

## A Brief Review of Behavioral Finance

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**Abstract:** Different behaviors play a large role in how finance is conducted; the study of financial decisions behind behaviors, psychological influences, and biases is known as Behavioral Finance. Over the past 50 years, Behavioral Finance theories have become mainstream and are among the tools used in a variety of financial industries for financial analysis. There are different theories and behaviors that I will be exploring in this paper: Rational Expectations Theory, Efficient Markets Hypothesis, Utility Theory, Prospect Theory, Anchoring, and Herd Behavior.

**Keywords:** Finance; Monetary Management; Investment

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### Background

As a high school student without much substantial exposure to rigorous finance, I saw this research paper as an opportunity to learn and gain more knowledge in this topic. In the past, I have always been exposed to basic applications of finance such as trading stocks on my phone, but I have truly understood the reasoning behind my decision-making. Researching finance allowed me to understand the mechanics of my decisions and learn from them.

Finance, in broad terms, is the study of how money is managed. The world, as we know it, revolves around finance. Something as simple as having a savings account, or more complex as the Federal Reserve raising the interest rate all come back to the study of finance.

### Analysis

In Finance, almost all decisions are directly affected by risk and return. The relationship between risk and return is a complex one. Before introducing the actual correlation between these two terms, the meanings of each term must be understood.

### Return

Return is defined as the amount of money gained or lost from an investment expressed in percentage terms. A positive return indicates money gained, while a negative return indicates money lost. For example, let's assume that an individual invests \$10. A year later, he sells it for \$15. His return, expressed in percentage terms, is:  $\$15 / \$10 - 1 = 50\%$ . Return is generally expressed in annual terms.

### The Psychology of Risk

Investment risk and the individual's inclination to take on risk are inseparable. Risk is expressed as the uncertainty of return, or the standard deviation of return for an investor. A standard deviation represents the extent to which the actual return will deviate or differ from the expected return based on the average historical experience. Higher risk indicates greater potential deviation of return from historical experience, while lower risk indicates lower uncertainty of return. An investment that has no risk will manifest equal actual and expected returns.

There are many psychological factors that affect a person's motivation to either take or avoid taking risk, including the individual's risk tolerance, income, and age. Risk tolerance refers to the willingness of an investor to assume risk. Risk tolerance correlates with an investor's personality; an investor who is adventurous and brave would be more willing to assume risk than that of a more reserved investor.

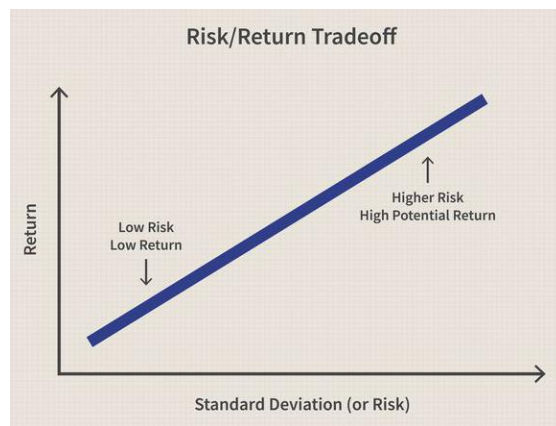
Income plays a role in taking a risk. A person with more money would be advised to invest in riskier investments because of their stronger ability to recover from a potential negative return than that of a person with less funds. Income and risk tolerance may interact with one another.

Age can sway risk decision making. An older person, nearing retirement, would be advised to take a less risky investment as he is no longer employed and benefiting from an ongoing stream of earned income. In contrast, a younger person might be advised to take riskier investments because he has more time to recover from a potential negative return, and he is possibly looking to create great wealth for himself. This is not to say that such a strategy for a young person is wise.<sup>[1]</sup>

## The Relationship Between Risk and Return

After understanding each term and different influences, the relationship may be explored. Generally, assuming a high risk would equate to earning a potential higher return, while a lower risk reflects earning a lower potential return. The standard deviation in Figure 1 below refers to the average distance from the mean. On average, lower or higher risks results in positive returns.<sup>1</sup> The standard deviation is the measure of risk.

Figure 1. Risk versus Return



## Rational Expectations Theory

Financial theories guide and advise investors on decisions. Based on three factors, Rational Expectations Theory conveys that individuals use their rationality, available information, and past experiences to guide their financial decisions.

The first factor is human rationality. Rationality, in finance, is the use of reason to maximize return, while minimizing risk. The second factor is available information. Such information is accessible and not private to investors to use when making financial decisions. Lastly, investors use past experiences to guide their choices. This factor describes that past outcomes influence future outcomes and people learn from their prior mistakes. While judgmental errors may happen, they are not persistently occurring.<sup>[2]</sup> The Efficient Markets Hypothesis describes how investors process information and then act upon it.

## The Efficient Markets Hypothesis

The Efficient Markets Hypothesis (EMH) explains that share prices reflect present information and consistent excess return is impossible. In an efficient market, prices which stocks trade reflects their true values. Therefore, it is impossible to buy undervalued stocks or sell them for inflated prices consistently. The theory states it should be impossible to consistently “beat the market” through expert stock picking or predicting markets trends. In order to earn higher rewards, individuals must purchase riskier investments.<sup>[3]</sup>

There are three forms of the Efficient Markets Hypothesis: the weak form (also known as the Random Walk Theory), the semi-strong form, and the strong form. The weak form states that past price patterns of stocks cannot be used to foretell future

prices. The semi-strong form states that current market prices change quickly with the emergence of new public information. In other words, changes in stock prices are the result of new available public information. The strong form states all information, whether private or public, reflects current stock prices.<sup>[4]</sup>

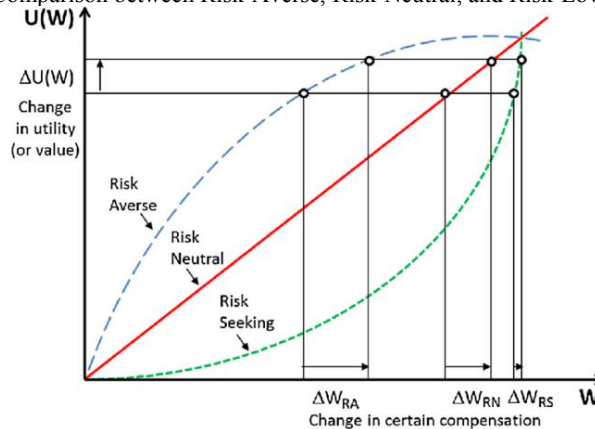
## Utility Theory

Utility Theory explains individual's behavior and choices on the basis of emotional satisfaction. The principle of utility describes that actions are positive if they promote pleasure, but they are negative when they promote displeasure.<sup>[5]</sup>

Contributing to many decisions involving risk and reward, utility is the main motivation to pull in great rewards. All investors strive to make decisions that maximize utility. Risk increases the chance of losing money, creating displeasure and thus less utility. As one takes more risk (seeking high returns), they have less utility and desire to take more risk; this concept is known as Risk Aversion. Risk-averse investors, generally, search for low-risk investments in order to gain more utility, resulting in lower return rates.

Contrarily, risk takers have more utility as they take on more risk in reward of potential increasing returns. These individuals have a higher risk tolerance, allowing them to be more willing to assume higher chances of potential losses. Risk neutral investors are insensitive to return. Rather than focusing on risk, risk neutral investors put their attention more on potential gains. Figure 2 (below) depicts the graphical comparison between risk-averse, risk-neutral, and risk-taking investors as they relate to utility.<sup>[6]</sup> For a risk-averse investor, the marginal utility, the amount of utility received after investing in one additional unit of an asset, is decreasing. For a risk-neutral investor, the marginal utility is constant. For a risk-seeking investor, the marginal utility is increasing.

Figure 2. Comparison between Risk-Averse, Risk-Neutral, and Risk-Loving Investors

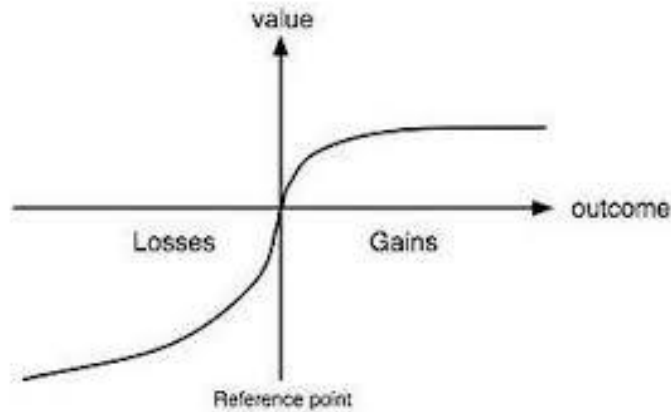


## Prospect Theory

Prospect Theory (also known as the theory of Loss Aversion), developed by psychologists Amos Tversky and Daniel Kahneman in 1992, explains that individuals value gains and losses differently. Attempting to depict the relationship between losses and gains, Tversky and Kahneman posited that the pain of losing is more impactful than an equivalent gain. Some even theorize that the sentiment felt during a loss is twice as strong as the feeling during a win.

Figure 3 (below) illustrates the greater impact felt during a loss; the slope of losses is steeper than that of gains.<sup>[7]</sup> For the same increase in a loss or a gain, more value is placed on the loss than the gain. An investor comes across two equal options: one choice is only presented with gains, while the other is presented with both losses and gains. The investor will choose the choice with only gains. Investors appear to fear losses more than they covet equivalent gains.<sup>[8]</sup> An investor will also choose a high-risk investment rather than a guaranteed loss. Presented with the option of a guaranteed gain, an investor will not choose a high-risk investment, minimizing their chances of feeling the pain of loss. In simple terms, Prospect Theory establishes that investors are willing to sacrifice any amount of return that involves risk for a secure and certain option.

Figure 3. The Emotional Profiles of Gains and Losses



## Anchoring

Anchoring, a cognitive bias theorized by Amos Tversky and Daniel Kahneman, explains the behavior when individuals subconsciously use irrelevant information to make decisions relating to investments. In one their initial studies,<sup>[9]</sup> Tversky and Kahneman designed a mathematical experiment, asking their participants to calculate the product of the integers 1 through 8 and then, once again, in reversed order all within five seconds. Not able to fully compute their answers, the participants used their first few multiplications to estimate their final answers. When the product began with one, the median estimate was smaller, at 512. When the product began with eight, the median estimate was greater, at 2,250. The correct calculation was 40,320. The experiment illustrated Anchoring behavior; individuals used the first piece of information to make their final decisions.

Specifically, in a financial context, Anchoring can poorly affect decision-making when selling an investment. For example, in a hypothetical situation, an individual buys an investment for \$100. The stock then drops \$50 in value but rises back \$10 (current value is \$60). Without an indication of the stock price increasing, the investor uses the starting price of \$100 as a fixed reference point and continues to hold the stock, rather than selling it. If the stock continued to drop, the investor would lose more money as he could have prevented such greater losses if he had not anchored the price at a \$100 reference point.<sup>[10]</sup>

## Herd Behavior

Herd Behavior is the theory behind the behavior when individuals follow the actions of others, assuming others are well informed. Such individuals do not follow their own instincts and knowledge, often being reliant on others.<sup>[11]</sup> In Herd Behavior, asymmetrical information is prevalent, as the “herd” is perceived to possess more knowledge than the individual who copies their actions. Observed by Abhijit Banerjee and Sushil Bikhchandani in 1992, as well as David Hirshleifer and Ivo Welch in 1992, these theorists described Herd Behavior resulted from asymmetrical information.<sup>[12]</sup>

Specifically, in finance, Herd Behavior occurs when investors copy the actions of a group of other investors. This behavior is evident when an investor decides to irrationally sell or buy a stock because a group of other investors sold or bought the same stock. Such situation could be financially detrimental as the herd that an investor is following may not be well-informed, thereby harming the copying investor. As a solution, investors should do their own analysis and research to make better investment decisions.

## Summary

The Behavioral Finance theories that were explored in this paper are Rational Expectations Theory, Efficient Markets Hypothesis, Utility Theory, Prospect Theory, Anchoring, and Herd Behavior. Traditionally, finance did not take into account the impact of emotions on decision-making. These theories fill in the void that explains why markets do not always manifest objective pricing characteristics.

Rational Expectations Theory explains how rational individuals utilize information available to them and incorporate the information to advise their financial decisions. In every financial decision, rational investors attempt to maximize return, while minimizing risk. Furthermore, Efficient Markets Hypothesis explains that market prices reflect all information in the market and consistent superior returns are thus impossible because all investors act rationally upon the same information.

Utility Theory describes an individual's decisions based on one's inclination to assume more or less risk when investing. This explains risk-taking behavior, as all investors seek to maximize their utility. This theory, however, does not alter the association between risk and return.

Prospect Theory, in contrast, explains that individuals do not value gains and losses in the manner predicted Rational Expectations and Utility Theories. In such a theory, losses impact investors emotionally more than gains, causing investors to alter their inclinations to take on risk.

Anchoring describes the bias that individuals use incorrectly targeted prices in investment decision-making. Herd Behavior explains that investors assume that other investors are more knowledgeable than they, and therefore follow their lead.

Prior to the advent of Behavioral Finance theories, the research community was not able to explain why markets did not behave according to classical economic theories that were based on rationality alone. We have now come to understand that as human beings our decisions are based on other factors, including fear and greed, incomplete information, miscalculation, and a plethora of emotional interferences.

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