

Behavioral Finance

UNDERSTANDING HOW BIASES IMPACT DECISIONS

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Executive Summary

- **Behavioral finance**, first developed in the late 1970s, demonstrates the pitfalls of economic theory that result from the assumption of rationality
 - > “Irrational” human behavior can be categorized and modeled
 - > By learning about how these behaviors impact investors, financial professionals can help their clients mitigate and prevent errors
- The behavioral economist’s replacement for expected utility theory is known as **prospect theory**, which demonstrates cognitive shortcuts and their impact on decision-making
 - > **Loss aversion**, an aspect of prospect theory, asserts that losses loom larger than gains

Example: Investors are prone to keep losing stocks, hoping they will rebound, and are more likely to sell gaining stocks, afraid of a potential downturn
 - > Individuals tend to make decisions based on how outcomes compare to a **reference point**, typically the status quo

Example: An investor who sees his portfolio fall to \$2 million from \$3 million considers himself worse off than an investor who sees his portfolio rise from \$1 million to \$1.5 million, even though the first investor still has more wealth
- **Cognitive errors**, which cause a person’s decisions to deviate from rationality, fall into two subcategories
 - > **Belief preservation errors** refer to the tendency to cling to one’s initial belief even after receiving new information that contradicts it
 - > **Information processing errors** refer to mental shortcuts
- **Emotional errors** arise as a result of attitudes or feelings that cause one to deviate from rationality

While human behavior is difficult to change, working with a professional investment manager such as **City National Rochdale**, which uses objective research and proprietary tools to inform decisions, can help an investor mitigate the impact of biases.

Introduction

Behavioral finance has come under the spotlight recently after Richard Thaler was awarded the Nobel Prize in Economics. Although behavioral finance is a much younger field than economics, significant research has been conducted to develop behavioral finance since its inception in the late 1970s. The discipline demonstrates the pitfalls of economic theory that result from the assumption of rationality and self-interest. To account for the deviations from rationality, economic issues are looked at through a psychological lens that more accurately predicts and explains human behavior. In fact, many of the findings appear intuitive, but only with the emergence of behavioral finance did data and experimentation give credence to these ideas.

Thaler was recognized in 2017 for his research illustrating that individuals depart from rationality systematically. In other words, when people behave “irrationally”—in an economic sense—they do so consistently, meaning this behavior can be categorized and modeled.¹ He outlines how choice architecture can influence decisions and claims that a libertarian paternalistic approach should be established to increase overall welfare in society.²

Libertarian paternalism refers to the idea that organizations, both public and private, should have the right to influence behavior while still retaining people’s freedom of choice. Thaler asserts that small nudges in both the public and private sector can benefit those who are prone to making these systematic errors at little to no cost to the more sophisticated decision-makers. In other words, libertarian paternalism is a compromise between paternalism and autonomy in the market and attempts to appease both ends of the spectrum.

Investment managers are not spared from the biases described by behavioral finance. The literature indicates that even experts in their respective fields fall prey to cognitive biases.^{4,5,6} It is important for advisors and wealth managers to be aware of biases and mental shortcuts that can impact their decisions. By learning about the nuances of observed behavior in the market, people can learn to mitigate and prevent future errors. The tenets of behavioral finance outlined below demonstrate the pitfalls of standard economic theory and illustrate how to reduce the various biases.

The Origins of Behavioral Finance

The origin of behavioral finance can be attributed to the publication of prospect theory in 1979—the behavioral economist’s replacement for expected utility theory.⁷ Prospect theory built on several previous articles that showcased cognitive shortcuts, also known as heuristics, and their substantial impact on decision-making.⁸ The theory consists of four major components: reference points, probability weighting, loss aversion, and diminishing sensitivity.

The most salient feature of prospect theory for investment professionals is loss aversion. Prospect theory asserts that losses loom larger than gains.³

In other words, the feeling associated with a loss is much stronger than the positive feeling experienced with a gain. For instance, individuals report that a 50% chance of losing \$100 must be offset by a 50% chance of gaining \$200.⁹ A 50/50 chance of winning or losing \$100 is deemed too risky. In order to be comfortable with the bet, people require a better upside—on average one that’s twice the size of the loss. According to standard economics, however, people should accept a gamble as long as the positive gain surpasses \$100. This phenomenon only scratches the surface of the influence of loss aversion.

Turning to the stock market, investors are prone to keep losing stocks, hoping they will rebound, and are more likely to sell gaining stocks, afraid of a potential downturn. Historical data indicate that the momentum of a gaining stock is likely to continue and those with a negative return should be sold off.¹⁰ Nevertheless, loss aversion can promote disadvantageous behaviors in the market.

Similarly, prospect theory argues that people are risk-seeking over losses but risk-averse in gains. The following finding illustrates the asymmetrical shape of risk preferences shown in the graph below. Most people prefer the certainty of receiving \$3,000 over the 80% chance of \$4,000. However, when these figures enter the negative domain, people prefer the 80% chance of losing \$4,000 over the certainty of losing \$3,000.¹¹

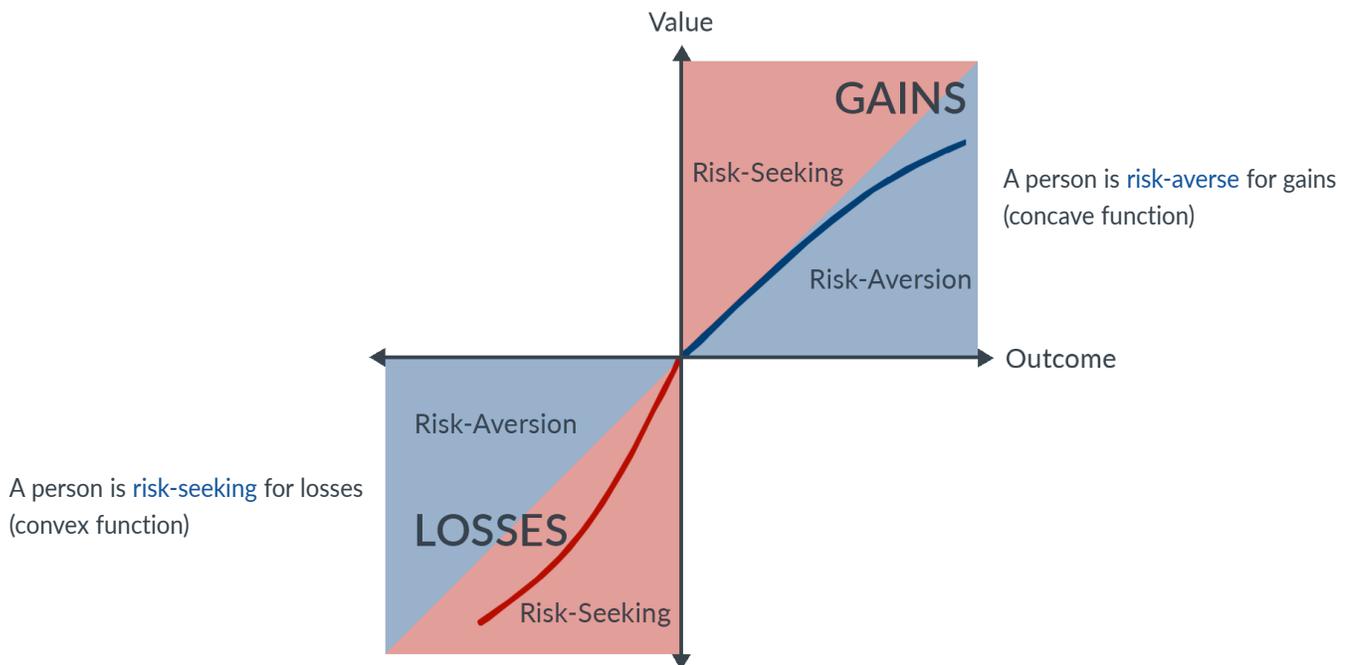
The existence of this phenomenon can be explained by another tenet of prospect theory: probability weighting. Behavioral finance research suggests that people critically misjudge probabilities and their objective value. In general, individuals tend to put extra weight on low probabilities but

underweight high probabilities. For instance, people stated that a 5% chance of winning \$100 was worth \$10 but a 90% chance of winning \$100 was only worth \$63.¹² This finding depicts how even objective values can be perceived subjectively and demonstrates a common theme in behavioral finance: almost everyone struggles with statistics.

This leads to further errors of judgment in the markets. Investors buy too many positively skewed stocks—shares that have long right tails—in the hopes that the companies turn out to be the next Google. Their optimistic expectations lead to inefficient asset allocations and increased risk, particularly because positively skewed stocks tend to have below average returns.¹³

Prospect theory has also led to the development of a more robust asset pricing model that incorporates loss aversion and the influence of past outcomes.¹⁴ Research has shown how investors become more risk-seeking after experiencing gains, but risk-averse after realizing losses.¹⁵ Commonly referred to as the “house money effect” in the behavioral

Prospect Theory: The Value Function



Source: Kahneman, D., & Tversky, A. (1979). Prospect Theory: An Analysis of Decision under Risk. *Econometrica*, 47(2), 263-291.

finance field, the phenomenon can explain the dynamic nature of risk preferences over time. After seeing positive returns, people are willing to take on more risk because they see the gains as a cushion against potential losses. That sentiment certainly rings true in the current bull market and record-setting stock market in 2017. By integrating the fluctuations in risk and loss aversion, the behavioral finance pricing model can explain more stock market data, including high historical returns and volatile periods.

REFERENCE POINTS

Behavioral finance also relies upon the influence of reference points. Prospect theory argues that individuals make decisions based not merely on final outcomes, but how those outcomes compare to a reference point, typically the status quo. Take the following example adapted from Kahneman's speech upon receiving the Nobel Prize in Economics in 2002. One investor sees their portfolio increase from \$1 million to \$1.5 million. Another investor witnesses their portfolio fall to \$2 million from its initial position of \$3 million. Consider these questions: Who has the higher welfare of the two? And who is happier?¹⁶

That simple example demonstrates that the final state is not as salient as the context or point of reference. Although the second investor still has more wealth, it would be hard to argue that they are happier. A similar phenomenon is observed when comparing the levels of happiness when receiving \$200 instead of \$100 than when receiving \$1,200 instead of \$1,100.¹⁷ Both represent a \$100 difference, but relatively the first is a significantly happier event. These instances illustrate how relative changes matter more than the ultimate outcome.

Despite the importance of assessing reference points, locating them for every person can prove difficult. This could partially explain why behavioral finance has experienced a slow uptake in practice.¹⁸ For some individuals the reference point might be their current wealth, but for others it might be the expected returns of a portfolio, or perhaps a return above the risk-free rate. Any positive returns would be seen as a gain for the first person, but for the second and third investor, a certain threshold of returns must be reached. Advisors should pay close attention to their clients in order to gauge their reference point and maintain a positive relationship.

Cognitive Errors: Heuristics & Biases

Cognitive errors are defined as basic statistical, information processing, or memory errors that cause a person's decision to deviate from the rationality assumed in traditional finance. These errors fall into two sub-categories: belief preservation errors (the tendency to cling to one's initial belief even after receiving new information that contradicts it) and information processing errors (mental shortcuts).

The three major cognitive shortcuts that laid the groundwork of prospect theory are **representativeness** (belief preservation), **anchoring** (information processing), and **availability** (information processing). These heuristics influence our judgments, typically subconsciously, and can certainly bias investment decisions.

TYPES OF BELIEF PRESERVATION ERRORS

Representativeness

Representativeness, the first of the "big three" heuristics, is a cognitive shortcut that replaces a question of probability with one of similarity. In other words, rather than considering the objective chances of a scenario happening, individuals find it easier and faster to assess how closely it corresponds to a similar question. The representativeness bias further supports the notion that people fail to properly calculate and utilize probability in their decisions. Investors can fail to notice trends or extrapolate data erroneously because they interpret it as fitting their preconceived notions.

The most common mistake to arise from this heuristic is the conjunction error. This refers to when the probability of A&B happening is judged to be higher than the probability of A. For instance, after reading a brief character description of someone lacking imagination but being very analytical, individuals deemed such a character more likely to both be an investor and play jazz than just play jazz. They failed to realize

that an investor who plays jazz is nested within the category of anyone playing jazz.¹⁹ In the markets, investors can encounter the conjunction fallacy when interpreting key indicators. Pointing this error out does not preclude people from falling prey to it again. Although they understand the basic calculating error, people are prone to making the mistake time and time again.²⁰ What is even more concerning is that experts making high-stakes decisions make the conjunction error too. The failure to recognize nested scenarios affected nearly all economists, analysts, and professional statisticians—illustrating how difficult it can be to avoid this mistake.²¹

What follows are some additional examples of belief preservation errors.

Conservatism

Conservatism refers to the tendency to insufficiently revise one's belief when presented with new evidence. In other words, it occurs when a person overweighs their prior view and underweighs new information. The original information is considered to be more meaningful and important than the new information, even when there is no rational reason for this belief.²²

In finance, conservatism can lead investors to under-react to corporate events such as earnings announcements, dividends, and stock splits.²³

Confirmation Bias

One's tendency to search for, interpret, favor, and recall evidence as confirmation of one's existing beliefs is referred to as confirmation bias. For example, people tend to gather or remember information selectively, or to interpret ambiguous evidence in a manner that supports their existing position. Confirmation bias also manifests when people tend to actively seek out and assign more weight to evidence that confirms what they already think, and to ignore or underweight evidence that could disconfirm it.²⁴

In finance, confirmation bias can lead investors to ignore evidence that indicates their strategies may lose money, causing them to behave to overconfidently.²⁵

Hindsight Bias

Hindsight bias refers to when past events appear to be more prominent than they actually were, leading an individual to believe that said events were predictable, even if there was no objective basis for predicting them. Essentially, this bias occurs when, after witnessing the outcome of an unpredictable event, one believes they “knew it all along.”

Illusion of Control

The illusion of control occurs when people overestimate their ability to control events or influence outcomes, including random ones, even when there is no objective basis for such a belief. In finance, this bias may lead investors to underestimate risks and have greater difficulty adjusting to negative events.

TYPES OF INFORMATION PROCESSING ERRORS

Anchoring

The second of the “big three” heuristics, and one of the hardest to mediate, is anchoring, which occurs when people consider a seemingly arbitrary value before estimating a quantity. Merely repeatedly saying a number, or having it drawn at random, can influence the estimate of an unfamiliar value. Before answering mathematical survey questions, participants had to write down the last four digits of their phone number. When analyzing the results, researchers found a correlation between those who reported high numerical estimates and those who had “high” phone numbers and, vice versa, a correlation of low estimates and “low” phone numbers.²⁶ A completely rational investor would easily discount the extraneous information, yet research indicates that these seemingly irrelevant factors play a role in our judgments.

A secondary troubling finding regarding the

anchoring bias is how difficult it is to control. Even when people were told about the anchoring effect, they were influenced by it despite reporting that they had consciously disregarded it.²⁷ Anchoring further defies standard economic theory because high monetary incentives do little to mitigate its effect. Even large cash rewards for accurate estimates were not enough to make individuals more careful with their value judgments.²⁸

For investors, the anchor can even be the price of the stock at the time of purchase. Future investment decisions can be associated with that value. For example, if a stock price drops, an investor may wait to break even to sell despite other indicators suggesting that a rebound in price is unlikely.²⁹ Regardless of how the anchor manifests itself, whether it’s the buy-price or the 52-week high, investors should remain objective in their strategies and allocations.

Availability

The availability heuristic demonstrates how ease of recall can make a phenomenon seem more likely to occur. Additionally, an easier to imagine scenario is perceived to have a higher chance of happening than one that is harder to imagine. As a result, individual differences arise and can lead to vastly disparate perceptions. If an investor saw their property value plummet after the housing market crash, that experience will influence their decision in future real estate investments. Although adjustment is possible if people are made aware of the bias, it is not a foolproof method.³⁰

The availability heuristic can help explain speculative bubbles. As interest rises for a particular asset, the media reports on it more frequently, more conversations revolve around the subject, and speculation increases. This creates a self-fulfilling prophecy in which investors bolster their own expectations thanks to the exuberance surrounding the asset or commodity. The ease of recall fuels such speculation and consequently a downturn is perceived to be unlikely.

What follows are additional examples of information processing errors.

Framing

A framing bias occurs when people view or react to information differently depending on the context in which it was framed. For instance, whether something is viewed as a loss or a gain may depend upon the description of the scenario. When information is presented in a positive manner, people tend to avoid risk. However, when the same information is presented in a negative manner, they tend to seek risk. This is because, according to prospect theory, a loss is more significant than an equivalent gain, and a certain gain is considered preferable to a likely gain. Meanwhile, a likely loss is preferred over a certain loss.³¹

In investing, framing bias can lead to a lack of understanding about the risk of short-term market movements since headlines tend to focus on the negative, leading investors to fail to adequately process the positives that remain in place.

Mental Accounting

Individuals tend to take a bucket approach to forming portfolios, mentally segregating their assets in order to simplify them. For example, they may separate their safe investment portfolio from their speculative portfolio to prevent the negative returns that speculative investments may have from affecting the entire portfolio. However, despite the effort of separating the portfolio, the investors' net wealth will be no different than if they had held one larger portfolio.³²

BIASES IN THE MARKET

The aforementioned heuristics can all be applied to FAANG (namely Facebook, Apple, Amazon,

Netflix, and Alphabet's Google) stocks.³³ The repetitive and popular coverage of these assets can give rise to the availability bias. Their past performance notwithstanding, the ease with which investors can recall the fundamentals of FAANG stocks compared to lesser known ones can bias asset allocations. The representativeness bias, on the other hand, can influence the generation and perception of benchmarks. When evaluating certain equities, investors may compare them to FAANG stocks and look for any similarities. In fact, many headlines on news sites already make these comparisons—judging a tech company based on how it measures up to Amazon.³⁴ Since objective probability is hard to judge, the easier question of similarity takes its place. Although nearly every page of disclosures mentions that past performance does not predict future results, many investment decisions can be swayed by precedents and retrospection. Anchoring also mitigates the effects of objective evaluations because irrelevant values can impact decision-making. Therefore, understanding fundamentals and ensuring diligent research can help immensely with making better decisions. However, it is crucial to be cognizant of the effect extraneous information can have on behavior because expertise does not eliminate these biases entirely.³³

Not unlike other shortcuts, heuristics can be advantageous in many situations. They are so pervasive because of how effective they tend to be. Unfortunately, occasional errors can occur, and in the world of finance and wealth management, those can be disastrous.

Emotional Errors

Emotional errors arise as a result of attitudes or feelings that cause the decision to deviate from the rationality assumed in traditional finance. While these are more difficult to fix than cognitive errors, it's important to understand how emotions can influence investor behavior.

Endowment Bias

Endowment bias refers to peoples' tendency to ascribe more value to items they own simply because they own them. For instance, people will pay more to retain something they already have than to obtain something that does not belong to them, even when there is no cause for attachment.³⁵

In finance, this bias can lead to investors keeping certain assets because they are familiar, even if they become unprofitable or are inappropriate.

Loss Aversion

As mentioned in "The Origins of Behavioral Finance" section of this paper, loss aversion is the most salient feature of prospect theory. Simply put, it's a person's tendency to prefer avoiding losses to acquiring equivalent gains.³⁷

Overconfidence

Many investors tend to overestimate their analytical skills and misinterpret the accuracy of their information. This is particularly true in the internet age, where access to so much information can lead to the illusion of knowledge. Overconfidence may lead to individuals taking on

too much risk, under-diversifying portfolios, and trading too frequently.

Regret Aversion

Regret aversion occurs when people fear that their decision will turn out wrong in hindsight and is associated with risk aversion. Regret is a negative emotion, and anticipating it may affect behavior as people strive to eliminate or reduce this possibility. People are particularly likely to overestimate the regret they will feel when they miss a desired outcome by a narrow margin.³⁸

Self-Control Bias

When people fail to act in pursuit of their long-term goals because of a lack of self-control, this is known as self-control bias. For instance, people may consume more today at the expense of saving for tomorrow. Self-control bias can also be described as the conflict between one's long-term goals and one's ability to pursue it due to a lack of discipline.

In investing, this can manifest in savings behaviors—such as the ability to save for retirement.³⁹

Status Quo Bias

Status quo bias refers to the tendency to prefer that things to stay the same. In other words, people prefer to keep things the way they are because "it's always been this way." In investing, this can manifest in concentrated stock positions or the tendency to remain invested in assets that may no longer be appropriate for their portfolio.

Conclusion

Behavioral finance has blossomed into a highly regarded discipline. Many of its proponents believe that in the coming years, behavioral finance will become so embedded in mainstream economics and business that the distinction will not have to be made. True progress in the field of economics cannot be made without the inclusion of research findings from the behavioral and psychological disciplines since the economic worldview of

rational agents can no longer be supported. Although human behavior may appear irrational in some cases, the departures from complete rationality are systematic and can still be modeled and studied. By embracing behavioral finance, advisors and wealth managers can gain an edge over their competition by making better decisions and wiser choices.

City National Rochdale's View

Human behavior is part of one's personality and very difficult to change. As an investor, one may even realize that one's behavior is affecting returns, but it can be hard to appreciate just how much of an impact behavioral characteristics can have on whether one's financial goals are reached.

Behavioral finance is currently a hot topic around investment firms, academic organizations, and designation authorities (e.g., the CFP® Board, the CFA Institute®, and AIF®). The consensus is

that if we understand these behaviors, we will be better equipped to be more thoughtful investors.

One of the most effective ways to navigate biases in finance is to hire a financial advisor to draft a financial plan and help you adhere to it. In addition, a sound investment manager like City National Rochdale can work with that advisor to manage your investments on your behalf by applying objective research and proprietary tools that seek to avoid behavioral pitfalls.

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