

## Behavioral Finance

Source: 1996 1Q *TIFF Funds*

### Behavioral Finance and Related Terms

In an effort to make the following discussion as user-friendly as possible, we have structured it as a dialogue. The comments in boldface are those of a fiduciary who is skeptical that investors can profit much from academic research in finance, but who concedes that there may be exceptions to the general rule.

*A money manager whom I respect tells me I should get acquainted with "behavioral finance." What in the devil is that?*

Behavioral finance is a nascent but growing discipline within the larger academic field known as financial economics. Traditionally, financial economists have focused their intellects and computers on measurable phenomena: risks, returns, correlations, and the like. But after decades of analyzing exhaustively a necessarily finite data set, financial economists were bumping into the law of diminishing returns.[1] In recent years a cadre of bright thinkers have begun pushing the envelope outward again by focusing their considerable energies on **why** investors behave the way they do.

*Fine. But how can behavioral finance help me become a better investor?*

By focusing rigorously on root causes, behavioral finance can help fiduciaries recognize conditions that are conducive to irrational behavior, avoid falling into "suboptimality traps," and exploit profitably the irrational actions of others.

*That assumes that reasonable people can agree on what it means to act "irrationally."*

Good point. Indeed, the debate over a workable definition of rationality is a central focus of behavioral finance. Traditionally, economists have defined rationality as behavior which is (a) guided by the actor's self-interest (which need not be wholly selfish) and (b) consistent. However, recognizing that **no** person is completely rational in this sense, researchers in behavioral finance have begun viewing investor behavior through a new prism - one which assumes that people make inconsistent choices all the time, so to speak.

*Good heavens. As if the relativism that dominates modern culture weren't bad enough, now it's creeping into economics?*

Yes, but not without reason. Consider the following question: would the average retiree rather see his portfolio appreciate 10% and the cost of living rise 15%, or his portfolio remain flat and the cost of living rise 5%? Research into such dilemmas indicates that most people strongly prefer the first result, even though the two scenarios entail

approximately the same decline in purchasing power (~5%). And virtually everyone prefers both options to a scenario entailing stable prices coupled with a 5% decline in their portfolio, which also produces roughly a 5% reduction in purchasing power. Inconsistent? Yes. Irrational? Perhaps not - not if one's definition of rationality incorporates the indisputable fact that people weigh losses roughly twice as heavily as gains.

*Fair enough. But I still don't understand why academics make such a big deal about "root causes."*

Perhaps the following example will help. Advocates of low P/E approaches to stock investing argue that a contrarian mindset is essential for beating the market. Behavioral finance gurus concede that low P/E strategies work well in most market environments, but they caution that practitioners must understand fully **why** such strategies generally succeed, and whether the market conditions needed for them to work are permanent or transitory. Fiduciaries who employed so-called value managers during the low P/E bloodbath in 1990 appreciate fully the importance of distinguishing between strategies that exploit the **symptoms** of investor irrationality and strategies that exploit the **root causes** of such behavior. By the late 1980s, value-oriented approaches to the U.S. stock market were so much in vogue that the preconditions for their continuing success were absent: strategies and managers that had traditionally been regarded as contrarian had become contrarian in name only. Behavioral deviance had metamorphosed into behavioral conformity, with catastrophic results, especially in the three years ending in 1990.

*Sounds interesting, but I don't have the time to wade through a bunch of books and articles. Can you summarize the key findings?*

I can try, although I'll admit that I haven't mastered all of the work being done in the field. But I'd be happy to summarize the concepts that seem most relevant to the challenges that fiduciaries routinely confront. Before I do, let me emphasize that while researchers often analyze the behavioral tendencies I'll mention as if they were discrete phenomena, in real life they're interrelated - and mutually reinforcing. Indeed, if a lay person does a lot of reading in behavioral finance, the discrete discoveries that have brought crowds to their feet at academic conferences congeal into a single obvious fact. As Mark Twain put it, "There's as much human nature in some folks as in others, if not more so."

*What's the most pervasive tendency discovered thus far?*

Probably **myopic loss aversion**, which refers to the empirical fact that investors experience more pain from a dollar lost than they experience pleasure from an equivalent dollar gained. Consequently, most choices involving losses are risk-seeking - i.e., people will gamble on the margin to avoid losing - while most choices involving gains are risk-averse.

*Of course. What's so interesting about that?*

Not much, but consider what happens if the hypothetical is reversed, and the committee must choose between firing a manager who has underperformed the market by 12% and plowing the proceeds into an index fund, or retaining the manager while knowing that there's a 75% chance he will underperform by an additional 4% and a 25% chance he will regain all of the lost ground. In this situation, most trustees will favor the gamble of retaining the manager over the option of locking in relative losses by indexing the portfolio, even though the expected excess return is identical [-12% if the manager is fired; a 75% chance of a -16% outcome coupled with a 25% chance of breaking even if he is retained]. In short, investors are not so much **risk**-averse as they are **loss**-averse. As economist Amos Tversky has observed, investors do not hate uncertainty - rather, they hate losing. [2]

*In what other ways does "myopic loss aversion" manifest itself?*

Goodness, the list goes on and on. Consider how sensitive some people are to manager fees. Precluded by law or custom from employing the most obvious antidote to high fees - performance-based compensation - many investors make suboptimal choices of managers or mutual funds based solely on a consideration of the asset-based fees they charge. The reason they do this is because high fees represent a "sure loss," whereas the outperformance that higher fee strategies potentially entail is uncertain. In short, the potential pain associated with paying high fees for subpar results looms larger in some investors' eyes than the pleasure they would experience if - after paying up - the pricier alternative in fact produced higher net returns.

*What you call loss aversion reminds me of what economists used to call utility.*

Loss aversion is different from utility, but the one builds on the other. In fact, the foundation for today's work in behavioral finance was laid more than two centuries ago by the famed polymath Daniel Bernoulli, who was the first economist to recognize that subjective value or utility counts much more than objective value when people are confronted with hard choices. In graphical terms, subjective value or utility is a concave function of money - i.e., the millionth dollar a person acquires has less utility than the first dollar she acquires (see Figure A).

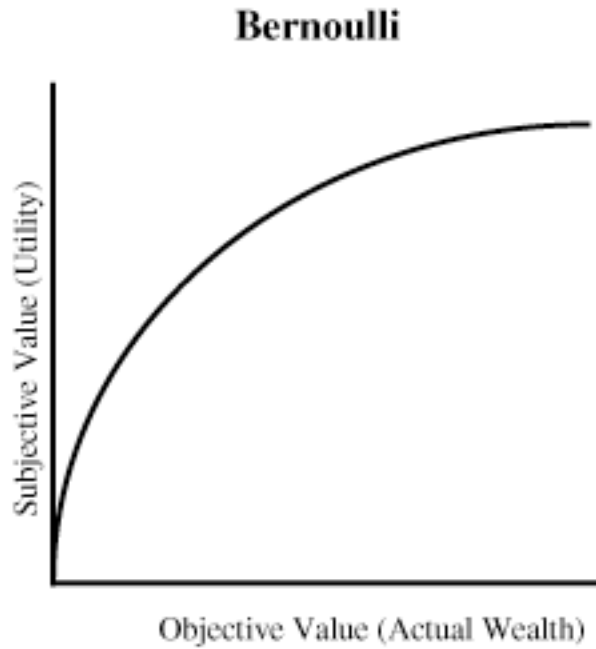


Figure A

But the truth, as Tversky and his colleague Daniel Kahneman argued in a pathbreaking 1984 paper, is much more complex than Bernoulli recognized: in graphical terms, subjective value or utility is actually an asymmetrical function of the absolute size of an investor's gains or losses (see Figure B).

## Kahneman & Tversky

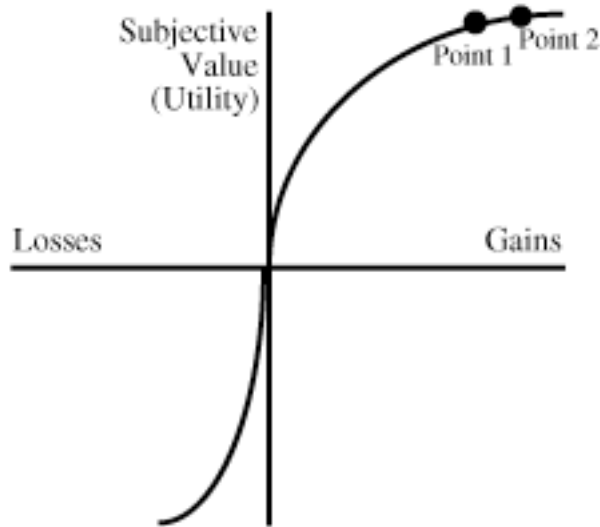


Figure B

*You lost me. Can you furnish a concrete example of how the mindset depicted in Figure B manifests itself in the real world?*

Sure - merger arbitrage. The reason competent merger arbitrageurs make such a good living is because many investors place a higher subjective value on the initial dollars gained when a company whose shares they own becomes the subject of an announced deal than they do on the added dollars that might flow their way if they held their shares until the deal actually closed. In other words, the initial 50% profit that the archetypical widow makes when a stock she owns becomes a disclosed target has more subjective value to her than five times the 10% gain she forfeits by selling her shares to an arbitrageur after the deal is announced but before it closes. (Point 1 in Figure B denotes the price at which the widow sells to the arbitrageur; Point 2 denotes the price the arbitrageur hopes to realize when the deal closes.) Of course, if the deal collapses, the person left holding the bag could slide a long distance down the sickeningly steep loss aversion curve in the southwest quadrant of Figure B. It is precisely this prospect that induces most shareholders to sell at Point 1 - and that inhibits many talented investors from becoming arbitrageurs. The best arbitrageurs may eat well, but they don't sleep well.

By the way, the asymmetrical relationship between loss aversion and gain preference embodied in Figure B also helps explain why call options tend to be such a lousy investment: because a loss of \$X is more loathsome than a gain of \$X is attractive,

investors seeking to earn superior returns without an intolerable amount of downside risk **overpay** for calls (i.e., contracts that provide the right but not the obligation to buy securities at a stated price for a fixed period of time).

*Are there ways in which loss aversion manifests itself in the boardroom?*

You bet. Strange as it may seem, some people view gains as losses. For example, some governing boards view a 20% gain in endowment purchasing power as a defeat if peer institutions' endowments soar 30%. Consequently, some boards pursue investment policies that, while faithful in their mimicry of peer institutions' practices, are hard to reconcile with such boards' stated risk preferences. More specifically, they non-rationally choose policies entailing gambles instead of policies that (probabilistically) will produce the same result but in a more reliable manner. They do so because peer institutions have themselves opted for the gambles (e.g., allocations to certain risky assets that would not be held otherwise), and the trustees in question are averse to "losing," which is defined broadly to include earning less than peer institutions if gambles the latter have taken pay off.

*Gains masquerading as losses? Sounds like pretty confused accounting to me.*

Perhaps, but we all get confused from time to time. Indeed, researchers have coined a term to describe such confusion: **mental accounting**. I don't know why they adopted this term - perhaps to distinguish the confused behavior they find so intriguing from the seemingly perfect tallying of results for which CPAs are lauded.

*Obviously they haven't spent much time wrestling with annual reports! Give me an example of how "mental accounting" can lead an investor astray.*

Imagine that an investor owns two \$40 stocks in his IRA, one purchased for \$20, the other for \$50. Interestingly, research shows that the typical investor is much more reluctant to close out the losing position than the winning position, even when furnished with data hinting that the losing stock could continue falling. However, when given the option of closing out **both** positions, the average investor is much more willing to realize the loss on his losing trade, probably because closing out the two positions simultaneously produces a net gain (\$10 in our example). Academics speculate that this is one reason mutual funds are so popular, despite their generally poor performance: instead of forcing investors to deal with a variety of gain and loss positions, mutual funds reduce stress by automatically netting gains and losses.

A celebrated real-world example of mental accounting is a true tale told by finance whiz Meir Statman. According to Statman, when the CEO of Consolidated Edison announced at the company's 1974 annual meeting that it was suspending the payment of cash dividends to stockholders, one lady stood up and asked if the blow could be softened by issuing stock dividends instead! Such comments confirm what researchers have long surmised: people segregate monies into mental accounts.

*Such as "income" versus "capital"?*

Exactly. Obviously, some trustees must pay strict attention to the distinction between income and capital, or they could wind up in jail. But a lot of folks whose hands are not tied nonetheless mentally segregate wealth into income versus capital, probably because doing so helps them exert self-control. If all monies were viewed fungibly, the injunction against "dipping into capital" would have a hollow ring indeed.

*Any other terms I need to know?*

I'm not sure you **need** to know them, but there are several tongue-twisters in the literature that might prove useful. One that comes immediately to mind is **cost-loss discrepancy**, which refers to the fact that investors are more averse to losses than costs. For example, a manager who underperforms his benchmark in a sharply rising market is less likely to be fired than a manager who underperforms by the same margin in a falling market. The reason: trustees view underperformance in a rising market as a cost, whereas they view underperformance in a falling market as what it is - a loss.

Another tongue-twister that comes to mind is **reference preference**, which means simply that an investor's preferences are heavily influenced by his or her wealth quotient or reference point.

*That sounds a lot like loss aversion, which we already talked about.*

True, but I forewarned you that a lot of the concepts are interrelated. Let me give you an example of reference preference. Imagine that in a falling market environment, an investment committee is confronted with the following nasty choice: liquidate shares in a newly public firm for \$5 million, or retain the shares and endure an even chance of having them appreciate to \$8 million or fall to \$3 million. In the standard analysis, the choice will turn on the committee's utility function, which is assumedly uniform over time and securities - barring trustee turnover, of course. In fact, the utility associated with a given change in wealth depends heavily on an investor's reference point with respect to such wealth, as can be seen by subdividing our hypothetical into two scenarios. In Scenario A, the shares now worth \$5 million were acquired through a venture partnership for \$5 million, while in Scenario B they were acquired by the same means for \$8 million.

*Wait a minute - I thought all venture investments produce huge gains!*

That's probably because people only talk about their winners, not their losers! The point I was trying to make is that the committee is more likely to sell its shares in Scenario A than Scenario B, for an important reason. In Scenario A, the decision is actually between the status quo ex ante (having \$5 million) or an even chance of realizing a \$3 million gain (i.e., having \$8 million) or a \$2 million loss (i.e., having \$3 million). In this situation, trustees are generally risk averse: the committee will likely conclude that the chance of racking up a \$3 million gain does not quite offset the risk of losing \$2 million. Under Scenario B, however, the effective choice is between a sure loss of \$3 million (i.e.,

walking away with just \$5 million) and an even chance of losing \$5 million (having \$3 million) or restoring the status quo ex ante (having \$8 million). In this situation, people generally favor the gamble. In other words, investment options are evaluated not solely in terms of expected ending values, but also in terms of gains and losses relative to a fixed reference point - starting wealth.

*Any other tongue-twisters I can impress people with?*

How about **preference reversal**? Preference reversal occurs when a person chooses Option A over Option B when these alternatives are evaluated simultaneously, but places a higher value on B when the two options are assessed independently. For example, take the case of a trustee who sits on two foundation boards. He votes in favor of one foundation's moving \$10 million from stocks to bonds, and then the next day votes in favor of the other foundation's allocating \$10 million in new gifts to stocks - despite virtual uniformity in all relevant variables (e.g., spending needs, initial endowment sizes, prior asset mixes, etc.). Researchers with social science backgrounds tend to attribute such inconsistencies to differences in the manner in which the choices are presented and evaluated in the two boardrooms. Researchers with natural science backgrounds don't necessarily disagree, but they point out that many personality traits are traceable to specific neurochemical processes. Indeed, biologists have found that one trait which is highly germane to the boardroom is significantly correlated with specific neuroregulating enzymes: impulsivity.

*Give me a break. The next thing you know, we'll be using biological screens to pick board members.*

I doubt it, but it is a fact that what researchers have dubbed **sensation seeking** is negatively related to age, for proven biological reasons. This may be one reason that retirees maintain portfolios that, viewed objectively, are excessively conservative in light of their expected lifespans.

*You haven't mentioned anything about so-called herd behavior. Why not?*

I was getting to that. As with the other ideas we've discussed, researchers have coined a term to describe the behavioral underpinnings of herd behavior: **status quo bias**. What they've found is that people tend to ascribe acute importance to recent trends, thus creating the preconditions for sustained market movements, the extreme form of which is a speculative "bubble." Of course, following the crowd is rational in at least one respect: if the costs or difficulty of gathering independent information are excessive, then mimicking the behavior of others is sensible. A good example would be manager selection - a task that, if performed independently, is so time-intensive that some folks simply hire the manager with the most prestigious client list. Can you tolerate hearing about a few more terms?

*I guess, although what I've heard so far hasn't done much for my confidence as an investor.*



Strange you should say that, because some of the most interesting work in behavioral finance deals with the pervasive problem of **overconfidence**. The fact is, people tend to have excessive confidence in their own predictive powers, for at least two reasons. First, because people want to maintain self-esteem, they tend to remember their correct predictions but not their mistaken ones. Second, the human brain seems to have difficulty contending with chance processes.

*Again, can you give me examples of each concept?*

Sure. Let's start with an example involving **selective recall**. Remembering that it correctly reduced stock market exposure from 70% to 50% prior to the Crash of 1987, an investment committee elects to make the same adjustment as stock values are racing upward in 1995. There's just one problem: the reason that stock exposure has increased to 70% is not because the committee shifted funds back into stocks after the Crash, but rather because rising stock prices have transformed the 50% allocation that it adopted in 1987 - but never subsequently changed - into a 70% position. The committee's selective recall ignores the fact that to "time" the market, a long-term investor must make **two** timely decisions: when to get **out**, and when to get back **in**.

The problems that human beings have assessing **chance processes** can be illustrated by contrasting how computers assess such processes on the one hand versus how mortals do so on the other. Ask a computer to calculate the expected value of a portfolio under multiple scenarios and it will spit back the answer in a flash: the expected value equals the portfolio's terminal value in each scenario weighted by each scenario's probability. Ask the portfolio's human owner to perform the same computation, however, and the answer will likely differ from the computer's. It will differ because the relative weight that people attach to possible outcomes varies inversely with their probability, with remote possibilities being assigned higher weights than they in fact deserve. As a result, investors tend to allocate more to disaster hedges than is warranted by the disasters' true probabilities. This explains why, at least historically, there has been such a large disjunction between institutional asset mixes and institutional return objectives. For example, most private foundations state that they seek to preserve the long-term purchasing power of their endowments, and yet they maintain asset mixes that, historically, have not come close to generating real or inflation-adjusted returns commensurate with a 5-6% payout rate.

As an aside, it's interesting to note that, in addition to overweighting remote possibilities, people also place undue importance on the **complete** elimination of especially worrisome outcomes. The most familiar real-world example is catastrophic hazard insurance, which is priced in a manner that reflects buyers' uneconomic willingness to pay more than they should (in probability-weighted terms) to eliminate **completely** certain risks.[3] An analogous problem (and opportunity) arises in financial markets, especially with respect to bond portfolios, many of which are prohibited from holding lower quality securities. The guidelines are designed to eliminate the possibility of a complete wipe-out. But there are costs: opportunity costs to the extent that low-rated credits generate incremental

yields sufficient to offset their incremental risks; and actual costs if guidelines trigger forced sales of downgraded securities at acutely depressed prices. Selective recall reinforces the problem because fiduciaries never forget distressed securities they sold that subsequently became worthless, but they do tend to forget disgorged holdings that subsequently soared in value.

*How true. If there's anything else I need to know about behavioral finance, make it quick. I have to call my broker!*

Fair enough - two quickies. First, **causal reasoning**, which works as follows: when confronting novel situations, people struggling to form a coherent view are heavily influenced by the order in which they receive conflicting information. The classic examples are juries, which numerous studies have shown ascribe excessive importance to the initial "facts" presented to them. A good example of causal reasoning in the investment world is the problem institutions run into when their first foray into an asset class - emerging markets, for example - goes poorly. If causal reasoning kicks in, it can take years, if not generations, for trustees whose first foray went poorly to commit additional sums to an asset class, even if the poor returns in question result from price declines that have made the asset class **more** attractive in the valuation sense.

A final, related concept is called **positive testing**, which refers to the fact that good results impel people to conclude that the methods they employed to achieve such results are inherently sound. The problem is that they then reject alternate methods that might also work well, if not better. In the money management business, positive testing manifests itself frequently with respect to manager selection: it induces fiduciaries to retain winning managers or strategies even when the risks of regressing to the mean are acute, and to reject approaches that conflict with settled ways of doing business.

*Isn't that just a fancy way of saying that it's dangerous to give money to a manager with the proverbial hot hand?*

Yes. Speaking of hot streaks, you might be interested to know that one of the most interesting studies by behavioral finance types focused on exactly that topic. Truth be told, what makes the study interesting is that it focused not on money or investing but rather on basketball - specifically the question of whether shooters actually experience "hot streaks." When interviewed by researchers (in the 1980s), a representative sample of professional basketballers estimated that they were 25% more likely to make a shot after a hit than after a miss. But studies of game tapes indicated that, in fact, there is no serial relationship in shotmaking. Researchers surmise that the reason players (and fans) believe "hot streaks" occur is because people forget that even purely random sequences inevitably produce streaks: flip a coin twenty times and there is a ten percent chance that a streak of six heads (or tails) will occur. Since top basketballers shoot close to 50% from the field, it's not surprising that they (and their fans) believe in the proverbial "hot hand." Hot streaks occur in investing also, although - unlike in basketball - they are often not interpreted as such. The best example is arguably interest rate anticipation, which is a discipline whose continuing popularity is hard to square with its consistent failures. Why

then do investors persist in believing that interest rate anticipation is a sensible way to manage bond portfolios? Perhaps because, with so many managers practicing it, the laws of probability guarantee that some will do well, thus helping perpetuate the view that rate forecasting is indeed a reliable road to riches.[4]

*Forewarned is forearmed. Any closing thoughts on ways in which behavioral finance can make me a better investor?*

Sure. First, Mark Twain was right: there's as much human nature in any of us as there is in all of us, and hence the only safe premise on which our investment behavior can be based is the assumption that our intuitions are likely to mislead us from time to time. From this, an important corollary follows: to prevent us from acting on wrong intuitions, we need frameworks - literally checklists or worksheets - that compel us to consider factors that, acting on intuition alone, we are likely to miss. Admittedly, some especially gifted investors can do well without such devices, but the rest of us cannot.

## **Endnotes**

1. Arguably the most robust data base available to financial economists is the one found at the University of Chicago's Center for Research in Securities Prices (known to cognoscente as "CRISP"), which extends back many decades. Unfortunately, it does not yet encompass enough data points for investors to reach the sort of definitive conclusions about stock market movements (past or future) that, for example, engineers can reach about stresses and loads when designing a bridge. Moreover, unlike the natural world - which is governed by "laws" whose permanence engineers can safely take for granted - markets are human creations whose attributes can and do change over time.

2. Behavioral Finance and Decision Theory in Investment Management; Charlottesville, VA: The Association for Investment Management and Research, 1995. This is an excellent one-volume summary of work being done in behavioral finance. AIMR's phone is 434-977-9966.

3. The economic inconsistencies reflected in the pricing of catastrophic insurance create profit-making opportunities that are compelling in the eyes of some investors, including famed investor Warren Buffett (profiled at pages 8-9). Through a Berkshire Hathaway affiliate, Mr. Buffett is an increasingly active underwriter of so-called "supercat" policies - contracts that pay Mr. Buffett huge premia to insure other insurers against mega-huge losses, typically those arising from natural disasters.

4. The basketball study mentioned in the text is summarized in the June 1985 issue of Discover magazine. The writer thanks Arnold Wood of Martingale Asset Management for furnishing this and other articles on behavioral finance.