change (Choi, Laibson, Madrian, & Metrick, 2004). There is a clear need for help in portfolio construction, and one way that an advisor can do that is through helping the client create goals within their portfolio.

The standard mean-variance portfolio theory simply lines up an entire investor's portfolio with his accepted level of risk and return (Statman, 2014). On the other hand, behavioral portfolio theory embraces the human side of investing as it starts with an investor's different goals and shapes the portfolio around reaching those goals (Statman, 2014). Fully understanding the client and his preferences such as risk tolerance, liquidity needs, and time horizon can help the financial advisor and client shape their appropriate goals, which can range from a luxurious retirement to helping fund their children's education (Liersch, 2016a; Statman, 2014).

Once an advisor fully understands the client's goals, he can actually use the behavioral finance bias of mental accounting to his advantage (Thaler & Benartzi, 2004). This starts by dividing up the portfolio into different mental buckets, with each bucket representing a sub-portfolio with its own unique goal and correlated risk tolerance (Baker & Ricciardi, 2015; Das et al., 2011; Statman, 2014). Das et al. (2011) gave the example of separating a client's investments into three different goals of inheritance, education funding, and retirement.

Each goal would have its own allocation of funds, and differing amount of risk, with a client embracing a small amount of risk for his retirement, a medium amount of

risk for his children's education funding, and a larger amount of risk for his inheritance (Das et al., 2011). The most risky sub-portfolio, in this case the client's inheritance, could be composed of mostly equity and concentrated in a few stock positions (Statman, 2014). On the other hand, his most conservative sub-portfolio, his retirement savings, would be well diversified amongst not only different equities, but also amongst the different asset classes in general (Statman, 2014). Baker and Ricciardi (2015) found that clients are more successful in reaching their financial goals if they can designate a sub-portfolio, such as retirement, as not to be disturbed, with another sub-portfolio that allows them to tinker. Advisors can capitalize on clients' mental accounting bias by fully integrating a goals-oriented approach to their portfolio construction.

The field of behavioral finance has greatly developed over the last half century, and is expected to continue to evolve in its effort to more accurately describe how people interact with the economic world around them. Thaler (2016) posited that the future of behavioral finance should capitalize on our ever-increasing technological abilities such as brain imaging and artificial intelligence to better understand the psychological aspect of economic decisions. Another development worth monitoring is the advancements made in DNA analysis that have begun to examine the links between genetics and certain behavior, as De Neve and Fowler (2014) found a link between credit card usage and the monoamine oxidase A (MAOA) gene. With advancements in economics, psychology, technology, and science, the future scope of behavioral finance should both widen and deepen in impact.

Hirshleifer (2015) proposed that behavioral finance will evolve into a newer field of social finance, which will look at the macro social aspect of finance, instead of the individual level cognitive biases that behavioral finance concentrates on. Specifically, social finance studies how social linkages among people affect the flow of information in securities markets (Cohen, Frazzini, & Malloy, 2010; Ozsoylev, Walden, Yavuz, & Bildik, 2014). One could also study the growing impact of social networks online such as Facebook, Twitter, and LinkedIn, and how they affect the flow of financial information amongst investors. A sharpened understanding of the entirety of social networks could help explain where many heuristics come from, as Hirshleifer (2015) supposed that they are far from entirely innate. Also, developments in social finance, such as the influence of the media, could help provide more detailed explanations for the causes of stock market bubbles and crashes, and how to avoid them in the future (Hirshliefer, 2015).

Thaler (2016) believed that the logical conclusion of behavioral finance is actually the end of behavioral finance. Once everyone includes all of the factors that have an influence on economic behavior, then the field of behavioral finance will no longer need to exist (Thaler, 2016). When economists incorporate all of the behavior that they experience in the real world, the word “behavioral finance” will become redundant, as finance will already include all of the observed behaviors that impact people’s economic decisions (Thaler, 2016). However, until that day arrives, behavioral finance will continue to be an indispensable tool for both individual investors and financial advisors to better understand and interact with the economic world around them.

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