

# The Finance Professionals Post

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## Whither Efficient Markets? Efficient Market Theory and Behavioral Finance

The notion of efficient markets has been the subject of rigorous academic research and intense debate for more than a century. As early as 1889, George Rutledge Gibson wrote in *The Stock Exchanges of London, Paris, and New York* that when “shares become publicly known in an open market, the value which they acquire may be regarded as the judgment of the best intelligence concerning them.” But it wasn’t until the mid 1960s, through the independent work of MIT economist Paul A. Samuelson and Eugene Fama, then a PhD candidate at the University of Chicago, that the efficient markets hypothesis (EMH) gained widespread acceptance.

Fama defined an efficient market as a market: (1) with a large numbers of rational profit maximizers actively competing against each other to predict future market values of individual securities; and (2) in which important current information is almost freely available to all participants. “In an efficient market, on the average, competition will cause the full effects of new information on intrinsic values to be reflected *instantaneously* in actual prices” (Fama 1965).

The theory that stock prices instantaneously adjust to reflect new information leads to the view that stock prices are unpredictable and follow a random walk. “If the flow of information is unimpeded and immediately reflected in stock prices, then tomorrow’s price change will reflect only tomorrow’s news and will be independent of the price changes today. Since news is, by definition, unpredictable, the resulting price changes also must be unpredictable,” Burton G. Malkiel, professor of economics at Princeton, explains in a 2003 paper.

In his groundbreaking paper, “Efficient Capital Markets: A Review of Theory and Empirical Work,” Fama proposed three types of efficiency:

- **Weak form** efficiency asserts that current securities prices fully reflect all information contained in past price movements. Therefore, future prices cannot be predicted by analyzing past prices. According to Clarke et al (2001), “security prices are arguably the most public as well as the most easily available pieces of information. Thus, one should not be able to profit from using something that ‘everybody else knows.’”
- **Semi strong-form** efficiency holds that share prices fully reflect all the relevant publicly available information. This includes not only past price movements but also data contained in published financial reports and filings, such as earnings and dividend announcements, technological breakthroughs, resignations of directors, and announced mergers. The semistrong-form of efficiency implies that there is no advantage to be gained from analyzing publicly available information after it has been released, because the market has already absorbed it into the price.

- **Strong-form** efficiency asserts that all relevant information, including that which is privately held, is reflected in the share price. Here the focus is on insider trading, in which a few privileged individuals (for example directors) are able to trade in shares, as they know more than the normal investor in the market. In a strong-form efficient market even insiders are unable to make abnormal profits.

In its purest form, the EMH obviates active portfolio management, calling in to question the very motivation for portfolio research. The theory's crucial implication—that it's impossible to beat the market—is the logic underlying index funds. An index fund relies on a passively managed portfolio of securities to closely track an index, such as the Standard & Poor's 500, while saving transactions costs and management fees.

Fama's efficient markets hypothesis was subject to rigorous testing in the late 1960s and 1970s. By 1975 the preponderance of evidence supported the view that securities markets were efficient. "There is no other proposition in economics which has more solid empirical evidence supporting it than the efficient markets hypothesis," Harvard economist Michael Jensen (1978) wrote.

But even as EMH gained dominance, academics and practitioners continued to debate its merits. By 1978 a significant body of research documented profitable selection rules based on publicly available information, such as the tendency for stocks with low price earnings ratios and high dividend yields to outperform the market and the incremental returns in excess of the amount needed to compensate for the additional risk of small capitalization stocks.

But the most persistent challenge to Fama's efficient markets hypothesis has come in the last 30 years from the growing field of behavioral finance—the branch of finance and economics that applies research from the fields of psychology, sociology, and, more recently neuroscience to understanding investor behavior.

Behavioral finance takes issue with two crucial implications of the EMH: (1) that the majority of investors make rational decisions based on available information; and (2) that the market price is always right. Proponents of behavioral finance believe that numerous factors—irrational as well as rational—drive investor behavior. In sharp contrast to EMH theorists, behaviorists believe that investors frequently make irrational decisions and that the market price is not always a fair estimate of the underlying value.

Some proponents of behavioral finance believe it's possible to capitalize on the pricing inefficiencies caused by investors' behavioral biases and have designed investment strategies to do that. To cite a few examples, legendary speculator George Soros has made a fortune by taking the other side of trades driven by investors' fear and panic. And David Dreman, chairman and chief investment officer of Jersey City-based Dreman Value Management, has long focused on exploiting equity analysts' tendency to overreact to news—both good and bad.

Still, many proponents of behavioral finance agree with at least one implication of the efficient market theory—that it's not possible to reliably earn abnormal returns. "One usually can't capitalize on the pricing anomalies," says Jay Ritter, professor of finance at the University of Florida.

Over the last 30 years, research on how investors make decisions has led to a large body of literature documenting the systematic errors in human thinking that predispose investors toward irrational investment decisions. Chief among the human cognitive biases is the pervasive human tendency to be overconfident. “People think they know more than they do,” Shiller says. “Overconfidence appears to be a fundamental factor in promoting the high volume of trade we observe in speculative markets,” he says. If traders were completely rational, half would believe they are below average and would be unwilling to enter into speculative trades with the other half.

There are many other human cognitive biases that cause investors to make systematic errors which fuel their tendency toward irrational exuberance and its polar opposite—fear and pessimism. Among these biases are:

- **Representativeness:** This explains the human tendency to make judgments by looking for familiar patterns and assuming that future patterns will resemble past ones, often without thinking about the reasons for the patterns in the first place.
- **Confirmation Bias:** This aspect of human behavior explains the tendency for people to actively seek information that supports their existing beliefs and to underweight information that runs counter to their views.
- **Quantitative Anchors:** Psychologists have demonstrated that people tend to make decisions based on whatever information is available at hand, leading to the human tendency to overweight the recent past. In making judgments about stock prices, the most likely anchor is the recently remembered price.
- **Moral Anchors or Stories:** Stories play a big role in driving the stock market. Stories provide investors with easy-to-grasp reasons to justify their investment decisions. As Shiller notes, those who sell stocks to the general public often tend to tell a story about the company and its product, omitting many facts—such as price, future earnings, and dividends—pertinent to a rational analysis of the stock’s merit.
- **Herd Behavior and Information Cascade:** Herd behavior is a key characteristic of every speculative bubble. It occurs when investors follow the majority view or believe authorities even when they plainly contradict matter-of-fact judgment.

Behaviorists assert that taken to the extreme, investors’ irrational tendencies, coupled with amplification and feedback mechanisms lead to destructive cycles of boom and bust and cite the 1998 to 2000 boom in Internet stocks and the more recent housing boom—and their sharp reversals—as evidence.

Not surprisingly, the debate between proponents of EMH and behavioral finance reached a fevered pitch in the 1990s, as an increasing number of market observers perceived the boom in Internet stocks as evidence of both investors’ irrationality and the fact that market prices stray far from fundamental value.

Stocks with no earnings whatsoever were selling at sky-high multiples. As an example, Shiller cites the case of eToys.com, a start-up Internet toy retailer which shortly after its 1999 initial public offering had a stock value of \$8 billion;

fiscal 1998 sales of \$30 million; and profits equal to negative \$28.6 million. In comparison, Toys “R” Us had a stock value of only \$6 billion—despite fiscal 1998 sales of \$11.6 billion, 400 times larger than that of eToys.com, and positive profits equal to \$376 million.

“In conventional, classical economics there is no real place for bubbles or manias,” says Tim Lee, author of *Why the Markets Went Crazy*.

Of course, the housing boom, its reversal, and the resulting financial crisis have added much fuel to the fire. Behaviorists see investors’ failure to accurately account for low probability risks as further evidence of their tendency toward irrational exuberance. “The market as a whole made a conceptual mistake in underestimating the possibility of a big downturn in the housing market,” says Ritter. Ritter explains that the market was operating under the (erroneous) assumption that just because there had never been a significant decline in housing prices (unadjusted for inflation) in the past, it would not happen in the future.

Many efficient market theorists and behaviorists alike, however, are quick to disagree that the housing boom was fueled by an irrational assessment of risk. Simon Gervais, associate professor of finance at the Fuqua School of Business at Duke University—a “cautious behaviorist,” in his own words, says that for behavioral biases to affect the economy as a whole, a large number of agents must simultaneously exhibit the exact same behavioral biases, while other investors are unable to identify the behavior and take the opposite position.” This wasn’t the case during the housing crisis, according to Gervais. He believes it’s possible that the majority of homeowners were affected by the similar behavioral biases when they chose to obtain the mortgage loans. But he says it’s unlikely the actions of bankers, brokers, rating agencies, institutional traders, and money managers were driven by irrational thinking.

Gervais, as well many other economists—from both the behaviorist and EMH camps—believe the factors responsible for the recent financial crisis are more closely associated with traditional economic theory. “The housing bubble was fueled by people following rational incentives,” Gervais says.

“Smart investors know that financial models are only as good as the assumptions that are fed into them,” says John Cochrane, professor of finance at the Booth School of Business at the University of Chicago. He believes the executives at the firms that invested heavily in the high-yielding collateralized debt obligations (CDOs) that led to the financial crisis were aware of the risk exposures accumulating on the company’s books. They rationally chose to assume the risk because they were being paid to take it. “The firms that invested in these securities were making huge profits because they were, in effect, writing earthquake insurance,” Cochrane says.

Lee also believes that financial institutions loaded up on high-yielding CDOs for purely rational reasons. “They were operating with the belief that, in a worst case scenario, governments would step in to avert a crisis.”

In the aftermath of the financial crisis, some critics have blamed investors and regulators’ blind faith in efficient markets as the cause. “The incredibly inaccurate efficient market theory [caused] a lethally dangerous combination of asset bubbles, lax controls, pernicious incentives, and wickedly complicated

instruments [that] led to our current plight,” market strategist Jeremy Grantham wrote in an October 2009 letter to shareholders.

Not so fast, say efficient markets theorists—and many other economists and financial market scholars. “The fact that yields on the [mortgage backed derivatives] were high despite their investment grade rating indicated that the market was rightly suspicious of the quality of the securities, and this should have served as a warning to prospective buyers,” Wharton School finance professor Jeremy Siegel wrote in the Wall Street Journal (2009).

One does not have to be an economist to make the prediction that the debate between behaviorists and efficient markets theorists will not end any time soon. Still, there are several points at which the two schools intersect. One is the recognition that the efficient markets hypothesis is among the most important contributions to modern finance. “It permeates and pervades everything we do in finance,” says Lo. Behaviorists also believe that efficient markets are the ideal to which we must strive. “If investors could learn to use behaviorists’ ideas to prevent themselves from succumbing to psychologically induced errors, we would wind up exactly where the efficient markets school predicts—with markets being efficient,” says Santa Clara University’s Shefrin.

“The efficient markets theory is not wrong; it’s just incomplete,” says MIT’s Lo. It tells only half the story—how markets behave under the right conditions. Lo explains that research has identified the one condition under which large groups are more likely to make a rational decision. That condition is a certain degree of independence among the individuals that comprise the group. “To have the wisdom of crowds, you need a broad and diverse a set of market participants without any single participated becoming too big or influential,” he adds. When the members of the group have different motivations; work independently; gather and analyze a lot information; and generate different ideas, the mistakes people make cancel out, and the aggregate estimate tends to be very accurate, Lo says.

Conversely, when the condition of independence is violated—that is, when all members of a group think exactly alike—the aggregate estimate tends to be inaccurate. “When everybody thinks exactly the same way and has the same information and motivations; we see, in lieu of the wisdom of crowds, the madness of mobs,” Lo says. Underlying the herd-like behavior is one of two emotions: greed or fear. “An extreme amount of greed or fear always leads to mob-like behavior,” Lo says. Greed can make the majority of investors want to buy the same group of stocks, like Internet stocks. On the other hand, fear of losing money causes everyone to pull their money out of the market at once.

Regardless of whether one subscribes to the efficient market theory or not, most observers agree that creating the conditions that promote the *wisdom of crowds* must become a top priority for investors, policymakers, regulators, governments, and central bankers. The precise role of each of these stakeholders, however, is the subject of an even larger academic debate.