What Is Behavioral Finance

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Behavioral finance is a framework that augments some parts of standard finance and replaces other parts. It describes the behavior of investors and managers; it describes the outcomes of interactions between investors and managers in financial and capital markets; and it prescribes more effective behavior for investors and managers.

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Standard finance, also known as modern portfolio theory, has four foundation blocks: (1) investors are rational; (2) markets are efficient; (3) investors should design their portfolios according to the rules of mean-variance portfolio theory and, in reality, do so; and (4) expected returns are a function of risk and risk alone. Modern portfolio theory is no longer very modern, dating back to the late 1950s and early 1960s. Merton Miller and Franco Modigliani described investors as rational in 1961. Eugene Fama described markets as efficient in 1965. Harry Markowitz prescribed mean-variance portfolio theory in its early form in 1952 and in its full form in 1959. William Sharpe adopted mean-variance portfolio theory as a description of investor behavior and in 1964 introduced the capital asset pricing theory (CAPM). According to this theory, differences in expected returns are determined only by differences in risk, and beta is the measure of risk.

Behavioral finance offers an alternative block for each of the foundation blocks of standard finance. According to behavioral finance, investors are "normal," not rational. Markets are not efficient, even if they are difficult to beat. Investors design portfolios according to the rules of behavioral portfolio

theory, not mean-variance portfolio theory. And expected returns follow behavioral asset pricing theory, in which risk is not measured by beta and expected returns are determined by more than risk. In this chapter, we describe each of these building blocks of behavioral finance.

"Normal" Investors and Rational Ones

The reluctance to realize losses is one of many examples of the differences between rational investors and normal investors. That reluctance is puzzling to rational investors since, as Miller and Modigliani (1961) wrote, rational investors care only about the substance of their wealth, not its form. In the absence of transaction costs and taxes, paper losses are different from realized losses only in form, not in substance. Moreover, tax considerations give an edge to realized losses over paper losses because realized losses reduce taxes while paper losses do not.

Normal investors are you and me, and even wealthy and famous people such as Martha Stewart. We are not stupid, but neither are we rational by Miller and Modigliani's definition. Evidence presented at Martha Stewart's trial highlights her reluctance to realize losses. "Just took lots of huge losses to offset sonic gains," Ms. Stewart wrote in an e-mail to Mark Goldstein, a friend, on December 22, 2001, "made my stomach turn." If Ms. Stewart were rational, she would have felt her stomach turn when the prices of her stocks declined and she incurred her "paper" losses, but not when she realized her losses, since transaction costs associated with the realization of losses were likely small relative to its tax benefits.

Shefrin and Statman (1985) presented the reluctance to realize losses in a behavioral framework. They argue that the reluctance stems from a combination of two cognitive biases and an emotion. One cognitive bias is faulty framing, where normal investors fail to mark their stocks to market prices. Investors open mental accounts when they buy stocks and continue to mark their value to purchase prices even after market prices have changed.

They mark stocks to market only when they sell their stocks and close their mental accounts. Normal investors do not acknowledge paper losses because open accounts keep alive the hope that stock prices would rise and losses would turn is into gains. But hope dies when stocks are sold and losses are realized.

The second cognitive bias that plays a role in the reluctance to realize losses is hindsight bias, which misleads investors into thinking that what is clear in hindsight was equally clear in foresight. Hindsight bias misleads investors into thinking that they could have seen losing stocks in foresight, not only in hindsight, and avoided them. The cognitive bias of hindsight is linked to the emotion of regret. Realization of losses brings the pain of regret when investors find, in hindsight, that they would have had happier outcomes if only they had avoided buying the losing stocks.

Postponing the realization of losses until December is one defense against regret. Normal investors tend to realize losses in December, and Ms. Stewart followed that practice when she realized her losses in December 2001. There is nothing rational in the role that December plays in the realization of losses. Investors get no more tax benefits from the realization of losses in December than in November or any other month. Indeed, Shefrin and Statman (1985) showed that it makes rational sense to realize losses when they occur rather than wait until December. The real advantage of December is the behavioral advantage. What is framed as an investment loss in November is framed as a tax deduction in December.

Behavioral Portfolio Theory

Behavioral portfolio theory, introduced by Shefrin and Statman (2000), is a goal-based theory. In that theory, investors divide their money into many mental account layers of a portfolio pyramid corresponding to goals such as secure retirement, college education, or being rich enough to hop on a cruise ship whenever they please.

The road to behavioral portfolio theory started more than 60 years ago when Friedman and Savage (1948) noted that hope for riches and protection from poverty share roles in our behavior; people who buy lottery tickets often buy insurance policies as well. So people are risk-seeking enough to buy lottery tickets while they are risk-averse enough to buy insurance. Four years later, Markowitz wrote two papers that reflect two very different views of behavior. In one, Markowitz (1952a), he created mean-variance theory, based on expected utility theory; in the other, Markowitz (1952b), he extended Friedman and Savage's insurance-lottery framework. People in mean-variance theory, unlike people in the insurance-lottery framework, never buy lottery tickets; they are always risk averse, never risk seeking.

Friedman and Savage (1948) observed that people buy lottery tickets because they aspire to reach higher social classes, whereas they buy insurance as protection against falling into lower social classes. Markowitz (1952b) clarified the observation of Friedman and Savage by noting that people aspire to move up from their current social class or "customary wealth." So, people with $10,000 might accept lottery-like odds in the hope of winning $1 million, and people with $1 million might accept lottery-like odds in the hope of winning $100 million. Kahneman and Tversky (1979) extended the work of Markowitz (1952b) into prospect theory. Prospect theory describes the behavior of people who accept lottery-like odds when they are below their levels of aspiration but reject such odds when they are above their levels of aspiration.

A central feature in behavioral portfolio theory is the observation that investors view their portfolios not as a whole, as prescribed by mean-variance portfolio theory, but as distinct mental account layers in a pyramid of assets, where mental account layers are associated with particular goals and where attitudes toward risk vary across layers. One mental account layer might be a "downside protection" layer, designed to protect investors from being poor. Another might be an "upside potential" layer, designed to give investors a

chance at being rich. Investors might behave as if they hate risk in the downside protection layer, while they behave as if they love risk in the upside potential layer. These are normal, familiar investors, investors who are animated by aspirations, not attitudes toward risk.

In 2002, *New York Times'* writer Mylene Mangalindan told the story of David Callisch, a man who bet on one stock. When Callisch joined Altheon WebSystems, Inc. in 1997, he asked his wife "to give him four years and they would score big," and his "bet seemed to pay off when Altheon went public." By 2000, Callisch's Altheon shares were worth $10 million. "He remembers making plans to retire, to go back to school, to spend more time with his three sons. His relatives, his colleagues, and his broker all told him to diversify his holdings. He didn't." Unfortunately, Callisch's lottery ticket turned out to be a loser.

Callisch's aspirations are common, shared by the many who gamble on individual stocks and lottery tickets. Most lose, but some win. One lottery winner, a clerk in the New York subway system, said "I was able to retire from my job after 31 years. My wife was able to quit her job and stay home to raise our daughter. We are able to travel whenever we want to. We were able to buy a co-op, which before we could not afford." Investors such as Mr. Callisch and lottery buyers such as the New York subway clerk aspire to retire, buy houses, travel, and spend time with their children. They buy bonds in the hope of protection from poverty, stock mutual funds in the hope of moderate riches, and individual stocks and lottery tickets in the hope of great riches.

Mean-variance portfolio theory and behavioral portfolio theory were combined recently as mental accounting portfolio theory by Das, Markowitz, Scheid and Statman (2010). Investors begin by allocating their wealth across goals into mental account layers, say 70 percent to retirement income, 20 percent to college funds, and 10 percent to being rich enough to hop on a cruise ship whenever they please. Next, investors specify the desired probability of reaching the threshold of each goal, say 99 percent for retirement

income, 60 percent for college funds, and 20 percent for getting rich. Each mental account is now optimized as a sub-portfolio by the rules of mean-variance theory, and each feasible goal is achieved with a combination of assets. For example, the retirement goal is likely to be achieved in a sub-portfolio with a combination weighted toward bonds, the college goal is likely to be achieved in a sub-portfolio with a balanced combination of stocks and bonds, and the getting rich goal is likely to be achieved in a sub-portfolio with a combination weighted toward stocks, perhaps with some options and lottery tickets thrown in. The overall portfolio is the sum of the mental account sub-portfolios and it, like the mental account sub-portfolios, lies on the mean-variance efficient frontier.

Behavioral Asset Pricing Model

Stripped to their basics, all asset-pricing models are versions of the old reliable supply-and-demand model of introductory economics. The benefits that determine demand vary from product to product, but they can be classified into three groups, utilitarian, expressive, and emotional. The utilitarian benefits of a car include good gas mileage and reliability. Expressive benefits are those that enable us to signal to ourselves or others our values, social class, and tastes. Expressive characteristics include style (e.g. the style of a Jaguar automobile), and social responsibility (e.g. the environmental responsibility of a Prius). Emotional benefits include pride (e.g. "having arrived" by a Rolls Royce) and exhilaration (e.g. BMW as the "Ultimate Driving Machine").

In the investment context, utilitarian features are often labeled “intrinsic,” while expressive and emotional features are often labeled “sentiment.” High expected returns and low risk are utilitarian benefits of a stock, and those who restrict the demand function to it are considered rational. The rubric of rationality is not so easily extended to expressive and emotional benefits, such as the benefit the display of social responsibility in a socially

responsible mutual fund, the display of wealth in a hedge fund, or the excitement of an initial public offering.

What characteristics do stock buyers like? Investors like stocks with low volatility in prices and earnings. They also like stocks with large capitalization, high price-to-book ratios, high price-to-earnings ratios, low leverage, and more. Stocks with desirable characteristics fetch higher prices, and higher prices correspond to lower expected returns. Stocks with low book-to-market ratios (growth stocks) and large-cap stocks have low expected returns. In the behavioral asset pricing model (BAPM) (Shefrin and Statman (1994), Statman (1999), stocks with desirable characteristics have low expected returns.

The asset pricing model of standard finance is moving away from the capital asset pricing model (CAPM)—in which beta is the only characteristic that determines expected stock returns—toward a model that is similar to the BAPM. For instance, the three-factor model formulated by Fama and French (1992), popular in standard finance, adds market capitalization and book-to-market ratio to beta as characteristics that affect expected returns. One difference between this three-factor model of standard finance and the BAPM is in the interpretation of these characteristics. In standard finance, market capitalization and book-to-market ratios are interpreted as measures of risk; small-cap stocks and stocks with high book-to-market ratios (value stocks) are considered high-risk stocks, and the high risk justifies high expected returns.

In contrast, in behavioral asset pricing theory, the same characteristics are interpreted as reflections of affect, an emotion, and representativeness, a cognitive bias. Both lead investors to identify good stocks as stocks of good companies. Small-cap stocks and stocks with high book-to-market ratios (value stocks) are stocks of "bad" companies, (e.g., Bank stocks in 2008). These companies have negative affect, so investors shun them, depressing their prices and pushing up their expected returns. Statman, Fisher and Anginer (2008) find that respondents in the *Fortune* surveys of admired companies consider stocks of small-cap, high book-to-market companies as unattractive

investments, yet stocks of admired companies yielded lower returns, on average, than stocks of spurned companies.

Still, the road from the preferences of normal investors to security returns is not straightforward, as explained by Shefrin and Statman (1994) and more recently by Pontiff (2006). Suppose that most investors are indeed normal investors who believe, erroneously, that good stocks are stocks of good companies. But surely not all investors commit that error. Some investors are rational, investors aware of the biases of normal investors and seeking to capitalize on them favoring stocks of "bad" companies. Would rational investors not nullify any effect of normal investors on security prices through arbitrage? If the effects of normal investors on stock returns are nullified, risk-adjusted expected returns to stocks of good companies will be no different from risk-adjusted expected returns to stocks of bad companies. However, if arbitrage is incomplete, risk-adjusted expected returns to stocks of bad companies will exceed risk-adjusted expected returns to stocks of good companies.

As we consider arbitrage and the likelihood that it would nullify the effects of the preferences of normal investors on stock price, we should note that no perfect (risk-free) arbitrage is possible here. To see the implications of imperfect arbitrage, imagine rational investors who receive reliable, but not perfect, information about the expected return of a particular stock. Imagine also that the nature of the information is such that the expected return of the stock as assessed by rational investors is higher than the expected return as reflected in the current price of the stock, It is optimal for rational investors to increase their holdings of the particular stock, but as the amount devoted to the stock increases, their portfolios become less diversified as they take on more idiosyncratic risk. The increase in risk leads rational investors to limit the amount allocated to the stock, and with it, limit their effect on its price.

So what does the BAPM look like?

The CAPM is expressed as an equation where:

Expected return of a stock = *f* (market factor).

The three-factor model is expressed as an equation where:

Expected return of a stock = *f* (market factor, book-to-market factor, market cap factor).

Similarly, the BAPM is expressed as:

Expected return of a stock = *f* (market factor, book-to-market factor, market cap factor, momentum, affect factor, social responsibility factor, status factor, and more).

Market Efficiency

Fama (1991) noted long ago that market efficiency per se is not testable. Market efficiency must be tested jointly with an asset pricing model, such as the CAPM or the three-factor model. For example, the excess returns relative to the CAPM of small-cap stocks and stocks with high book-to-market ratios might indicate that the market is not efficient or that the CAPM is a bad model of expected returns.

The definition of "market efficiency" says that a market for a stock is efficient if the price of a stock is always equal to its intrinsic value. A stock's intrinsic value is the present value of cash flows the stock can reasonably be expected to generate, such as dividends. Over the years, the definition of "market efficiency" became confused with the notion that a market is efficient when you cannot beat it by earning excess returns (or positive "alpha"). To earn excess returns, you must identify deviations of price from intrinsic value and then buy undervalued securities and sell overvalued ones. Logically, a market that is efficient in terms of the price-equals-intrinsic-value definition is also a market that cannot be beaten, but a market that cannot be beaten is not necessarily efficient. For example, think of a market in which price deviates greatly from intrinsic value, such as during a bubble. Still, you cannot beat the

market unless you have a way to take advantage of differences between price and value, and that's not always possible. Plenty of investors believed that the stock market was experiencing a bubble in 1998, yet plenty of them lost much money by shorting stocks in 1999.

We have much evidence that stock prices regularly deviate from intrinsic value, so we know that markets for stocks are not always efficient. Richard Roll (1988) found that only 20 percent of changes in stock prices can be attributed to changes in intrinsic value, and Ray Fair (2002) found that many changes in the S&P 500 Index occur with no change in intrinsic value. The stock market crash of 1987 stands out as an example of deviation from market efficiency. The U.S. stock market dropped more than 20 percent in one day, October 19, 1987 (popularly referred to as "Black Monday"). No one has been able to identify any change in the intrinsic value of U.S. stocks that day that might come close to 20 percent.

The problem of joint testing makes much of the debate on market efficiency futile. Proponents of standard finance regard market efficiency as fact and challenge anomalies that are inconsistent with it. For their part, investment professionals who claim that they can beat the market regard market efficiency as false and delight in anomalies that are inconsistent with it. Standard finance proponents were happy with the CAPM as its asset pricing model as long as it served to show that markets are efficient, but they abandoned the CAPM in favor of the three-factor model when the CAPM produced anomalies inconsistent with market efficiency. The problem of jointly testing market efficiency and asset pricing models dooms us to attempt to determine two variables with only one equation. Instead, we can assume market efficiency and explore the characteristics that make an asset pricing model or we can assume an asset pricing model and test market efficiency. I'm inclined toward the former. When we see a Toyota automobile in a showroom with one price tag side by side with a Lexus with a higher price tag we are inclined to look to the automobile asset pricing model for reasons for the price

difference rather than conclude that the automobile market is inefficient. Does the Lexus have leather seats while the Toyota's seats are upholstered in cloth? Does the Lexus nameplate convey higher status than the Toyota nameplate? The same is true when we see stock A with an expected return of 8% and stock B with an expected return of 6 percent.

Elegant Theories and Testable Hypotheses

The statement that behavioral finance is an interesting collection of stories but does not offer the equivalent of the comprehensive theory and rigorous tests of standard finance is as common as it is wrong. When people think about standard finance, they usually think about the CAPM and mean-variance portfolio theory. These two models are elegant, but no one uses them. The elegant CAPM has been replaced as standard finance's asset pricing model by the messy three-factor model, which claims that expected return is not really a function of beta but of equity market capitalization and the ratio of book value to market value. In turn, the three-factor model has become the four-factor model with the addition of momentum and the five-factor model with the addition of liquidity. The list is likely to grow. Similarly, no one applies mean-variance theory or its optimizer in their elegant forms. Instead, it is constraints on the optimizer that determine mean-variance optimal portfolios, and these constraints are often rooted in behavioral consideration. A constraint on the proportion allocated to foreign stocks is one example, driven by "home bias." But we don't need elegant models; we need models that describe real people in real markets. These are the models of behavioral finance.

Behavioral finance offers behavioral asset pricing theory and behavioral portfolio theory, which are no less elegant than the models of standard finance and are much closer to reality. Moreover, behavioral finance offers testable hypotheses and empirical assessments that can reject these hypotheses if they deserve to be rejected. For example, Shefrin and Statman (1985) offered the testable "disposition" hypothesis that investors are disposed to hold on to

losing stocks. This hypothesis can be rejected by empirical evidence that in are quick to realize losses. But the evidence among many types of investors in many countries supports the hypothesis.

Summary

Standard finance, introduced in the late 1950s and early 1960s, was preceded by what I call *proto-behavioral finance* and followed, beginning in the early 1980s, by *behavioral finance*. Proto-behavioral finance and behavioral finance are populated by normal people, while standard finance is populated by rational people. Rational people always prefer more wealth to less and are never confused by the form of wealth. In contrast, normal people, affected by cognitive biases and emotions, are often confused by the form of wealth, and while they always prefer more to less, it is not always wealth they want more of. Sometimes normal people want more status or more social responsibility and are willing to sacrifice wealth for them.

The distinction between rational and normal underlies other differences between standard finance and behavioral finance, including those related to answers to portfolio theory, asset pricing theory, and market efficiency theory. I described the path from proto-behavioral finance to standard finance and to behavioral finance in Statman (2005).

Finance was in its proto-behavioral era in 1957 when Howard Snyder (1957) taught normal investors "how to take a loss and like it" in an article by that name. "There is no loss without collateral compensation," he wrote, explaining that realizing losses increases wealth by reducing taxes. Yet he went on to note that normal investors are reluctant to realize losses. "Human nature being what it is, we are loath to take a toss until we are forced into it. Too often, we believe that by ignoring a loss we will someday glance at the asset to find it has not only recovered its original value but has shown some appreciation" (p. 116). Snyder's observation about the reluctance of normal investors to realize losses more than a half a century ago was reintroduced by

Shefrin and Statman as the “disposition effect” in 1985, the early period of behavioral finance.

Proto-behavioral finance was the obese era of finance. It described normal human behavior, encompassed many human concerns, and recognized many human proclivities, but it was unstructured and unfit, often going straight from anecdote to conjecture and to general conclusion.

Standard finance ruled in the anorexic era of finance. Its narrowing focus is illustrated by the common standard finance refrain: “Yes, but what does it have to do with asset prices?” Proponents of standard finance were busy excluding questions from its domain rather than answering them. As Merton Miller (1986) wrote in response Shefrin and Statman’s (1984) article on dividends “… stocks are usually more than just the abstract ‘bundles of return’ of our economic models. Behind each holding may be a story of family business, family quarrels, legacies received, divorce settlement, and a host of other considerations almost totally irrelevant to our theories of portfolio selection. That we abstract from all these stories in building our models is not because the stories are uninteresting but because they may be too interesting and thereby distract us from the pervasive market forces that should be our principal concern” (p. S467).

Behavioral finance is the era that strives for a muscular and fit finance. Behavioral finance describes normal people in many settings, including those that Merton Miller preferred to exclude. It includes explorations into why people trade, why they consume more from dividend dollars that from capital dollars, and why they prefer to invest in socially responsible companies, or eager to invest in hedge funds.

Behavioral finance owes much to standard finance. Standard finance introduced into finance the exacting rules of science, where theory leads to hypotheses and to empirical evidence that can support the hypotheses or reject them. Behavioral finance will never abandon the scientific method. For

example, the disposition hypothesis predicts that people will realize gains in haste but procrastinate in the realization of losses. The hypothesis can be rejected by analysis of data. But it has been overwhelmingly supported by many empirical studies.

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