BEHAVIORAL FINANCE DEFINED

Behavioral finance is commonly defined as the application of psychology to understand human behavior in finance or investing. Meir Statman of Santa Clara University has said that people in standard finance are rational, whereas people in behavioral finance are normal.

As you are probably aware, the term “behavioral finance” appears in many books, newspapers and other media outlets, but many people still lack a clear understanding of the concepts behind behavioral finance, or what is meant by the term. One cause of this confusion is that many similar topics are discussed in the mainstream media, namely:

- behavioral science
- investor psychology
- cognitive psychology
- behavioral economics
- experimental economics
- cognitive science

To make things easy, in this lesson we will take the traditional approach to teaching behavioral finance and break behavioral finance into two subtopics:

- behavioral finance micro, and
- behavioral finance macro

Behavioral Finance Micro versus Behavioral Finance Macro

**Behavioral finance micro (BFMI)** examines the behavioral biases (that is, the irrational behaviors) of individual investors.

**Behavioral finance macro (BFMA)** describes anomalies or irregularities in the overall market that contradict the efficient market hypothesis (which is described later).

In BFMI, we compare irrational investors to rational investors, as envisioned in classical economic theory, also known as “homo economicus,” or rational economic man.

In BFMA, we are taught that markets are efficient, but that abnormal market behaviors occur, such as the January effect (and others discussed later), that demonstrate that human behavior influences securities prices and, therefore, markets.

As wealth advisors, our primary focus is BFMI, or the study of individual investor behavior. Specifically, we want to identify relevant psychological biases our clients might have and investigate their influence on asset allocation decisions. We can then try to manage the effects of those biases on the investment process to help our clients meet their financial goals.

In order to gain a fundamental understanding of BFMI, we must explore the central question of irrational versus rational behavior, which is:

Do individual investors behave rationally, or do cognitive (relating to conscious intellectual activity such as thinking, reasoning and remembering) and emotional errors affect their financial decisions?
Any student of behavioral finance needs to understand that much of economic and financial theory is based on the assumption that individuals act rationally and consider all available information in the financial decision-making process. However, over the years many academic researchers have collected and documented evidence of irrational behavior and repeated errors in financial judgment.

We can learn a lot from this research if we take the time to understand and interpret it. The most fundamental topic in behavioral finance research is the classic debate of homo economicus (rational economic man) versus the behaviorally biased human.

**Homo Economicus versus the Behaviorally Biased Human**

First established in neo-classical economics, homo economicus, or “rational economic human,” is a model of human economic behavior that states that the three principles of perfect self-interest, perfect rationality and perfect information rule economic decisions made by individuals.

Academics and practitioners believe in the homo economicus model with varying degrees of stringency. Some believe in a strong form, which holds that irrational behavior does not exist. Others have adopted a semi-strong form; this version sees an unusually high occurrence of rational economic traits. Other economists support a weak form of homo economicus, in which the irrational traits exist, but are not strong. All of these versions share the core assumption that humans are "rational economic maximizers" who are self-interested and make rational economic decisions.

Economists like to use the rational economic human as a principle for two primary reasons:

1. It makes economic analysis relatively simple.
2. It allows economists to quantify their research findings, which makes their work easier to teach and disseminate.

If humans are perfectly rational, with perfect information and perfect self-interest, then perhaps their behavior can be quantified. Most criticisms of homo economicus challenge the bases for the three underlying assumptions. We will examine some of these challenges now.

The challenges make it easier to accept that individual investors make irrational decisions and, therefore, need the help of advisors.

**Criticisms of Perfect Rationality**  
When humans are rational, they have the ability to make logical and self-interested judgments. However, many agree that rationality is not the sole driver of human behavior.

Many psychologists believe that the human intellect is subservient to human emotion. They contend that human behavior is less the product of logic than of subjective impulses such as fear, love, hate, pleasure and pain. We use our intellect only to achieve or avoid emotional outcomes. Thus, perfect rationality is only a theoretical construct, not a practical occurrence.

**Criticisms of Perfect Self-Interest**  
Many studies have demonstrated that human beings are not perfectly self-interested. If they were, neither philanthropy nor charity would exist. Many religions promote selflessness, sacrifice and kindness, and have done so for centuries.
Perfect self-interest would:
- preclude people from performing unselfish acts of kindness, such as volunteering or helping others
- prohibit self-destructive behavior such as suicide, alcoholism and substance abuse

Again, the argument that people are perfectly self-interested is a losing one.

Criticisms of Perfect Information

Some people may possess perfect or near-perfect information on certain subjects.

For example, a doctor should be well-versed in the inner workings and intricacies of the human body. However, it is not possible for every person to have perfect knowledge of every subject. A good example is the world of investing. Here, there is an infinite amount to know and learn, and even the most successful investors don't master all disciplines.

Thus, it is difficult to believe that anyone possesses perfect information, especially in the investing realm.

In conclusion, human rationality and irrationality doesn’t manifest itself in scenarios that are either black or white.

Because people are neither perfectly rational nor perfectly irrational, but possess diverse combinations of rational and irrational characteristics, they can benefit from our help.

Now that we have a basis for acknowledging the existence of behavioral finance, we will explore another core concept in understanding behavioral finance: the standard finance versus behavioral finance debate.

Click here to go to Interactive Lesson 1 Activity 4

STANDARD FINANCE VERSUS BEHAVIORAL FINANCE

Meir Statman, one of the great contributors to the field of behavioral finance, describes standard finance as follows:

“Standard finance is the body of knowledge built on the pillars of the arbitrage principles of Miller and Modigliani, the portfolio principles of Markowitz, the capital asset pricing theory of Sharpe, Lintner and Black, and the option-pricing theory of Black, Scholes and Merton.”

The intellectual leaders of finance that Statman references in his quotation provide mathematical explanations for complex finance questions that, when posed in the real world, are complicated by imprecise and challenging conditions.

The standard finance approach relies on a set of assumptions that often oversimplify reality. For example, embedded within standard finance is the concept of homo economicus (discussed earlier), i.e., the idea
that humans make perfectly rational economic decisions at all times. It’s a nice theory, but, as we’ve just learned, it doesn’t work in practice.

Standard finance is characterized by rules that address how investors should behave rather than describing how they actually behave.

- Behavioral finance, on the other hand, identifies with and learns from human behavior in financial markets as demonstrated by individual investors.

- Behavioral finance, like standard finance, contains underlying assumptions, but standard finance grounds its assumptions in idealized financial behavior, while behavioral finance grounds its assumptions in observed financial behavior.

By way of background, we will review the efficient market debate before moving on to the practical application of behavioral finance for clients.

**Efficient Markets versus Irrational Markets**

During the 1970s, the standard finance theory of market efficiency became an accepted model of market behavior by many academics and professionals. The efficient market hypothesis was developed from the doctoral dissertation of Professor Eugene Fama of the University of Chicago.

Fama demonstrated that in a securities market populated by many well-informed investors, investments will be accurately priced and reflect all available information. There are three forms of the efficient market hypothesis:

<table>
<thead>
<tr>
<th>Efficient Market Hypothesis</th>
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<tr>
<td>The weak form:</td>
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<tr>
<td>all past market prices and data are fully reflected in securities prices</td>
</tr>
<tr>
<td>The semi-strong form:</td>
</tr>
<tr>
<td>all publicly available information is fully reflected in securities prices</td>
</tr>
<tr>
<td>The strong form:</td>
</tr>
<tr>
<td>all information is fully reflected in securities prices</td>
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The market efficiency debate has inspired numerous studies attempting to determine whether specific markets are, in fact, efficient.

Many of these studies point to evidence that supports the efficient market hypothesis. Other researchers, though, have documented numerous, persistent anomalies that contradict the efficient market hypothesis. The three main types of market anomalies that advisors should know about are:

- fundamental anomalies
- technical anomalies, and
- calendar anomalies.

We will now review some of these anomalies.
Anomalies that Contradict the Efficient Market Hypothesis

| **Fundamental Anomaly** | • is an irregularity in a security’s current price when compared to a fundamental assessment of its intrinsic value.  
For example, there is a large body of evidence documenting that investors consistently overestimate the prospects of growth companies and underestimate the value of out-of-favour companies. This behavior would not occur in a totally efficient market.  
Eugene Fama and Ken French performed a study of low price-to-book-value ratios between 1963 and 1990. The study considered all equities listed on the NYSE, AMEX and NASDAQ in the US. The stocks were divided into ten groups by book/market and were re-ranked annually.  
The lowest book/market stocks outperformed the highest book/market stocks 21.4% to 8%, with each decile (representing one-tenth of the sample or population) performing more poorly than the previously ranked, higher-ratio decile. They also ranked the deciles by beta (the measure of an investment’s volatility relative to the market as a whole) and found that the value stocks posed lower risk and the growth stocks had the highest risk. This prompted many investors to buy value stocks.  
The methodology contained in the analysis is widely used today and is based on inefficient market conditions. |
| **Technical Anomaly** | • is rooted in a form of market examination called “technical analysis.”  
Technical analysis attempts to forecast securities prices by studying past prices. Sometimes, technical analysis reveals inconsistencies in the efficient market hypothesis. Patterns emerge that are called “technical anomalies.”  
In general, the majority of research-focused technical analysis trading methods are based on the principles of the weak-form efficient market hypothesis. Many believe that prices adjust rapidly in response to new stock market information and that technical analysis techniques are not likely to provide any advantage to investors.  
However, proponents continue to argue the validity of certain technical strategies, and use them. |
| **Calendar Anomalies** | • are irregular securities patterns that emerge during certain times of the year, such as the January effect, mentioned earlier.  
In general, the January effect demonstrates that stock prices (particularly small-capitalization stocks) tend to move unusually higher during the month of January, regardless of the year.  
Haugen and Jorion, two researchers in this area, have observed that the January effect is perhaps the best-known example of anomalous behavior in securities markets throughout the world. The January effect is particularly illuminating because it hasn’t disappeared, despite being
well-known for many years. Arbitrage theory (taking advantage of a state of imbalance between two or more markets) tells us that anomalies should disappear as traders attempt to exploit them.

From a practical standpoint, the January effect is attributed to stocks rebounding following year-end tax loss selling.

**Decision Making Under Uncertainty**

Each day, people make hundreds of decisions without exerting effort or experiencing mental stress. This is because the most appropriate course of action is often clear, and many decisions do not determine outcomes significant enough to merit a great deal of thought. On occasion, however, too many paths are possible and the correct course is not so clear. Sometimes, too, our decisions have significant consequences.

These situations demand substantial time and effort because people try to create a systematic approach to analyzing the myriad possible courses of action.

Even when a decision maker must choose among a number of possible actions, the ultimate consequences of each action are often unknown, because they depend on future events.

Some generally accepted guidelines that a decision maker should follow when making decisions under uncertainty are:

1. Take an inventory of all potentially viable options available for gathering data, for experimentation and for ultimate action.
2. List the potential outcomes that may occur.
3. Arrange pertinent information and choices/assumptions.
4. Rank the consequences resulting from the various courses of action.
5. Determine the probability of an uncertain event occurring.
6. Make the best decision based on the information available.

When facing uncertainty, most people cannot and do not systematically describe problems, record all the necessary data, or synthesize information to create decision rules. Instead, we venture down more subjective, less ideal paths of reasoning, as we attempt to determine the course of action consistent with our basic judgments and preferences.

How, then, to more faithfully model decision-making? The next section outlines some of the important research that provides the foundation for behavioral finance analysis.

**Howard Raiffa**

In 1968, decision theorist Howard Raiffa published a groundbreaking paper entitled *Decision Analysis: Introductory Lectures on Choices under Uncertainty*.¹ In this paper, he introduced three approaches to the analysis of decisions that provide a more accurate view of a real person’s thought process.

- *Normative analysis* is concerned with the rational solution to the decision problem. It defines an ideal that actual decisions should strive to approximate.
- *Descriptive analysis* is concerned with the manner in which real people actually make decisions.
Prescriptive analysis is concerned with practical advice and tools that might help people achieve results more similar to those of normative analysis.

Kahneman and Riepe

Raiffa’s contribution laid the foundation for a significant work in the field of behavioral finance micro, an article by Daniel Kahneman and Mark Riepe entitled “Aspects of Investor Psychology: Beliefs, Preferences and Biases Investment Advisors Should Know About.”¹² This work was the first to connect decision theory and financial advising.

According to Kahneman and Riepe, “to advise effectively, advisors must be guided by an accurate picture of the cognitive and emotional weaknesses of investors that relate to making investment decisions:

- their occasionally faulty assessment of their own interests and true wishes
- the relevant facts that they tend to ignore, and
- the limits of their ability to accept advice and to live with the decisions they make.”

Kahneman and Riepe’s work categorizes behavioral biases on three grounds: biases of judgment, errors of preference and biases associated with living with the consequences of decisions. Biases of judgment include overconfidence, optimism, hindsight and overreaction to chance events. Errors of preference include non-linear weighting of probabilities; the tendency of people to value changes, not states; the value of gains and losses as a function; the shape and attractiveness of gambles; the use of purchase price as a reference point; narrow framing; tendencies related to repeated gambles and risk policies; and the adoption of short versus long views. Living with the consequences of decisions gives rise to regrets of omission and commission, and also has implications about the relationship between regret and risk taking.

Kahneman and Tversky

At about the same time that Raiffa’s work was published, two relatively unknown cognitive psychologists, Amos Tversky and Daniel Kahneman, began research on decision making under uncertainty. This research resulted in an important work, Judgment under Uncertainty: Heuristics and Biases,³ published in 1974.

The following is an excerpt from an interview with Tversky and Kahneman, in which they discuss their findings about mainstream investors’ thinking:

The paper describes three judgmental heuristics (simple, efficient rules of thumb) — representativeness, availability and anchoring—that are commonly used to estimate probability, frequency and values. The heuristics are highly economical and usually effective, but they also produce predictable biases.

The research reviewed in this paper began in 1969 when Daniel Kahneman invited Amos Tversky to discuss potential applications of research on judgment and decision making in a seminar on applied psychology. Immediately after the seminar we started a conversation about errors of judgment, their causes and consequences, which led to an extensive professional collaboration and a close personal friendship lasting more than 13 years.

The research was sparked by the realization that intuitive predictions and judgments under uncertainty do not follow the laws of probability or the principles of statistics. Instead, people appear to rely on a limited number of heuristics and evaluate the likelihood of an uncertain event by the degree to which it is representative of the data generating process, or by the degree to
which its instances or causes come readily to mind. These hypotheses were formulated very early in conversations between us but it took many years of research and thousands of subject hours to study the role of representativeness, availability and anchoring, and to explore the biases to which they are prone. We spent the better part of 1973 writing the paper and then revising it again and again in an attempt to summarize our research on heuristics and biases in judgment under uncertainty. To our pleasant surprise, the paper reached many readers outside psychology and it has been reprinted in several volumes of readings in economics, public policy, statistics and cognitive science.

It was widely cited because it suggested a new approach to the study of subjective probability.

The approach to the study of judgment that is reflected in the paper is characterized by

(1) a comparison of intuitive judgment to normative principles of probability and statistics;
(2) a search for heuristics of judgment and the biases to which they are prone; and
(3) an attempt to explore the theoretical and practical implications of the discrepancy between the psychology of judgment and the theory of rational belief.

Essentially, Tversky and Kahneman brought to light the incidence, causes and effects of human error in economic reasoning. Building upon the success of their 1974 paper, the two researchers published, in 1979, what is now considered the seminal work in behavioral finance: Prospect Theory: An Analysis of Decisions under Risk. The following is the abstract from the paper:

This paper presents a critique of expected utility theory as a descriptive model of decision making under risk, and develops an alternative model, called prospect theory. Choices among risky prospects exhibit several pervasive effects that are inconsistent with the basic tenets of utility theory.

In particular, people underweight outcomes that are merely probable in comparison with outcomes that are obtained with certainty. This tendency, called the certainty effect, contributes to risk aversion in choices involving sure gains and to risk seeking in choices involving sure losses.

In addition, people generally discard components that are shared by all prospects under consideration. This tendency, called the isolation effect, leads to inconsistent preferences when the same choice is presented in different forms. An alternative theory of choice is developed, in which value is assigned to gains and losses rather than to final assets and in which probabilities are replaced by decision weights.

The value function is normally concave for gains, commonly convex for losses, and is generally steeper for losses than for gains. Decision weights are generally lower than the corresponding probabilities, except in the range of low probabilities. Overweighting of low probabilities may contribute to the attractiveness of both insurance and gambling.

Prospect theory, in essence, describes how individuals evaluate gains and losses. The theory names two specific thought processes: editing and evaluation.

During the editing state, alternatives are ranked according to basic guidelines (heuristics). Then, during the evaluation phase, a reference point is designated that provides a relative basis for appraising gains and losses. A value function, passing through this reference point and assigning a value to each positive or negative outcome, is S-shaped, and is asymmetrical (i.e., not proportional), to reflect loss aversion (i.e., the tendency to feel the impact of losses more than gains). This can also be thought of as risk seeking in domain losses (the reflection effect). The Figure below depicts a value function, as typically diagrammed in prospect theory.
Prospect theory also, importantly, observes that people often mentally frame predicted outcomes in very subjective terms; this accordingly affects expected utility. For an exemplary instance of framing, we turn to experimental data cited in the 1979 article.

Kahneman and Tversky reported that they presented groups of subjects with a number of problems.

One group of subjects was presented with this problem:

1. In addition to whatever you own, you have been given $1,000. You are now asked to choose between:
   A. A sure gain of $500
   B. A 50% chance to gain $1,000 and a 50% chance to gain nothing.

Another group of subjects was presented with another problem.

2. In addition to whatever you own, you have been given $1,000. You are now asked to choose between:
   A. A sure loss of $500
   B. A 50% chance to lose $1,000 and a 50% chance to lose nothing.

In the first group, 84% of participants chose A. In the second group, however, the majority (69%) opted for B. The net expected value of the two prospective prizes was, in each instance, identical. However, the phrasing of the question caused the problems to be interpreted differently.

**Psychographic Models used in Behavioral Finance**

Psychographic models are designed to classify individuals according to certain characteristics, tendencies or behaviors. Psychographic classifications are particularly relevant with regard to individual strategy and risk tolerance. An investor’s background and past experiences can play a significant role in decisions made during the asset allocation process. If investors fitting specific psychographic profiles are more likely to exhibit specific investor biases, then advisors may be able to recognize the relevant telltale behavioral tendencies before investment decisions are made. Hopefully, resulting considerations will yield better investment outcomes.
Two studies, Barnewall (1987) and Bailard, Biehl and Kaiser (1986), apply useful models of investor psychographics:

**Barnewall Two-Way Model**

One of the oldest and most prevalent psychographic investor models, based on the work of Marilyn MacGruder Barnewall and intended to help investment advisors interface with clients, distinguishes two relatively simple investor types: passive investors and active investors. Barnewall notes:

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<tr>
<th>Passive investors</th>
<th>Are defined as investors who:</th>
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<tr>
<td></td>
<td>• have become wealthy passively, for example, by inheritance or by risking the capital of others rather than their own;</td>
</tr>
<tr>
<td></td>
<td>• have a greater need for security than they have tolerance for risk.</td>
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Occupational groups that tend to have passive investors include corporate executives, lawyers with large firms, accountants with large accounting firms, medical and dental non-surgeons, individuals with inherited wealth, small-business owners who inherited the business, politicians, bankers and journalists.

The fewer economic resources a person has, the more likely the person is to be a passive investor. The lack of resources gives individuals a higher security need and a lower tolerance for risk. Thus, a large percentage of the middle and lower socioeconomic classes are also passive investors.

<table>
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<tr>
<th>Active investors</th>
<th>Are defined as investors who:</th>
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<tbody>
<tr>
<td></td>
<td>• have earned their own wealth in their lifetimes;</td>
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<tr>
<td></td>
<td>• have been actively involved in the wealth creation and have risked their own capital in achieving their wealth objectives.</td>
</tr>
<tr>
<td></td>
<td>• have a higher tolerance for risk than they have need for security.</td>
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Related to their high risk tolerance is the fact that active investors prefer to maintain control of their own investments. If they become involved in an aggressive investment they are not in control of, their risk tolerance quickly drops.

Their tolerance for risk is high because they are confident. They get very involved in their investments, gathering a tremendous amount of information about them, and tend to frustrate their investment advisors. They believe that their involvement and control will reduce risk to an acceptable level.

Barnewall’s work suggests that a simple, non-invasive overview of an investor’s personal history and career record might reveal potential pitfalls when establishing an advisory relationship. Her analysis also indicates that a quick, biographic glance at a client can provide important context for portfolio design.
Bailard, Biehl and Kaiser (BB&K) Five-Way Model
The BB&K model features some of the principles of the Barnewall model, but introduces an additional dimension of analysis by classifying investor personalities along two axes—level of confidence and method of action. BB&K provide a graphic representation of their model (see Figure below):

The first aspect of personality deals with how confidently the investor approaches life (i.e., any aspect such as career, health or money). These are important emotional choices, which are dictated by the investor's level of confidence, or tendency to worry, about each aspect.

The second element deals with whether the investor is methodical, careful and analytical in his approach to life or whether he is emotional, intuitive, and impetuous. These two elements can be thought of as two axes of individual psychology; one axis is “confident-anxious” and the other is “careful-impetuous.”

The following table includes BB&K’s descriptions of the model’s five investor personality types. The authors also suggest approaches to advising each type of client.

**Descriptions of the BB&K Investor Personalities**

<table>
<thead>
<tr>
<th>The Adventurer</th>
<th>&quot;people who are willing to put it all on one bet and go for it because they have confidence. They are difficult to advise, because they have their own ideas about investing. They are willing to take risks, and they are volatile clients from an investment counsel point of view.&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Celebrity</td>
<td>“These people like to be where the action is. They are afraid of being left out. They really do not have their own ideas about investments. They may have their own ideas about other things in life, but not investing. As a result they are the best prey for maximum broker turnover.”</td>
</tr>
<tr>
<td>The Individualist</td>
<td>“These people tend to go their own way and are typified by the small business person or an independent professional such as a lawyer or engineer. These are people who are out trying to make their own decisions in life, carefully going about things, having a certain degree of confidence about them, but also being careful, methodical, and analytical. These are clients whom everyone is looking for – rational investors with whom the portfolio manager can talk sense.”</td>
</tr>
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</table>
### Reading
**Lesson 1 – Introduction to Behavioral Finance**

| The Guardian | “Typically as people get older and begin considering retirement they approach this personality profile. They are careful and a little bit worried about their money. They recognize that they face a limited earning time span and have to preserve their assets. They are definitely not interested in volatility or excitement. Guardians lack confidence in their ability to forecast the future or to understand where to put money, so they look for guidance.” |
| The Straight Arrow | “These people are so well balanced, they cannot be placed in any specific quadrant, so they fall near the center. On average this group of clients is the average investor, a relatively balanced composite of each of the other four investor types, and by implication a group willing to be exposed to medium amounts of risk.” |

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**Endnotes**


