

Behavioral Finance: Theories and Evidence

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That behavioral finance has revolutionized the way we think about investments cannot be denied. But its intellectual appeal may lie in its cross-disciplinary nature, marrying the field of investments with biology and psychology. This literature review discusses the relevant research in each component of what is known collectively as behavioral finance.

This review of behavioral finance aims to focus on articles with direct relevance to practitioners of investment management, corporate finance, or personal financial planning. Given the size of the growing field of behavioral finance, the review is necessarily selective. As Shefrin (2000, p. 3) points out, practitioners studying behavioral finance should learn to recognize their own mistakes and those of others, understand those mistakes, and take steps to avoid making them. The articles discussed in this review should allow the practitioner to begin this journey.

Traditional finance uses models in which the economic agents are assumed to be rational, which means they are efficient and unbiased processors of relevant information and that their decisions are consistent with utility maximization. Barberis and Thaler (2003, p. 1055) note that the benefit of this framework is that it is “appealingly simple.” They also note that “unfortunately, after years of effort, it has become clear that basic facts about the aggregate stock market, the cross-section of average returns, and individual trading behavior are not easily understood in this framework.”

Behavioral finance is based on the alternative notion that investors, or at least a significant minority of them, are subject to behavioral biases that mean their financial decisions can be less than fully rational. Evidence of these biases has typically come from cognitive psychology literature and has then been applied in a financial context.

Examples of biases include

- Overconfidence and overoptimism—investors overestimate their ability and the accuracy of the information they have.
- Representativeness—investors assess situations based on superficial characteristics rather than underlying probabilities.
- Conservatism—forecasters cling to prior beliefs in the face of new information.
- Availability bias—investors overstate the probabilities of recently observed or experienced events because the memory is fresh.
- Frame dependence and anchoring—the form of presentation of information can affect the decision made.
- Mental accounting—individuals allocate wealth to separate mental compartments and ignore fungibility and correlation effects.
- Regret aversion—individuals make decisions in a way that allows them to avoid feeling emotional pain in the event of an adverse outcome.

Behavioral finance also challenges the use of conventional utility functions based on the idea of risk aversion. For example, Kahneman and Tversky (1979) propose prospect theory as a descriptive theory of decision making in risky situations. Outcomes are evaluated against a subjective reference point (e.g., the purchase price of a stock) and investors are loss averse, exhibiting risk-seeking behavior in the face of losses and risk-averse behavior in the face of gains.

One aspect of the discussion about rational and irrational investors that is important to consider is the extent to which professional traders and money managers are subject to the same behavioral biases that are more commonly discussed in the context of individual (typically assumed uninformed) investors. A number of articles—discussed here—consider this issue directly and find that professionals are far from immune to the biases. A full description of these biases and the evidence for them is beyond the scope of this review. Readers who would like a more detailed discussion should refer to Barberis and Thaler (2003) and Shefrin (2000).

Although the existence of behavioral biases among some investors is an essential component of behavioral finance, a second essential strand relates to the limits to arbitrage. Traditional finance holds that if some (irrational) investors misprice assets, the mispricing will be corrected by the trading actions of rational investors (arbitrageurs) who spot the resulting profit opportunity, buy cheap assets, and sell expensive ones. Behavioral finance theory counters that mispricing may persist because arbitrage is risky and costly, which has the result of limiting the arbitrageurs' demand for the fair-value restoring trades (Shleifer and Vishny 1997).

The existing academic literature has tended to develop behavioral finance against the “foil” of traditional rational finance. But a number of authors (e.g., Statman 1999a; Thaler 1999) make the case for the “end of behavioral finance,” arguing that because all financial theory requires some assumptions about investor behavior, researchers should strive to make the best assumptions about behavior in all models rather than invent a subclass of models featuring empirically observed behavior. Despite great strides in recent years, behavioral finance does not appear to have reached the point of being considered in all models.

Investors seeking a more comprehensive introduction to the field are directed to the review articles by Hirshleifer (2001) and Barberis and Thaler (2003) as well as to the relevant articles in the November/December 1999 issue of the *Financial Analysts Journal*. Shefrin's (2000) book *Beyond Greed and Fear* is also recommended.

In the following sections, we discuss key areas in the application of behavioral finance. We discuss the limits to arbitrage and then proceed to discuss behavioral asset pricing theory, behavioral corporate finance, and evidence of individual investor behavior and behavioral portfolio theory. We also discuss briefly the psychology of risk, ethics, and the emerging field of neuroeconomics. The final section of this review provides a bibliography with a brief summary of each reference.

The Limits to Arbitrage

A key argument in behavioral finance is that the existence of behavioral biases among investors (noise traders) will affect asset prices and returns on a sustained basis only if limits to arbitrage also exist that prevent rational investors from exploiting short-term mispricings and, by doing so, returning prices to equilibrium values. Evidence suggests that limits to arbitrage exist, for example, in the failure to eliminate obvious and straightforward mispricing situations. Mitchell, Pulvino, and Stafford (2002) are able to document 82 cases in which the market value of a company is less than the market value of the company's stake in its subsidiary. These situations imply arbitrage opportunities leading to swift correction of the pricing anomaly, but the authors find a degree of persistence that indicates barriers to arbitrage.

Barberis and Thaler (2003) outline the various issues that create limits to arbitrage. When the mispriced asset lacks a fairly priced close substitute, arbitrageurs are faced with fundamental risk in that they are unable to effectively hedge their position in the mispriced asset from adverse changes in fundamentals. Even if a close substitute is available, arbitrageurs face noise trader risk. Because trading by uninformed investors may cause the mispricing to increase before it corrects, the arbitrageur may be unable to maintain the position in the face of margin calls, especially when trading with other people's capital, as in institutional investment management. Finally, other issues include high implementation costs for any arbitrage trade. At the extreme, taking a short position in an overpriced security may be impossible if, for example, stock lending is prohibited or no shares are available to borrow.

On the latter point, Lamont and Thaler (2003) review examples in which the market value of spun-out subsidiaries of tech companies exceeded that of the parent company that retained a majority stake in the spinout. In these cases, short-selling of the spinout was difficult, expensive, or impossible, reducing or eliminating the arbitrage opportunity.

Behavioral Asset Pricing

Whereas academics talk about asset pricing and about explaining the cross-section of stock returns, for practitioners, the same issues fall under the simpler heading of “stock picking.” If behavioral biases among investors cause mispricing of stocks in a predictable fashion, then active managers may have the scope to beat the market by using strategies based on these sources of mispricing.

Investor Sentiment. One important issue is whether investor sentiment has the potential to affect stock returns, which is considered self-evident by most practitioners. But traditional finance theory has little role for sentiment in asset pricing.

Recent behavioral literature (Baker and Wurgler 2006; Kumar and Lee 2006; Tetlock 2007) suggests evidence of investor sentiment affecting stock returns. The effect is most pronounced for stocks that are difficult to value and/or hard to arbitrage. This category includes small stocks, young stocks, unprofitable stocks, and extreme-growth stocks. When investor sentiment is high, subsequent returns for these types of stocks tend to be relatively low, and vice versa.

Causes of swings in investor sentiment vary and, in some cases, can be quite trivial. Hirshleifer and Shumway (2003) present evidence that daily returns across the world’s markets are affected by the weather in the city of the country’s leading stock exchange. Unfortunately, a strategy to exploit this predictability in returns involves quite frequent trading, and trading costs may well eliminate any available gains for most investors. Kamstra, Kramer, and Levi (2003) provide similar evidence, showing that returns in various countries through the year are related to hours of daylight—a result possibly driven by the occurrence of seasonal affective disorder.

The effect of sentiment is evident in various arenas. For example, Gemmill and Thomas (2002) show that noise trader sentiment, as proxied by retail investor fund flows, leads to fluctuations in the discount of closed-end funds. Of note, one measure of sentiment that does not predict returns is the current sentiment—bullish or bearish—of investment newsletter writers. Rather, recent past returns predict the sentiment of the writers, which, in turn, has no correlation with future returns (Clarke and Statman 1998).

Under- and Overreaction. Another key area of behavioral research relates to the extent to which investors under- or overreact to information in pricing securities. The available empirical evidence appears to suggest short-term (up to 12 months) return continuations, or momentum (e.g., Jegadeesh and Titman 1993), but longer term (three- to five-year) reversals (e.g., De Bondt and Thaler 1985; Lakonishok, Shleifer, and Vishny 1994). This evidence poses something of a challenge for behavioral researchers to come up with a theory that explains initial underreaction but longer term overreaction and rebuts Fama’s (1998) contention that a market that overreacts about as much as it underreacts can be regarded as broadly efficient.

Various behavioral models have been developed to explain the empirical findings. In Barberis, Shleifer, and Vishny (1998), investors suffer conservatism bias and use the representativeness heuristic. Conservatism means that individuals are slow to change their beliefs in the face of new evidence and can explain why investors would fail to take full account of the implications of an earnings surprise. The representativeness heuristic means that individuals assess the probability of an event or situation based on superficial characteristics and similar experiences they have had rather than on the underlying probabilities. This approach can mean that investors, seeing patterns in random data, could extrapolate a company’s recent positive earnings announcements further into the future than is warranted, creating overreaction.

Daniel, Hirshleifer, and Subrahmanyam (1998) present a related model based on overconfidence and biased self-attribution. Overconfidence leads investors to overweight their private information in assessing the value of securities, causing the stock price to overreact. When public information arrives, mispricing is only partially corrected, giving rise to underreaction. Furthermore, biased self-attribution means that when public information confirms the initial private signal, investor confidence in the private signal rises, leading to the potential for overreaction.

Finally, Hong and Stein (1999) present a model populated by “news watchers,” those who base their trades on private information but not past prices, and “momentum traders,” those who base their trades on past price trends. News spreads slowly among the news watchers, causing initial underreaction, but it is followed by momentum buying that can create an eventual overreaction.

Related empirical work includes Dreman and Berry’s (1995) study that finds an asymmetry of response to earnings surprise between low and high P/E stocks. Low P/E (i.e., value) stocks respond most favorably to a positive earnings surprise, suggesting the low P/E status may be the result of prior overreaction to negative news. Lee and Swaminathan (2000) show that turnover levels provide a link between value and momentum effects. Winners with high past volume experience reversals at five-year horizons, consistent with initial underreaction and eventual overreaction. They argue also that as stocks decline in popularity, trading volume drops off and the stocks become neglected value stocks. Taffler, Lu, and Kausar (2004) document market underreaction to the bad news contained in going-concern-modified audit reports. The underreaction may be the result of the limits to arbitrage in the sample companies, predominantly small loser stocks, but the authors cannot rule out the behavioral explanation of investors (professional and individual) being in denial of the implications of the going-concern opinion.

Other articles attempt to explain short-term momentum in returns, arguably the most difficult empirical finding to reconcile with traditional rational finance theory. Grinblatt and Han (2005) argue that prospect theory, and the resulting tendency of investors to hold losing positions and sell winners, explains the momentum effect. This trading behavior of investors means prices underreact to news and momentum occurs as the mispricing slowly corrects. For example, when good news emerges about a stock, selling by investors who, subject to the disposition effect, are inclined to sell winners will slow the pace at which the good news can be reflected in a higher stock price. The authors find that a proxy for unrealized gains, which will determine investors’ disposition to sell or hold, can explain the level of momentum profits.

Representativeness Bias and “Good Companies.” The representativeness heuristic involves individuals assessing situations based on superficial characteristics rather than underlying probabilities. One possible manifestation of this inclination is the assumption that the shares of a “good company” will be a good investment. Shefrin and Statman (1995) show that survey respondents believe that the shares of companies that do well in the annual *Fortune* magazine survey of corporate reputation will prove to be good investments. Their findings indicate that these companies tend to be large companies (past winners) with low book-to-market ratios, which are characteristics linked empirically to *poor* subsequent returns. More recent work is somewhat mixed. Anderson and Smith (2006) find that the shares of the *Fortune* survey’s most admired companies outperform the S&P 500 Index in the periods following publication of the survey results, whereas Statman, Fisher, and Anginer (2008) use a longer sample and find results consistent with Shefrin and Statman (1995).

Cooper, Dimitrov, and Rau (2001) show that investors can be influenced also by the name a company adopts, again consistent with the representativeness heuristic. Their analysis of 95 companies that changed to dot-com (.com) names during 1998 and 1999 finds that these companies earned statistically significant and sizably positive abnormal returns that did not appear to reverse in the following 120 trading days. They note that adoption of the dot-com name appears to lead to “investor mania.” Not all of the companies that changed names had substantial involvement with the internet, but the extent to which they did was not related to the share price response.

The Equity Risk Premium. The relatively high level of the equity risk premium—that is, the excess return of equities over bonds or T-bills—is another empirical finding regarded by some authors in the traditional finance literature as a puzzle. Behavioral theories may offer some solution to the puzzle. Benartzi and Thaler (1995) argue that loss-averse investors who evaluate their portfolio on a regular—at least annual—basis will require a high risk premium to be induced to invest in equities. For these investors, losses are weighed more heavily than comparable-sized gains, and given the distribution of gains and losses at short horizons, investors who regularly evaluate their portfolios will often be confronted with painful losses.

Asness (2000) presents an explanation for time variation in the equity risk premium based on the idea that the relative yield on stocks versus bonds will reflect the experience of each generation of investors with each asset class, particularly in terms of volatility. The risk premium at any point in time is argued to be determined by the relative volatility of stocks and bonds over the past 20 years (i.e., the personal experience of the majority of current investors). The results are shown to be robust when changing the horizon to between 10 and 30 years. The results can explain why stocks previously yielded more than bonds but in the more recent past have had the opposite relationship. (See also Zhiyi Song's literature review on the Equity Risk Premium: www.cfapubs.org/toc/rflr/2007/2/1.)

Behavioral Corporate Finance

Behavioral finance also has applications in analysis of corporate finance decisions. As Baker, Ruback, and Wurgler (2007) note, the extension of behavioral ideas to corporate finance has taken two distinct paths. The first path, which takes the view that investors are less than fully rational, analyzes the corporate financing decisions made by management in response to the behavior of investors—that is, the rational managers make decisions in response to the mispricing of securities by behaviorally biased investors. The second path holds that corporate managers can be subject to behavioral biases and that some of the corporate finance transactions they undertake are the result of those biases. For example, managers may make certain decisions because they are overconfident about their abilities or the prospects for their firm or because they are loss averse. Baker et al. (2007) note that the second, “irrational managers,” path is somewhat less developed than the first path, which focuses on managerial responses to market mispricing.

Rational Managers and Irrational Investors. The rational managers/irrational investors school of thought has its main implications in terms of corporate financial structure and the timing of securities issues. For example, Baker and Wurgler (2000) find that the share of equity issues relative to total equity and debt issues is high before periods of low equity market returns, suggesting that companies time their equity issues to take advantage of positive investor sentiment and market mispricing. These results suggest also that corporate capital structure often reflects the cumulative outcome of past attempts to time the equity market rather than some target capital structure (Baker and Wurgler 2002).

Baker and Wurgler (2004) argue that dividend policy may be influenced by managers “catering” to the demands of investors. According to the authors, managers rationally cater to investor demand by paying dividends when investors put higher prices on payers and not paying when investors prefer nonpayers. The authors show that the lagged dividend premium—the difference between the average market-to-book ratio for dividend payers relative to the average for nonpayers—is positively related to dividend initiations. The authors argue also that investors' time-varying demand for dividends is related to sentiment. When the dividend premium is high, investors are seeking companies that exhibit characteristics of safety, and when it is low, investors are seeking maximum capital growth.

Shleifer and Vishny (2003) present a model that seeks to explain merger and acquisition (M&A) deals in behavioral terms. In the model, stocks are mispriced and management perceives and responds to the mispricing. The authors argue that M&A decisions and decisions about methods of financing deals are driven by misvaluations of the participating companies; for example, acquisitions will involve payment in stock when valuations are high. The model suggests that acquisitions for stock are made by overvalued companies and target companies tend to be less overvalued. The model is able to explain many of the observed characteristics of the M&A market.

Behavioral finance also has implications for the market for IPOs. These offerings are widely documented as showing high first-day returns, usually taken to imply that the issues are underpriced at the offering price. One puzzle is why issuers and pre-IPO shareholders are prepared to tolerate this “money left on the table” phenomenon. Loughran and Ritter (2002) propose a model based on prospect theory in which issuers are likely to net the amount of money left on the table by an underpriced offering together with the “gain” in their wealth that comes from the rise in the price of the shares that they retain in the company. The net amount will often be a positive sum

with the increase in value of the retained holdings exceeding the difference between the offer price and the market price for the shares sold in the offering. Furthermore, the most underpriced offerings tend to be those in which the offer price has been revised up in the face of strong demand from the price set out in the prospectus. Therefore, the original pre-IPO shareholders can offset the loss of the underpricing with the good news that their total wealth is higher than was previously expected. Ljungqvist and Wilhelm (2005) provide some support for this hypothesis in that issuers of underpriced offerings often use the IPO underwriter for subsequent equity issues, suggesting they are not unhappy with the service received.

Irrational Managers. Despite the suggestion by Baker and Wurgler (2004) that the irrational managers school of behavioral corporate finance is currently underdeveloped, the theory can be regarded as having a relatively long history. For example, Roll's (1986) "hubris hypothesis" of takeovers is based on the idea of overconfidence among managers, which leads them to overestimate the gains to be made from corporate activity. More recently, Doukas and Petmezas (2007) calculate a measure of management overconfidence and find overconfident managers' companies earn lower merger announcement returns and have poorer long-term share price performance. Self-attribution bias also appears to be at play, in that returns are lower for serial acquirers (five or more deals in three years) than for first-time deals.

Another example of the managerial overconfidence idea relates to project appraisal and internal investment decisions. Malmendier and Tate (2005) argue that overconfident management overestimates the returns on investment projects and views external funds as too costly. They tend to overinvest when internal funds are abundant but refrain from investing when external funds are required. The authors use management's personal financial exposure to company-specific risk as a proxy for overconfidence and find that investment by overconfident CEOs is closely related to cash flow.

Investor Behavior and Behavioral Portfolio Theory

In this section, we look at the trading and portfolio construction behavior of investors without regard to whether or not that behavior has a lasting impact on market prices. We consider the evidence for professional investors, fiduciaries (such as pension fund trustees), and individual investors.

Professional Investors. Categorizing market participants as informed and uninformed traders, or noise traders and arbitrageurs, encourages the perspective of professional investors as the rational, informed arbitrageurs. But plenty of evidence is available of behavioral biases being displayed by professional investors, even in "real money" situations.

Hong, Kubik, and Stein (2005) find that mutual fund managers herd in terms of the stocks that they buy or sell during a particular quarter. Coval and Shumway (2005) show that traders at the Chicago Board of Trade (CBOT) are loss averse and inclined to take more risk in the afternoon if they have had losses in the morning. Their action has at least a short-term effect on prices. In an experimental setting, Haigh and List (2005) show that CBOT traders display myopic loss aversion to a greater degree than do students. Garvey and Murphy (2004) find evidence of the disposition effect—the tendency to sell winners and hold losers—among a group of profitable proprietary traders. The tendency to sell winners and hold losers lowers the returns the traders earn.

Fiduciaries. A large proportion of institutional funds are controlled by trustee boards or other fiduciary committees that are potentially subject to behavioral biases. Importantly in this context, individual behavioral biases operate alongside biases that may occur as a result of the dynamic of group (or committee) decision making. For example, Wood (2006) provides an interesting discussion of the behavioral biases that may affect investment committees.

Hodgson, Breban, Ford, Streatfield, and Urwin (2000) provide a practitioner's view of these biases based on the authors' experiences of providing investment advice to pension funds and other institutions. Using the results of a survey of fiduciaries and other investment professionals, they estimate that behavioral factors account for almost half of the decision-making process of fiduciaries. They classify the behavioral factors into two groups:

- “SleepWell” payoffs: gained from making comfortable decisions that reduce the risk of regret; and
- “SeemsGood” payoffs: gained from believing decisions to be value enhancing but, in reality, tend to reduce financial efficiency.

They argue that, given the extent to which the decisions of fiduciaries are scrutinized and judged by others, SleepWell payoffs are a valid and valuable component of the decision-making process. Pursuing SleepWell payoffs encourages fiduciaries to make safe, conventional choices rather than seeking financially optimal positions as finance theory would suggest. The SeemsGood biases are unhelpful and should be eliminated if possible. The chief SeemsGood bias is the tendency of fiduciaries to release managers after a period of poor short-term performance and replace them with a manager with a recent strong record.

The SeemsGood bias is explored in more depth by Goyal and Wahal (forthcoming 2008). They analyze the hiring and firing decisions of 3,700 U.S. plan sponsors between 1994 and 2003. Their results confirm that plan sponsors show a significant bias to hire managers with good three-year excess returns and fire managers with poor three-year returns. They also find that chasing returns destroys value and if plan sponsors had stayed with their fired managers, their investment returns would have been larger than those actually delivered by newly hired managers. This behavior is consistent with the fiduciaries using the representativeness heuristic.

The behavioral tendency of plan sponsors to chase short-term returns may have implications for the behavior of fund managers in terms of short-termism and closet index tracking. Of note in the context of the research findings discussed above, the fund managers' behavior does not reflect behavioral biases but rather the rational response to an agency problem.

Individual Investors. In this section, we look at the trading behavior and portfolio choices of individual (or retail) investors. Some of the behavior relates to pension fund portfolios—for example, 401(k) plans—whereas some relates to trading in brokerage accounts or mutual fund selection.

Behavioral findings relating to personal financial issues have a number of practical implications. Professional investors could use knowledge of the biases and mistakes of individual investors in attempts to “get on the other side of the trade” and make profits at the expense of the individual investors. Alternatively, financial services firms could use knowledge of such biases to inform their product development and marketing departments. Finally, regulators could apply the knowledge to informing regulation and education that can be used to mitigate the biases and improve the welfare of individual investors.

Evidence suggests that individual investors fail to behave rationally in even quite simple situations. Elton, Gruber, and Busse (2004) examine investors' choices of index funds. Fees vary across funds, and given nearly identical investment strategies, the variations drive predictable differences in performance. Despite this predictability, many investors invest in high-fee funds with (predictable) inferior performance.

Evidence also indicates that many investors have fairly weak portfolio preferences. For example, Benartzi and Thaler (2002) examine investors' portfolio choice decisions in the context of 401(k) plans. A majority of survey participants prefer the distribution of outcomes of the median investor's portfolio to the one they have chosen, leading the authors to conclude that investor autonomy is “not worth much.”

The idea that investors struggle to deal with investment choices is also consistent with the evidence of Sethi-Iyengar, Jiang, and Huberman (2004), who document a negative relationship between the number of fund choices in a 401(k) plan and the participation rate. They find the average participation rate in plans with 2 fund choices is 75 percent, whereas in plans with 20 fund choices, it is 70 percent, and in plans with 40 fund choices, 65 percent. The results suggest that fund choices create complexity for members, which discourages them from joining the plan.

Investors with weak preferences or limited knowledge may use simple rules of thumb to deal with investment choice. Benartzi and Thaler (2001) document experiments of investors using a naïve $1/n$ diversification strategy in which they allocate contributions equally among the funds offered in their 401(k) pension plans. This type of strategy means the fund range has a strong influence on the investors' chosen asset allocation. Huberman and Jiang (2006), using a larger and more appropriate dataset, find evidence instead for a conditional $1/n$ approach in which investors choose three or four funds from the range offered and then allocate equally among them. In this case, fund range has less influence on asset allocation.

One particularly puzzling example of investor behavior observed in 401(k) plans is the enthusiasm of many participants for investing their contributions in the stock of their employer. Although some of the account balances invested in employer stock are explained by the fact that employer matching contributions are often made in the form of stock, with restrictions on sale, studies (e.g., Benartzi 2001) find participants voluntarily allocating their own contributions to employer stock. Obviously, not only does this strategy represent an underdiversified portfolio, but the investment also has a strong correlation with employees' labor income. Participants should, ideally, look to hedge the labor income risk they face rather than "double up" with portfolio investments. Explanations for this strange investment approach include naïve extrapolation of the strong past performance of the company's shares (Benartzi 2001) and employees underestimating the risk of the employer's share, possibly because of their familiarity with the company (Benartzi 2001; Huberman 2001). Employees may also perceive implicit advice (or an endorsement) in the fact that employer matching contributions are made in stock.

In addition to evidence of 401(k) investors following dubious investment strategies, substantial evidence shows inertia that leads participants to stick with default options in terms of savings rates and investment funds. In many cases, the default funds will be cash or money market funds, which are arguably too conservative for long-term saving (e.g., Madrian and Shea 2001).

One of the most influential programs of research on the trading behavior of individual investors has been conducted by Barber and Odean, who managed to obtain the trading records of 35,000 investors with accounts at a discount brokerage. The authors find evidence of excessive trading reducing returns (Barber and Odean 1999, 2000; Odean 1999) and attribute the result to overconfidence. Psychology research typically finds men are more overconfident than women, and consistent with this, Barber and Odean (2001) find that men trade more than women and earn lower returns. Barber and Odean (1999; Odean 1998) also find evidence of the disposition effect (as do Shefrin and Statman 1985), in which investors are reluctant to realize losses and tend to sell winners and hold losers. In the discount brokerage data, stocks sold tended to do better subsequently than those retained or used to replace those sold.

Many individual investors use mutual funds rather than investing in individual stocks. Selecting mutual fund managers is, however, not necessarily an easier task than picking stocks. Rabin (2002) argues that many investors believe in the "law of small numbers" and are prone to overestimate the extent to which a short sequence of observations is likely to be characteristic of the underlying data-generating process. In the context of mutual fund performance, this view is likely to lead these investors to react to short-term performance records in hiring or firing funds, even those in which performance histories are uninformative as to future performance. This finding is similar to that discussed above in the context of fiduciary decision making.

Mutual fund investors are fooled by more than uninformative past performance figures. Cooper, Gulen, and Rau (2005) show that mutual fund name changes are often designed to latch on to the current "hot" investment styles. They find that in the year after a fund changed its name, money flows from investors increased substantially. The funds experienced no significant improvement in performance, and in many cases, the holdings of the fund did not match the style implied by the new name.

Further empirical support for the notion that fund selection decisions are affected by behavioral biases comes from Frazzini and Lamont (forthcoming 2008), who argue that mutual fund investor cash flows represent "dumb money." They find that mutual fund investors tend to reallocate their cash to funds that own stocks with low future returns.

Behavioral Portfolio Theory. Shefrin and Statman have published a number of articles on behavioral portfolio theory (e.g., Shefrin and Statman 2000; Statman 1999b, 2004). They argue that behavioral portfolios are formed as layered pyramids in which each layer is aligned with an objective. For example, a base layer of low-risk assets may be intended as “protection from poverty” whereas a higher layer of risky assets represents “hopes for riches.” Behavioral investors do not consider the covariances between the layers in the way that modern portfolio theory would suggest they should. The layered approach can explain observed features, such as undiversified stock portfolios (hopes for riches), and the reluctance to invest in foreign stocks despite the seemingly obvious diversification benefits.

The Psychology of Risk

Risk management is an important aspect of investment, and perceptions of risk are likely to be influenced by psychology. Shiller (2003, ch. 6) looks explicitly at applications of psychology in risk management. Perhaps the most obvious implication of the behavioral biases that underpin behavioral finance is that overconfidence and overoptimism can lead individuals to underestimate risk. The complexity of risk may also create problems in risk perception.

Framing is relevant in that perceptions of risk may be affected by aspects of the presentation of the situation. Shiller notes (p. 82) that risk management may be regarded as more attractive when described as “insurance.” Framing outcomes in terms of gains and losses may also affect risk-taking behavior, with evidence that individuals become risk seeking in the domain of losses (as in prospect theory).

Shiller also discusses the notion of “risk as feelings.” He notes that intellectual recognition of a risk may not be enough to provoke action without an emotional (or affective) response to the risk. Conversely, some risks that are quite trivial when considered on an intellectual level may provoke action if they somehow manage to create an affective response. An example might be extremely low probability events that have a “dread” element to them, such as a disaster at a nuclear power station.

In terms of levels of risk, changes in investor beliefs can be a source of risk. Kurz (1997) introduces the concept of endogenous uncertainty. Exogenous uncertainty relates to changes in asset prices caused by changes in fundamentals, but asset prices also fluctuate because of changes in investors’ beliefs, or endogenous uncertainty. Kurz assumes that economic agents cannot know the true value of an asset and have scope to disagree over the implications of news for future market performance.

Ethics

Standards of ethics and ethical decision making are important for the functioning of the investment industry and the wider financial system. Decisions on ethical issues, like decisions of any kind, are driven by the psychology of the decision maker. Oberlechner (2007) provides an extensive review of psychology research relevant to ethical decision making in the finance and investment industries. He notes that ethics goes beyond restraining from unethical behavior because of the potential costs of exposure. Some psychology research suggests people want to be ethical, an intrinsic interest that does not rely on a desire to avoid punishment. Psychological concepts used in behavioral finance, heuristic biases or cognitive dissonance, for example, can also affect ethical decision making. The review presents arguments that situational and social forces can result in otherwise ethical individuals committing unethical acts. Notably, in the financial sector the temptation to act unethically can be high because of the large sums of money involved.

Prentice (2007) provides another broad review of ethical decision making in a financial context. He argues that well-intentioned people can have ethical lapses if they find themselves in particular circumstances and do not take account of the errors in judgment that humans are behaviorally inclined to make. In short, “bad acts” are not committed only by “bad people.” Sometimes “good people” act in an unethical manner, out of a desire to conform with others around them or because they are overconfident, for example.

An alternative perspective on the psychology of ethics can be found in Daniel, Hirshleifer, and Teoh (2002). They argue that behavioral biases—for example, limited attention and processing capacity—make many investors credulous and thus overly inclined to take at face value the advice of parties in the financial industry. They do not consider the incentives for interested parties, such as corporate management, brokers, and analysts, to manipulate available information. This bias suggests that regulations mandating the increased disclosure of incentives and conflicts of interest may be beneficial.

Neuroeconomics

Neuroeconomics uses knowledge of brain functions to understand the aspects of brain activity that contribute to different types of decision making. Brain imaging and other types of neuroscientific techniques supply insight into the responses produced by particular situations and choices. Camerer, Loewenstein, and Prelec (2005) provide a comprehensive review of the literature of neuroeconomics.

A key finding from neuroscience is that brain processes can be subdivided into *controlled* and *automatic* processes and, further, between *cognition* and *affect*. The processes are sometimes simplified into two systems with various labels (e.g., system one and system two, X-system and C-system, associative and rule-based, or experiential and rational systems).

Camerer et al (2005) note that:

First, much of the brain implements “automatic” processes, which are faster than conscious deliberations and which occur with little or no awareness or feeling of effort. Because people have little or no introspective access to these processes, or volitional control over them, and these processes were evolved to solve problems of evolutionary importance rather than respect logical dicta, the behavior these processes generate need not follow normative axioms of inference and choice. Second, our behavior is strongly influenced by finely tuned affective (emotion) systems whose basic design is common to humans and many animals. These systems are essential for daily functioning, and when they are damaged or perturbed, by brain injury, stress, imbalances in neurotransmitters, or the “heat of the moment,” the logical-deliberative system—even if completely intact—cannot regulate behavior appropriately. (p. 11)

Put simply, traditional economics assumes that humans make decisions using a controlled cognitive process. In practice, decisions are often made using an automatic process, subject to biases caused by mental shortcuts, or an affective process influenced by emotions.

Behavioral finance has evolved based on observing how individuals make decisions. Advances in neuroscience now make direct measurement of thoughts and feelings possible and offer the potential to understand *why* individuals make these decisions. This information may help explain anomalies in decision making.

Bibliography

Anderson, J., and G. Smith. 2006. "A Great Company Can Be a Great Investment." *Financial Analysts Journal*, vol. 62, no. 4 (July/August):86–93.

"A classic investment mistake is to confuse a great company with a great investment. It is a mistake because a company's well-known virtues are presumably already factored into the price of the company's stock. This study tested this 'mistake' by looking at the stock performance of the companies identified each year by *Fortune* magazine as the most admired companies in the United States for 1983 through 2004. Surprisingly, a portfolio of these stocks outperformed the market by a substantial and statistically significant margin, which contradicts the efficient market hypothesis." [p. 86]

Asness, C. 2000. "Stocks versus Bonds: Explaining the Equity Risk Premium." *Financial Analysts Journal*, vol. 56, no. 2 (March/April):96–113.

"From the 19th century through the mid-20th century, the dividend yield (dividends/price) and earnings yield (earnings/price) on stocks generally exceeded the yield on long-term U.S. government bonds, usually by a substantial margin. Since the mid-20th century, however, the situation has radically changed. In addressing this situation, I argue that the difference between stock yields and bond yields is driven by the long-run difference in volatility between stocks and bonds. This model fits 1871–1998 data extremely well. Moreover, it explains the currently low stock market dividend and earnings yields. Many authors have found that although both stock yields forecast stock returns, they generally have more forecasting power for long horizons. I found, using data up to May 1998, that the portion of dividend and earnings yields explained by the model presented here has predictive power only over the long term whereas the portion not explained by the model has power largely over the short term." [p. 96]

Baker, M., and J. Wurgler. 2000. "The Equity Share in New Issues and Aggregate Stock Returns." *Journal of Finance*, vol. 55, no. 5 (October):2219–2257.

"The share of equity issues in total new equity and debt issues is a strong predictor of U.S. stock market returns between 1928 and 1997. In particular, firms issue relatively more equity than debt just before periods of low market returns. The equity share in new issues has stable predictive power in both halves of the sample period and after controlling for other known predictors. We do not find support for efficient market explanations of the results. Instead, the fact that the equity share sometimes predicts significantly negative market returns suggests inefficiency and that firms time the market component of their returns when issuing securities." [p. 2219]

———. 2002. "Market Timing and Capital Structure." *Journal of Finance*, vol. 57, no. 1 (February):1–32.

"The authors use regression analysis to evaluate the determinants of capital structure. Past equity valuations show an important and persistent inverse relationship with leverage. The authors conclude that capital structure is the result of past efforts by managers to time the equity market." [abstract written by Charles F. Peake, *CFA Digest*, August 2002, p. 9]

———. 2004. "A Catering Theory of Dividends." *Journal of Finance*, vol. 59, no. 3 (June):1125–1165.

"We propose that the decision to pay dividends is driven by prevailing investor demand for dividend payers. Managers cater to investors by paying dividends when investors put a stock price premium on payers, and by not paying when investors prefer nonpayers. To test this prediction, we construct four stock price-based measures of investor demand for dividend payers. By each measure, nonpayers tend to initiate dividends when demand is high. By some measures, payers tend to omit dividends when demand is low. Further analysis confirms that these results are better explained by catering than other theories of dividends." [p. 1125]

———. 2006. “Investor Sentiment and the Cross-Section of Stock Returns.” *Journal of Finance*, vol. 61, no. 4 (August):1645–1680.

“Classical finance theory suggests that in efficient markets, rational investors hold diversified portfolios and security prices reflect the discounted value of expected cash flows. Future cash flows, in turn, depend on systematic risk alone, and investor sentiment has no effect on security prices. Contrary to the theory, the authors argue that investor sentiment may, in fact, affect security valuation. They find that when investor sentiment is low, subsequent returns are relatively high for stocks of small, young, highly volatile, unprofitable, nondividend-paying, extreme growth, and distressed companies. On the other hand, when sentiment is high, the returns for these stocks are relatively low.” [abstract written by Rajiv Kalra, *CFA Digest*, February 2007, p. 49]

Baker, M., R. Ruback, and J. Wurgler. 2007. “Behavioral Corporate Finance: A Survey.” In *Handbook of Corporate Finance: Empirical Corporate Finance*. Edited by B. E. Eckbo. Amsterdam, Holland: Elsevier.

This review article examines the literature on behavioral drivers of corporate financial activity, such as equity issues, mergers, and dividend policy. The review looks at two strands: corporate activity as a rational response from managers to securities market mispricing and the assumption that managers are less than fully rational actors whose actions reflect their biases.

Barber, B., and T. Odean. 1999. “The Courage of Misguided Convictions.” *Financial Analysts Journal*, vol. 55, no. 6 (November):41–55.

“The field of modern financial economics assumes that people behave with extreme rationality, but they do not. Furthermore, people’s deviations from rationality are often systematic. Behavioral finance relaxes the traditional assumptions of financial economics by incorporating these observable, systematic, and very human departures from rationality into standard models of financial markets. We highlight two common mistakes investors make: excessive trading and the tendency to disproportionately hold on to losing investments while selling winners. We argue that these systematic biases have their origins in human psychology. The tendency for human beings to be overconfident causes the first bias in investors, and the human desire to avoid regret prompts the second.” [p. 41]

———. 2000. “Trading Is Hazardous to Your Wealth: The Common Stock Investment Performance of Individual Investors.” *Journal of Finance*, vol. 55, no. 2 (April):773–806.

“Individual investors who hold common stocks directly pay a tremendous performance penalty for active trading. Of 66,465 households with accounts at a large discount broker during 1991 to 1996, those that trade most earn an annual return of 11.4 percent, while the market returns 17.9 percent. The average household earns an annual return of 16.4 percent, tilts its common stock investment toward high-beta, small, value stocks, and turns over 75 percent of its portfolio annually. Overconfidence can explain high trading levels and the resulting poor performance of individual investors. Our central message is that trading is hazardous to your wealth.” [p. 773]

———. 2001. “Boys Will Be Boys: Gender, Overconfidence, and Common Stock Investment.” *Quarterly Journal of Economics*, vol. 116, no. 1 (February):261–292.

“Theoretical models predict that overconfident investors trade excessively. We test this prediction by partitioning investors on gender. Psychological research demonstrates that, in areas such as finance, men are more overconfident than women. Thus, theory predicts that men will trade more excessively than women. Using account data for over 35,000 households from a large discount brokerage, we analyze the common stock investments of men and women from February 1991 through January 1997. We document that men trade 45 percent more than women. Trading reduces men’s net returns by 2.65 percentage points a year as opposed to 1.72 percentage points for women.” [p. 261]

———. 2002. “Online Investors: Do the Slow Die First?” *Review of Financial Studies*, vol. 15, no. 2 (Special Issue):455–488.

“We analyze 1,607 investors who switched from phone-based to online trading during the 1990s. Those who switch to online trading perform well prior to going online, beating the market by more than 2% annually. After going online, they trade more actively, more speculatively, and less profitably than before—lagging the market by more than 3% annually. Reductions in market frictions (lower trading costs, improved execution speed, and greater ease of access) do not explain these findings. Overconfidence—augmented by self-attribution bias and the illusions of knowledge and control—can explain the increase in trading and reduction in performance of online investors.” [p. 455]

Barberis, N., and R. Thaler. 2003. “A Survey of Behavioral Finance.” In *Handbook of the Economics of Finance*. Edited by G. Constantinides, M. Harris, and R. Stulz. Amsterdam, Holland: Elsevier/North-Holland.

This comprehensive review discusses the literature on the two building blocks of behavioral finance: the limits to arbitrage and the psychological biases of investors. It also discusses using behavioral finance to explain the aggregate level of the stock market, the cross-section of stock returns, investor behavior, and corporate finance.

Barberis, N., A. Shleifer, and R. Vishny. 1998. “A Model of Investor Sentiment.” *Journal of Financial Economics*, vol. 49, no. 3 (September):307–343.

“Recent empirical research in finance has uncovered two families of pervasive regularities: *underreaction* of stock prices to news such as earnings announcements, and *overreaction* of stock prices to a series of good or bad news. In this paper, we present a parsimonious model of investor sentiment, or of how investors form beliefs, which is consistent with the empirical findings. The model is based on psychological evidence and produces both underreaction and overreaction for a wide range of parameter values.” [p. 307]

Benartzi, S. 2001. “Excessive Extrapolation and the Allocation of 401(k) Accounts to Company Stock.” *Journal of Finance*, vol. 56, no. 5 (October):1747–1764.

“About a third of the assets in large retirement savings plans are invested in company stock, and about a quarter of the *discretionary* contributions are invested in company stock. From a diversification perspective, this is a dubious strategy. This paper explores the role of excessive extrapolation in employees’ company stock holdings. I find that employees of firms that experienced the worst stock performance over the last 10 years allocate 10.37 percent of their *discretionary* contributions to company stock, whereas employees whose firms experienced the best stock performance allocate 39.70 percent. Allocations to company stock, however, do not predict future performance.” [p. 1747]

Benartzi, S., and R. Thaler. 1995. “Myopic Loss Aversion and the Equity Premium Puzzle.” *Quarterly Journal of Economics*, vol. 110, no. 1 (February):73–92.

“The equity premium puzzle refers to the empirical fact that stocks have outperformed bonds over the last century by a surprisingly large margin. The authors offer a new explanation based on two behavioral concepts. First, investors are assumed to be ‘loss averse,’ meaning that they are distinctly more sensitive to losses than to gains. Second, even long-term investors are assumed to evaluate their portfolios frequently. The authors dub this combination ‘myopic loss aversion.’ Using simulations, they find that the size of the equity premium is consistent with the previously estimated parameters of prospect theory if investors evaluate their portfolios annually.” [p. 73]

———. 2001. “Naive Diversification Strategies in Defined Contribution Saving Plans.” *American Economic Review*, vol. 91, no. 1 (March):79–98.

“There is a worldwide trend toward defined contribution saving plans and growing interest in privatized Social Security plans. In both environments, individuals are given some responsibility to make their own asset-allocation decisions, raising concerns about how well they do at this task. This paper investigates one aspect of the task, namely diversification. We show that some investors follow the ‘1/n strategy’: they divide their contributions evenly across the funds offered in the plan. Consistent with this naive notion of diversification, we find that the proportion invested in stocks depends strongly on the proportion of stock funds in the plan.” [p. 79]

———. 2002. “How Much Is Investor Autonomy Worth?” *Journal of Finance*, vol. 57, no. 4 (August):1593–1616.

“Defined-contribution savings plans sometimes permit participants to select their retirement savings investments. Many plans offer investors numerous funds, ideally allowing them to maximize their utility as measured by individual risk and return preferences. The authors survey employees at two organizations to see if they prefer the retirement portfolio asset mix they selected for themselves over other mixes. They find that retirement plan participants do not prefer their own portfolio when presented with various options, indicating that choice alone does not help them make an optimal allocation. Possibly, participants do not have enough knowledge of investments or of their own preferences to make optimal choices.” [abstract written by Ann C. Logue, *CFA Digest*, February 2003, p. 67]

Camerer, C., G. Loewenstein, and D. Prelec. 2005. “Neuroeconomics: How Neuroscience Can Inform Economics.” *Journal of Economic Perspectives*, vol. 43, no. 1 (March):9–64.

The authors provide a comprehensive review of the emerging field of neuroeconomics, in which knowledge of brain function is used to shed additional light on economic decision-making processes.

Clarke, R., and M. Statman. 1998. “Bullish or Bearish?” *Financial Analysts Journal*, vol. 54, no. 3 (May/June):63–72.

“The sentiment of newsletter writers, whether bullish or bearish, does not forecast future returns, but past returns and the volatility of those returns do affect sentiment. High returns over four-week periods are associated with a migration of newsletter writers from the bearish camp into the bullish camp. High returns over periods of 26 and 52 weeks are associated with ‘nervous bullishness’—a migration of newsletter writers from the bearish camp into both the bullish and the correction camps. High volatility, instead of scaring newsletter writers into bearishness, reduces the effects of both positive and negative returns on sentiment. Also, contrary to a popular hypothesis, the crash of 1987 had no significant effect on the pattern of forecasts.” [p. 63]

Cooper, M., O. Dimitrov, and P. Rau. 2001. “A Rose.com by Any Other Name.” *Journal of Finance*, vol. 56, no. 6 (December):2371–2388.

“We document a striking positive stock price reaction to the announcement of corporate name changes to Internet-related dotcom names. This ‘dotcom’ effect produces cumulative abnormal returns on the order of 74 percent for the 10 days surrounding the announcement day. The effect does not appear to be transitory; there is no evidence of a postannouncement negative drift. The announcement day effect is also similar across all firms, regardless of the firm’s level of involvement with the Internet. A mere association with the Internet seems enough to provide a firm with a large and permanent value increase.” [p. 2371]

Cooper, M., H. Gulen, and P. Rau. 2005. "Changing Names with Style: Mutual Fund Name Changes and Their Effects on Fund Flows." *Journal of Finance*, vol. 60, no. 6 (December):2825–2858.

"We examine whether mutual funds change their names to take advantage of current hot investment styles, and what effects these name changes have on inflows to the funds, and to the funds' subsequent returns. We find that the year after a fund changes its name to reflect a current hot style, the fund experiences an average cumulative abnormal flow of 28%, with no improvement in performance. The increase in flows is similar across funds whose holdings match the style implied by their new name and those whose holdings do not, suggesting that investors are irrationally influenced by cosmetic effects." [p. 2825]

Coval, J., and T. Shumway. 2005. "Do Behavioral Biases Affect Prices?" *Journal of Finance*, vol. 60, no. 1 (February):1–34.

"Recently, numerous studies espousing theories from experimental psychology have attempted to explain asset-pricing anomalies. The empirical evidence, however, is fraught with conflicting findings because many of the behavioral theories rely on biases that are quite different from each other. This article studies the trading behavior of Chicago Board of Trade traders and directly tests for biases in their behavior and for the impact of such biases on asset prices. Findings show that traders are highly loss averse and that losing traders actively purchase contracts at higher prices and sell contracts at lower prices than those that prevailed previously. However, price changes as a result of the behavior of loss-averse traders are reversed more quickly than those set by 'unbiased' traders." [abstract written by Chenchuramaiah T. Bathala, *CFA Digest*, November 2005, p. 68]

Daniel, K., D. Hirshleifer, and A. Subrahmanyam. 1998. "Investor Psychology and Security Market Under- and Overreactions." *Journal of Finance*, vol. 53, no. 6 (December):1839–1885.

"The authors propose a theory of security market under- and overreactions based on two well-known psychological biases: investor overconfidence and biased self-attribution. Their theory implies that investors overreact to private information signals and underreact to public information signals. The authors show that short-run positive return autocorrelations can be a result of continuing overreaction. These short-run effects, however, must eventually be followed by a long-run correction. Thus, short-run positive autocorrelations can be consistent with long-run negative autocorrelations." [abstract written by Stephen E. Wilcox, *CFA Digest*, Spring 1999, p. 69]

Daniel, K., D. Hirshleifer, and S. Teoh. 2002. "Investor Psychology in Capital Markets: Evidence and Policy Implications." *Journal of Monetary Economics*, vol. 49, no. 1 (January):139–209.

"We review extensive evidence about how psychological biases affect investor behavior and prices. Systematic mispricing probably causes substantial resource misallocation. We argue that limited attention and overconfidence cause investor credulity about the strategic incentives of informed market participants. However, individuals as political participants remain subject to the biases and self-interest they exhibit in private settings. Indeed, correcting contemporaneous market pricing errors is probably not government's relative advantage. Government and private planners should establish rules ex ante to improve choices and efficiency, including disclosure, reporting, advertising, and default-option-setting regulations. Especially, government should avoid actions that exacerbate investor biases." [p. 139]

De Bondt, W., and R. Thaler. 1985. "Does the Stock Market Overreact?" *Journal of Finance*, vol. 40, no. 3 (July):793–808.

"Research in experimental psychology suggests that, in violation of Bayes' rule, most people tend to 'overreact' to unexpected and dramatic news events. This study of market efficiency investigates whether such behavior affects stock prices. The empirical evidence, based on CRSP monthly return data, is consistent with the overreaction hypothesis. Substantial weak form market inefficiencies are discovered. The results also shed new light on the January returns earned by prior 'winners' and 'losers.' Portfolios of losers experience exceptionally large January returns as late as five years after portfolio formation." [p. 793]

Doukas, J., and D. Petmezas. 2007. "Acquisitions, Overconfident Managers and Self-Attribution Bias." *European Financial Management*, vol. 13, no. 3 (June):531–577.

"We examine whether acquisitions by overconfident managers generate superior abnormal returns and whether managerial overconfidence stems from self-attribution. Self-attribution bias suggests that overconfidence plays a greater role in higher order acquisition deals predicting lower wealth effects for higher order acquisition deals. Using two alternative measures of overconfidence (1) high order acquisition deals and (2) insider dealings we find evidence supporting the view that average stock returns are related to managerial overconfidence. Overconfident bidders realise lower announcement returns than rational bidders and exhibit poor long-term performance. Second, we find that managerial overconfidence stems from self-attribution bias. Specifically, we find that high-order acquisitions (five or more deals within a three-year period) are associated with lower wealth effects than low-order acquisitions (first deals). That is, managers tend to credit the initial success to their own ability and therefore become overconfident and engage in more deals. In our analysis we control for endogeneity of the decision to engage in high-order acquisitions and find evidence that does not support the self-selection of excessive acquisitive firms. Our analysis is robust to the influence of merger waves, industry shocks, and macroeconomic conditions." [p. 531]

Dreman, D., and M. Berry. 1995. "Overreaction, Underreaction, and the Low-P/E Effect." *Financial Analysts Journal*, vol. 51, no. 4 (July/August):21–30.

"Although earnings surprises have been studied extensively, they have not been examined in the context of contrarian strategies. Positive and negative earnings surprises affect 'best' (high-P/E) and 'worst' (low-P/E) stocks in an asymmetric manner that favors worst stocks. Long-term reversion to the mean, in which worst stocks display above-market returns while best stocks show below-market results, regardless of the sign of the surprise, continues for at least 19 quarters following the news. These results are consistent with mispricing (overreaction to events) prior to the surprise, and a corrective price movement after the surprise is consistent with extant research on underreaction. The mispricing-correction hypothesis explains the superior returns of contrarian strategies noted here and elsewhere in the literature." [p. 21]

Elton, E., M. Gruber, and J. Busse. 2004. "Are Investors Rational? Choices among Index Funds." *Journal of Finance*, vol. 59, no. 1 (February):261–288.

"S&P 500 index funds represent one of the simplest vehicles for examining rational behavior. They hold virtually the same securities, yet their returns differ by more than 2 percent per year. Although the relative returns of alternative S&P 500 funds are easily predictable, the relationship between cash flows and performance is weaker than rational behavior would lead us to expect. We show that selecting funds based on low expenses or high past returns outperforms the portfolio of index funds selected by investors. Our results exemplify the fact that, in a market where arbitrage is not possible, dominated products can prosper." [p. 261]

Fama, E. 1998. "Market Efficiency, Long-Term Returns, and Behavioral Finance." *Journal of Finance*, vol. 49, no. 3 (September):283–306.

"In studies of long-term stock return anomalies, overreaction to new information is as common as underreaction, and postevent continuation is as frequent as postevent reversal. This finding is consistent with market efficiency. Many of the apparent anomalies disappear when a different model of normal returns or different statistical method is used. Taken together, the studies of return anomalies do not provide reason to reject market efficiency." [abstract written by Johann de Villiers, *CFA Digest*, February 2000, p. 62]

Frazzini, A., and O. Lamont. Forthcoming 2008. “Dumb Money: Mutual Fund Flows and the Cross-Section of Stock Returns.” *Journal of Financial Economics*.

“We use mutual fund flows as a measure of individual investor sentiment for different stocks, and find that high sentiment predicts low future returns. Fund flows are dumb money—by reallocating across different mutual funds, retail investors reduce their wealth in the long run. This dumb money effect is related to the value effect: high sentiment stocks tend to be growth stocks. High sentiment also is associated with high corporate issuance, interpretable as companies increasing the supply of shares in response to investor demand.”

Garvey, R., and A. Murphy. 2004. “Are Professional Traders Too Slow to Realize Their Losses?” *Financial Analysts Journal*, vol. 60, no. 4 (July/August):35–43.

“Data on a U.S. proprietary stock-trading team provide evidence of the tendency of traders to hold on to their losers too long and sell their winners too soon—that is, the ‘disposition effect.’ The group of traders studied earned more than \$1.4 million in intraday trading profits, but they realized their winning trades at a much faster rate than their losing trades. This tendency lowered their profitability. When the traders limited their risk exposure by trading in small share sizes, in low-priced stocks, or during periods of low volatility, the discrepancy between losing and winning holding times rose. An analysis of intraday prices suggests that traders could increase trading profits by holding winners longer and selling losers sooner.” [p. 35]

Gemmill, G., and D. Thomas. 2002. “Noise Trading, Costly Arbitrage, and Asset Prices: Evidence from Closed-End Funds.” *Journal of Finance*, vol. 57, no. 6 (December):2571–2594.

“If arbitrage is costly and noise traders are active, asset prices may deviate from fundamental values for long periods of time. We use a sample of 158 closed-end funds to show that noise-trader sentiment, as proxied by retail-investor flows, leads to fluctuations in the discount. Nevertheless, we reject the hypothesis that noise-trader risk is the cause of the long-run discount. Instead we find that funds which are more difficult to arbitrage have larger discounts, due to: (1) the censoring of the discount by the arbitrage bounds, and (2) the freedom of managers to increase charges when arbitrage is costly.” [p. 2571]

Goyal, A., and S. Wahal. Forthcoming 2008. “The Selection and Termination of Investment Managers by Plan Sponsors.” *Journal of Finance*.

The authors document the tendency for pension trustees to terminate the contracts of recently underperforming fund managers and replace them with managers who have recently outperformed. Analysis of the results of these switches shows that, on average, the trustees would have done better to stay with the existing managers. This suggests trustees assume that a manager with positive past performance is representative of a manager who will do well in the future, even though the evidence does not support such an assumption.

Grinblatt, M., and B. Han. 2005. “Prospect Theory, Mental Accounting, and Momentum.” *Journal of Financial Economics*, vol. 78, no. 2 (November):311–339.

“The tendency of some investors to hold on to their losing stocks, driven by prospect theory and mental accounting, creates a spread between a stock’s fundamental value and its equilibrium price, as well as price underreaction to information. Spread convergence, arising from the random evolution of fundamental values and the updating of reference prices, generates predictable equilibrium prices interpretable as possessing momentum. Empirically, a variable proxying for aggregate unrealized capital gains appears to be the key variable that generates the profitability of a momentum strategy. Controlling for this variable, past returns have no predictability for the cross-section of returns.” [p. 311]

Haigh, M., and J. List. 2005. "Do Professional Traders Exhibit Myopic Loss Aversion? An Experimental Analysis." *Journal of Finance*, vol. 60, no. 1 (February):523–534.

"Two behavioral concepts, loss aversion and mental accounting, have been combined to provide a theoretical explanation of the equity premium puzzle. Recent experimental evidence supports the theory, as students' behavior has been found to be consistent with myopic loss aversion (MLA). Yet, much like certain anomalies in the realm of riskless decision-making, these behavioral tendencies may be attenuated among professionals. Using traders recruited from the CBOT, we do indeed find behavioral differences between professionals and students, but rather than discovering that the anomaly is muted, we find that traders exhibit behavior consistent with MLA to a *greater* extent than students." [p. 523]

Hirshleifer, D. 2001. "Investor Psychology and Asset Pricing." *Journal of Finance*, vol. 56, no. 4 (August):1533–1597.

"The basic paradigm of asset pricing is in vibrant flux. The purely rational approach is being subsumed by a broader approach based upon the psychology of investors. In this approach, security expected returns are determined by both *risk* and *misvaluation*. This survey sketches a framework for understanding decision biases, evaluates the a priori arguments and the capital market evidence bearing on the importance of investor psychology for security prices, and reviews recent models." [p. 1533]

Hirshleifer, D., and T. Shumway. 2003. "Good Day Sunshine: Stock Returns and the Weather." *Journal of Finance*, vol. 58, no. 3 (June):1009–1032.

"Research indicates that sunlight affects mood and that mood affects how individuals evaluate future prospects. The authors examine whether sunlight affects stock prices on 26 exchanges around the world. In both individual and pooled regressions, stock returns are negatively affected by cloudiness. The 'sunshine effect' is not attributable to adverse weather conditions, such as rain and snow, and is robust to various econometric specifications. The authors develop a trading strategy that generates improved Sharpe ratios, but the introduction of modest transaction costs erodes this improvement. Rather, the more important finding is that mood can affect security prices." [abstract written by Stephen M. Horan, *CFA Digest*, November 2003, p. 44]

Hodgson, T., S. Breban, C. Ford, M. Streatfield, and R. Urwin. 2000. "The Concept of Investment Efficiency and Its Application to Investment Management Structures." *British Actuarial Journal*, vol. 6, no. 3:451–545.

"Investment efficiency is a function of the risk, return and total cost of an investment management structure, subject to the fiduciary and other constraints within which investors must operate. Institutional investors implement their investment policies through investment management structures. In this paper the aim is to enhance the investment management structure by broadening the financial objectives, by recognising the effect of behavioural issues and by incorporating governance constraints. We therefore suggest that investment efficiency should be considered as a combination of financial efficiency and non-financial efficiency.

Modern portfolio theory had a revolutionary effect on portfolio construction. In the same way, we believe that investment management structures should be constructed in a more disciplined and quantitative manner. In this paper we outline the quantitative and qualitative methods by which these structures can be developed. The proposed new framework for designing investment management structures seeks to optimise net information ratios while simultaneously recognising the level of regret risk facing fiduciaries, minimising non-financially-productive behavioural biases and taking account of the resources available to the fiduciary to monitor these structures." [p. 451]

Hong, H., and J. Stein. 1999. "A Unified Theory of Underreaction, Momentum Trading, and Overreaction in Asset Markets." *Journal of Finance*, vol. 54, no. 6 (December):2143–2184.

"We model a market populated by two groups of boundedly rational agents: 'newswatchers' and 'momentum traders.' Each newswatcher observes some private information, but fails to extract other newswatchers' information from prices. If information diffuses gradually across the population, prices underreact in the short run. The underreaction means that the momentum traders can profit by trend-chasing. However, if they can only implement simple (i.e., univariate) strategies, their attempts at arbitrage must inevitably lead to overreaction at long horizons. In addition to providing a unified account of under- and overreactions, the model generates several other distinctive implications." [p. 2143]

Hong, H., J. Kubik, and J. Stein. 2005. "Thy Neighbor's Portfolio: Word-of-Mouth Effects in the Holdings and Trades of Money Managers." *Journal of Finance*, vol. 60, no. 6 (December):2801–2824.

"A mutual fund manager is more likely to buy (or sell) a particular stock in any quarter if other managers in the same city are buying (or selling) that same stock. This pattern shows up even when the fund manager and the stock in question are located far apart, so it is distinct from anything having to do with local preference. The evidence can be interpreted in terms of an epidemic model in which investors spread information about stocks to one another by word of mouth." [p. 2801]

Huberman, G. 2001. "Familiarity Breeds Investment." *Review of Financial Studies*, vol. 14, no. 3 (Fall):659–680.

"Shareholders of a Regional Bell Operating Company (RBOC) tend to live in the area which it serves, and an RBOC's customers tend to hold its shares rather than other RBOCs' equity. The geographic bias of the RBOC investors is closely related to the general tendency of households' portfolios to be concentrated, of employees' tendency to own their employers' stocks in their retirement accounts, and to the home country bias in the international arena. Together, these phenomena provide compelling evidence that people invest in the familiar while often ignoring the principles of portfolio theory." [p. 659]

Huberman, G., and W. Jiang. 2006. "Offering versus Choice in 401(k) Plans: Equity Exposure and Number of Funds." *Journal of Finance*, vol. 61, no. 2 (April):763–801.

"Records of over half a million participants in more than 600 401(k) plans indicate that participants tend to allocate their contributions evenly across the funds they use, with the tendency weakening with the number of funds used. The number of funds used, typically between three and four, is not sensitive to the number of funds offered by the plans, which ranges from 4 to 59. A participant's propensity to allocate contributions to equity funds is not very sensitive to the fraction of equity funds among offered funds. The paper also comments on limitations on inferences from experiments and aggregate-level data analysis." [p. 763]

Jegadeesh, N., and S. Titman. 1993. "Returns to Buying Winners and Selling Losers: Implications for Stock Market Efficiency." *Journal of Finance*, vol. 48, no. 1 (March):65–91.

"This paper documents that strategies which buy stocks that have performed well in the past and sell stocks that have performed poorly in the past generate significant positive returns over 3- to 12-month holding periods. We find that the profitability of these strategies are not due to their systematic risk or to delayed stock price reactions to common factors. However, part of the abnormal returns generated in the first year after portfolio formation dissipates in the following two years. A similar pattern of returns around the earnings announcements of past winners and losers is also documented." [p. 65]

Kahneman, D., and A. Tversky. 1979. "Prospect Theory: An Analysis of Decisions under Risk." *Econometrica*, vol. 47, no. 2 (March):263–291.

"This paper presents a critique of expected utility theory as a descriptive theory 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.

An alternative theory of choice is presented in which value is assigned to gains and losses rather than 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." [p. 263]

Kamstra, M., L. Kramer, and M. Levi. 2003. "Winter Blues: A SAD Stock Market Cycle." *American Economic Review*, vol. 93, no. 1 (March):324–343.

The authors analyze stock market index data from a variety of countries and find evidence that seasonal variation of daylight across countries influences investor sentiment, risk tolerance, and stock returns. This is consistent with evidence from psychology that seasonal affective disorder (SAD) is associated with exposure to fewer hours of daylight during the winter months.

Kumar, A., and C. Lee. 2006. "Retail Investor Sentiment and Return Comovements." *Journal of Finance*, vol. 61, no. 5 (October):2451–2486.

"Using a database of more than 1.85 million retail investor transactions over 1991–1996, we show that these trades are systematically correlated—that is, individuals buy (or sell) stocks in concert. Moreover, consistent with noise trader models, we find that systematic retail trading explains return comovements for stocks with high retail concentration (i.e., small-cap, value, lower institutional ownership, and lower-priced stocks), especially if these stocks are also costly to arbitrage. Macroeconomic news and analyst earnings forecast revisions do not explain these results. Collectively, our findings support a role for investor sentiment in the formation of returns." [p. 2451]

Kurz, M. 1997. "Endogenous Uncertainty: A Unified View of Market Volatility." Stanford University Working Paper.

The author discusses the rational belief equilibria whereby economic agents cannot know the processes generating fundamental values and hence will inevitably make mistakes in valuing securities. Market volatility will be affected not only by volatility in fundamentals but also by volatility in the sentiment of market participants.

Lakonishok, J., A. Shleifer, and R. Vishny. 1994. "Contrarian Investment, Extrapolation, and Risk." *Journal of Finance*, vol. 49, no. 5 (December):1541–1578.

"For many years, scholars and investment professionals have argued that value strategies outperform the market. These value strategies call for buying stocks that have low prices relative to earnings, dividends, book assets, or other measures of fundamental value. While there is some agreement that value strategies produce higher returns, the interpretation of why they do so is more controversial. This article provides evidence that value strategies yield higher returns because these strategies exploit the suboptimal behavior of the typical investor and not because these strategies are fundamentally riskier." [p. 1541]

Lamont, O., and R. Thaler. 2003. "Can the Market Add and Subtract? Mispricing in Tech Stock Carve-Outs." *Journal of Political Economy*, vol. 111, no. 2 (April):227–267.

"Recent equity carve-outs in U.S. technology stocks appear to violate a basic premise of financial theory: identical assets have identical prices. In our 1998–2000 sample, holders of a share of company A are expected to receive x shares of company B, but the price of A is less than x times the price of B. A prominent example involves 3Com and Palm. Arbitrage does not eliminate this blatant mispricing due to short-sale constraints, so that B is overpriced but expensive or impossible to sell short. Evidence from options prices shows that shorting costs are extremely high, eliminating exploitable arbitrage opportunities." [p. 227]

Lee, C., and B. Swaminathan. 2000. "Price Momentum and Trading Volume." *Journal of Finance*, vol. 55, no. 5 (October):2017–2069.

"The authors study past trading volume to see how reliably it can predict future returns for price-momentum portfolios. They also look into the information contained in trading volume to determine its usefulness as a proxy for liquidity. The authors investigate whether a company is relatively under- or over-valued, whether connections to earnings announcements exist, and whether a link to existing behavioral models is evident. Finally, the authors introduce their own momentum life cycle model to help explain a stock's movement through periods of under- and overvaluation and its concurrent changes in trading volume." [abstract written by John P. Rathnam, *CFA Digest*, May 2001, p. 18]

Ljungqvist, A., and W. Wilhelm. 2005. "Does Prospect Theory Explain IPO Market Behavior?" *Journal of Finance*, vol. 60, no. 4 (August):1759–1790.

"We derive a behavioral measure of the IPO decision-maker's satisfaction with the underwriter's performance based on Loughran and Ritter (2002) and assess its ability to explain the decision-maker's choice among underwriters in *subsequent* securities offerings. Controlling for other known factors, IPO firms are less likely to switch underwriters when our behavioral measure indicates they were satisfied with the IPO underwriter's performance. Underwriters also extract higher fees for subsequent transactions involving satisfied decision-makers. Although our tests suggest that the behavioral model has explanatory power, they do not speak directly to whether deviations from expected utility maximization determine patterns in IPO initial returns." [p. 1759]

Loughran, T., and J. Ritter. 2002. "Why Don't Issuers Get Upset about Leaving Money on the Table in IPOs?" *Review of Financial Studies*, vol. 15, no. 2 (Special Issue):413–444.

"The authors examine why issuers and underwriters are willing to price initial public offerings (IPOs) at a discount to market price. Prospect theory is used to explain issuer behavior. Issuers become risk averse once they determine that sufficient money will be earned from the IPO, so they stop bargaining for higher prices. The increase in share price also makes each issuer wealthier, so issuers are less concerned about lost equity. Underwriters, likewise, are content to leave money on the table because the indirect fees received from investor clients are greater than the underwriting fees associated with a higher IPO price." [abstract written by Lorne J. Zeiler, *CFA Digest*, August 2002, p. 17]

Madrian, B., and D. Shea. 2001. "The Power of Suggestion: Inertia in 401(k) Participation and Savings Behavior." *Quarterly Journal of Economics*, vol. 116, no. 4 (November):1149–1187.

"This paper analyzes the impact of automatic enrollment on 401(k) savings behavior. We have two key findings. First, 401(k) participation is significantly higher under automatic enrollment. Second, a substantial fraction of 401(k) participants hired under automatic enrollment retain both the default contribution rate and fund allocation even though few employees hired before automatic enrollment picked this particular outcome. This 'default' behavior appears to result from participant inertia and from employee perceptions of the default as investment advice. These findings have implications for the design of 401(k) savings plans as well as for any type of Social Security reform that includes personal accounts over which individuals have control. They also shed light more generally on the importance of both economic and noneconomic (behavioral) factors in the determination of individual savings behavior." [p. 1149]

Malmendier, U., and G. Tate. 2005. "CEO Overconfidence and Corporate Investment." *Journal of Finance*, vol. 60, no. 6 (December):2661–2700.

"We argue that managerial overconfidence can account for corporate investment distortions. Overconfident managers overestimate the returns to their investment projects and view external funds as unduly costly. Thus, they overinvest when they have abundant internal funds, but curtail investment when they require external financing. We test the overconfidence hypothesis, using panel data on personal portfolio and corporate investment decisions of Forbes 500 CEOs. We classify CEOs as overconfident if they persistently fail to reduce their personal exposure to company-specific risk. We find that investment of overconfident CEOs is significantly more responsive to cash flow, particularly in equity-dependent firms." [p. 2661]

Mitchell, M., T. Pulvino, and E. Stafford. 2002. "Limited Arbitrage in Equity Markets." *Journal of Finance*, vol. 57, no. 2 (April):551–584.

"The authors examine 82 situations in which the market value of a company is less than the market value of its subsidiary in order to study the risks and market frictions that prevent arbitrageurs from immediately forcing prices to fundamental values. For 30 percent of the sample, the link between the parent and its subsidiary ends before the mispricing ends. The authors conclude that margin requirements and other frictions substantially limit arbitrage." [abstract written by Michael G. Sher, *CFA Digest*, November 2002, p. 70]

Oberlechner, T. 2007. *The Psychology of Ethics in the Finance and Investment Industry*. Charlottesville, VA: Research Foundation of CFA Institute.

"Financial and investment professionals are particularly vulnerable to ethical wrongdoing. But what makes some blatantly violate ethical standards and even break the law while others behave highly ethically? This monograph sheds light on the psychology behind ethical and unethical behavior. It explores fascinating psychological insights into the characteristics of unethical personalities and the role of nonconscious attitudes in unethical decisions. It examines how group processes, leadership, and organizational reward systems can turn otherwise ethical persons into unethical persons, and it demonstrates how rationalization tactics, moral disengagement, and impression management are used to psychologically justify or conceal unethical actions. Fortunately, as the author shows, psychology also provides the key to a genuine ethics in the financial and investment industry." [Research Foundation abstract]

Odean, T. 1998. "Are Investors Reluctant to Realize Their Losses?" *Journal of Finance*, vol. 53, no. 5 (October):1775–1798.

"The author examines the behavior of individual investors and finds that they realize their profitable stock investments at a much higher rate than their unprofitable ones, except in December. He also finds that tax-motivated selling is most evident in December." [abstract written by Roger Ignatius, *CFA Digest*, Spring 1999, p. 44]

———. 1999. "Do Investors Trade Too Much?" *American Economic Review*, vol. 89, no. 5 (December):1279–1298.

Odean provides evidence that investors with discount brokerage accounts trade too much and reduce their returns by doing so. Investors not only incur high trading costs, but the stocks the investors buy also do less well than those they sell. The excess trading is attributed to overconfidence.

Prentice, R. 2007. "Ethical Decision Making: More Needed Than Good Intentions." *Financial Analysts Journal*, vol. 63, no. 6 (November/December):17–30.

"The flourishing field of behavioral finance indicates that people often do not engage in optimal decision making when investing. The same cognitive biases and mental heuristics that cause suboptimal investing may also cause people to make unethical decisions. For that reason, good intentions are necessary, but they are not sufficient for finance professionals who desire to act ethically. Insights presented in this article can assist the well-intentioned to do the right thing in difficult circumstances." [p. 17]

Rabin, M. 2002. "Inference by Believers in the Law of Small Numbers." *Quarterly Journal of Economics*, vol. 117, no. 3 (August):775–816.

"People exaggerate the degree to which small samples resemble the population from which they are drawn. To model this belief in the 'Law of Small Numbers,' I assume that a person exaggerates the likelihood that a short sequence of i.i.d. signals resembles the long-run rate at which those signals are generated. Such a person believes in the 'gambler's fallacy,' thinking that early draws of one signal increase the odds of next drawing other signals. When uncertain about the rate, the person overinfers from short sequences of signals that the rate is more extreme than it is, and consequently infers that there is more variation in these rates among different sources than there is. Economic applications are discussed, such as how the model predicts that investors will believe in nonexistent variation in the quality of mutual-fund managers." [p. 775]

Roll, R. 1986. "The Hubris Hypothesis of Corporate Takeovers." *Journal of Business*, vol. 59, no. 2 (April):197–216.

The author argues that hubris ("overconfidence" in the terminology of behavioral finance) on the part of individual decision makers in bidding companies can explain why bidding companies often pay too much for targets and experience poor subsequent returns. This is an application of the idea of the winner's curse, in which the winner in an auction is often the bidder who overpays.

Sethi-Iyengar, S., W. Jiang, and G. Huberman. 2004. "How Much Choice Is Too Much? Determinants of Individual Contributions in 401(k) Retirement Plans." In *Pension Design and Structure: New Lessons from Behavioral Finance*. Edited by O. Mitchell and S. Utkus. Oxford: Oxford University Press.

The authors document an inverse relationship between the number of fund choices available in a 401(k) pension plan and the take-up rate among eligible employees. They argue that this is consistent with the notion that choice confuses many members and that it is possible to offer too much choice.

Shefrin, H. 2000. *Beyond Greed and Fear: Understanding Behavioral Finance and the Psychology of Investing*. Boston: Harvard Business School Press.

———. 2001. "Behavioral Corporate Finance." *Journal of Applied Corporate Finance*, vol. 14, no. 3 (Fall):113–126.

This article discusses the implications of behavioral finance for managers of corporations. Using case studies of Sony, Syntex Corporation, and 3Com, the author discusses the implications of behavioral biases of the managers themselves and how managers should respond to behavioral biases in analysts and investors.

Shefrin, H., and M. Statman. 1985. "The Disposition to Sell Winners Too Early and Ride Losers Too Long: Theory and Evidence." *Journal of Finance*, vol. 40, no. 3 (July):777–790.

"One of the most significant and unique features in Kahneman and Tversky's approach to choice under uncertainty is aversion to loss realization. This paper is concerned with two aspects of this feature. First, we place this behavior pattern into a wider theoretical framework concerning a general disposition to sell winners too early and hold losers too long. This framework includes other elements, namely mental accounting, regret aversion, self-control, and tax considerations. Second, we discuss evidence which suggests that tax considerations alone cannot explain the observed patterns of loss and gain realization, and that the patterns are consistent with a combined effect of tax considerations and the three other elements of our framework. We also show that the concentration of loss realizations in December is not consistent with fully rational behavior, but is consistent with our theory." [p. 777]

———. 1995. “Making Sense of Beta, Size, and Book-to-Market.” *Journal of Portfolio Management*, vol. 21, no. 2 (Winter):26–34.

The authors show that the types of companies perceived to be good long-term investments in the annual *Fortune* magazine survey are large companies with low book-to-market ratios. The empirical evidence is that such companies actually tend to be poor long-term investments.

———. 2000. “Behavioral Portfolio Theory.” *Journal of Financial and Quantitative Analysis*, vol. 35, no. 2 (June):127–151.

“We develop a positive behavioral portfolio theory (BPT) and explore its implications for portfolio construction and security design. The optimal portfolios of BPT investors resemble combinations of bonds and lottery tickets, consistent with Friedman and Savage’s (1948) observation. We compare the BPT efficient frontier with the mean-variance efficient frontier and show that, in general, the two frontiers do not coincide. Optimal BPT portfolios are also different from optimal CAPM portfolios. In particular, the CAPM two-fund separation does not hold in BPT. We present BPT in a single mental account version (BPT-SA) and a multiple mental account version (BPT-MA). BPT-SA investors integrate their portfolios into a single mental account, while BPT-MA investors segregate their portfolios into several mental accounts. BPT-MA portfolios resemble layered pyramids, where layers are associated with aspirations. We explore a two-layer portfolio where the low aspiration layer is designed to avoid poverty while the high aspiration layer is designed for a shot at riches.” [p. 127]

Shiller, R. 2003. *The New Financial Order: Risk in the 21st Century*. Princeton, NJ: Princeton University Press.

Shleifer, A., and R. Vishny. 1997. “The Limits of Arbitrage.” *Journal of Finance*, vol. 52, no. 1 (March):35–55.

“Textbook arbitrage in financial markets requires no capital and entails no risk. In reality, almost all arbitrage requires capital, and is typically risky. Moreover, professional arbitrage is conducted by a relatively small number of highly specialized investors using other people’s capital. Such professional arbitrage has a number of interesting implications for security pricing, including the possibility that arbitrage becomes ineffective in extreme circumstances, when prices diverge far from fundamental values. The model also suggests where anomalies in financial markets are likely to appear, and why arbitrage fails to eliminate them.” [p. 35]

———. 2003. “Stock Market Driven Acquisitions.” *Journal of Financial Economics*, vol. 70, no. 3 (December):295–311.

“We present a model of mergers and acquisitions based on stock market misvaluations of the combining firms. The key ingredients of the model are the relative valuations of the merging firms and the market’s perception of the synergies from the combination. The model explains who acquires whom, the choice of the medium of payment, the valuation consequences of mergers, and merger waves. The model is consistent with available empirical findings about characteristics and returns of merging firms, and yields new predictions as well.” [p. 295]

Statman, M. 1999a. “Behavioral Finance: Past Battles and Future Engagements.” *Financial Analysts Journal*, vol. 55, no. 6 (November/December):18–27.

“Market efficiency is at the center of the battle of standard finance versus behavioral finance versus investment professionals. But the battle is not joined because the term ‘market efficiency’ has two meanings. One meaning is that investors cannot systematically beat the market. The other is that security prices are rational. Rational prices reflect only utilitarian characteristics, such as risk, not value-expressive characteristics, such as sentiment. Behavioral finance has shown, however, that value-expressive characteristics matter in both investor choices and asset prices. Therefore, the discipline of finance would do well to accept the first meaning of market efficiency and reject the notion that security prices are rational. We could then stop fighting the market efficiency battle and focus on exploring (1) asset-pricing models that reflect both value-expressive and utilitarian characteristics and (2) the benefits, both utilitarian and value expressive, that investment professionals provide to investors.” [p. 18]

———. 1999b. “Foreign Stocks in Behavioral Portfolios.” *Financial Analysts Journal*, vol. 55, no. 2 (March/April):12–16.

“By the rules of mean–variance and the example of the global equity market, foreign stocks should be attractive to U.S. investors, so why are investors so apprehensive about foreign stocks?” [p. 12]

———. 2004. “The Diversification Puzzle.” *Financial Analysts Journal*, vol. 60, no. 4 (July/August):44–53.

“The levels of diversification in U.S. investors’ equity portfolios present a puzzle. Today’s optimal level of diversification, measured by the rules of mean–variance portfolio theory, exceeds 300 stocks, but the average investor holds only 3 or 4 stocks. The diversification puzzle can be solved, however, in the context of behavioral portfolio theory. In behavioral portfolio theory, investors construct their portfolios as layered pyramids in which the bottom layers are designed for downside protection and the top layers are designed for upside potential. Risk aversion gives way to risk seeking at the uppermost layer as the desire to avoid poverty gives way to the desire for riches. But what motivates this behavior is the aspirations of investors, not their attitudes toward risk. Some investors fill the uppermost layer with the few stocks of an undiversified portfolio; others fill it with lottery tickets. Neither lottery buying nor undiversified portfolios are consistent with mean–variance portfolio theory, but both are consistent with behavioral portfolio theory.” [p. 44]

Statman, M., K. Fisher, and D. Anginer. 2008. “Affect in a Behavioral Asset-Pricing Model.” *Financial Analysts Journal*, vol. 64, no. 2 (March/April):20–29.

“Stocks, like houses, cars, watches, and other products, exude ‘affect’—that is, they are considered good or bad, beautiful or ugly; they are admired or disliked. Affect plays an overt role in the pricing of houses, cars, and watches, but according to standard financial theory, it plays no role in the pricing of financial assets. This article outlines a behavioral asset-pricing model in which expected returns are high not only when objective risk is high but also when subjective risk is high. High subjective risk comes with negative affect. Investors prefer stocks with positive affect, which boosts the prices of such stocks and depresses their returns.” [p. 20]

Subrahmanyam, A. 2008. “Behavioral Finance: A Review and Synthesis.” *European Financial Management*, vol. 14, no. 1 (January):12–29.

This paper is another comprehensive review that covers evidence on stock returns, evidence on how investors trade, and behavioral research in corporate finance.

Taffler, R., J. Lu, and A. Kausar. 2004. “In Denial? Stock Market Underreaction to Going–Concern Audit Report Disclosures.” *Journal of Accounting and Economics*, vol. 38, no. 1–3 (December):263–296.

“We investigate the stock price reaction to UK going–concern audit report disclosures in the calendar year subsequent to publication. Over this period our firm population underperforms by between 24% and 31% depending on the benchmark adopted. This market underreaction to such an unambiguous bad news release is not a post-earnings announcement drift phenomenon; it is also robust to other potentially confounding explanations. However, whatever the reasons for such stock mispricing, we find costly arbitrage prevents rational investors forcing prices back into line with fundamental value. Our results have implications for the market’s ability to impound bad news appropriately and the incompleteness of arbitrage in such small ‘loser’ firm situations.” [p. 263]

Tetlock, P. 2007. "Giving Content to Investor Sentiment: The Role of Media in the Stock Market." *Journal of Finance*, vol. 62, no. 3 (June):1139–1168.

"This study examines the influence of media on the stock market. Using the *Wall Street Journal's* 'Abreast of the Market' column, the author constructs a measure called Pessimism Media Factor (PMF) and uses it to predict the stock market performance, prices, and volume. The evidence shows that high media pessimism leads to a temporary negative impact on returns that is subsequently reversed. The study also predicts high trading volume when media pessimism is unusually high or low." [abstract written by Chenchuramaiah T. Bathala, *CFA Digest*, November 2007, p. 56]

Thaler, R. 1999. "The End of Behavioral Finance." *Financial Analysts Journal*, vol. 55, no. 6 (November/December):12–17.

"The controversy surrounding behavioral finance is dying out as scholars accept it as simply a new way of doing financial economic research." [p. 12]

Wood, A. 2006. "Behavioral Finance and Investment Committee Decision Making." *CFA Institute Conference Proceedings Quarterly*, vol. 23, no. 4 (December):29–37.

"Committees are a fact of life in the business world, and managing committee dynamics to enhance decision making is a challenging task, with the responsibility for ensuring committee effectiveness typically being the purview of the committee chair. A thorough understanding of the behavioral biases of individuals as they interact in a group, such as a committee, requires that the committee chair proactively neutralize both the behavioral and social obstacles that impede a committee's successful achievement of its goals." [p. 29]

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This publication qualifies for 1 CE credit.