

The Efficient Market Hypothesis: Rational Expectations in Financial Markets

While the theory of rational expectations was being developed by monetary economists, financial economists were developing a parallel theory of expectation formation in financial markets. It led them to the same conclusion as that of the rational expectations theorists: Expectations in financial markets are equal to optimal forecasts using all available information.

Although financial economists gave their theory another name, calling it *the efficient market hypothesis*, in fact their theory is just an application of rational expectations to the pricing of securities. The efficient market hypothesis is based on the assumption that prices of securities in financial markets fully reflect all available information.

An **efficient capital market** is one in which security prices adjust rapidly to the arrival of new information and, therefore, the current prices of securities reflect all information about the security.

Why should capital markets be efficient?

Set of assumptions that imply an efficient capital market

1. A large number of profit maximizing participants analyze and value securities, each independently of the others.
2. New information regarding securities comes to the market in a random fashion, and the timing of one announcement is generally independent of others.
3. The third assumption is especially crucial: profit-maximizing investors adjust security prices rapidly to reflect the effect of new information. Although the price adjustment may be imperfect, it is unbiased. This means that sometimes the market will over adjust and other times it will under adjust, but you cannot predict which will occur at any given time. Security prices adjust rapidly because of the many profit-maximizing investors competing against one another.

The combined effect of (2) information coming in a random, independent, unpredictable fashion and (3) numerous competing investors adjusting stock prices rapidly to reflect this new information means that one would expect price changes to be **independent and random**. Most of the early work related to efficient capital markets was based on this *random walk hypothesis*, which contended that changes in stock prices occurred randomly. Fama formalized the theory and organized the growing empirical evidence as discussed below.

Alternative efficient market hypotheses

Fama divided the overall efficient market hypothesis (EMH) and the empirical tests of the hypothesis into three sub- hypotheses depending on the information set involved:

(1) Weak-form EMH,

(2) Semi- strong-form EMH, and

(3) Strong-form EMH.

The **weak-form EMH** assumes that current stock prices fully reflect all historical security market information, including the historical sequence of prices, rates of return, trading volume data, and other market-generated information, such as odd-lot transactions, block trades, and transactions by exchange specialists. Because it assumes that current market prices already reflect all past returns and any other security market information, this hypothesis implies that past rates of return and other historical market data should have no relationship with future rates of return (that is, rates of return should be independent). Therefore, this hypothesis contends that you should gain little from using any trading rule that decides whether to buy or sell a security based on past rates of return or any other past market data (This is a vindication to the *Technical analysts- Chartists*).

The **semi strong-form EMH** asserts that security prices adjust rapidly to the release of all public information; that is, current security prices fully reflect all public information. The semi strong hypothesis encompasses the weak-form hypothesis, because all the market information considered by the weak-form hypothesis, such as stock prices, rates of return, and trading volume, is public. Public information also includes all nonmarket information, such as earnings and dividend announcements, price-to-earnings (P/E) ratios, dividend-yield (D/P) ratios, price book value (P/BV) ratios, stock splits, news about the economy, and political news. This hypothesis implies that investors who base their decisions on any important new information after it is public should not derive above-average risk-adjusted profits from their transactions, considering the cost of trading because the security price already reflects all such new public information.

The **strong-form EMH** contends that stock prices fully reflect all information from public and private sources. This means that no group of investors has monopolistic access to information relevant to the formation of prices. Therefore, this hypothesis contends that no group of investors should be able to consistently derive above-average risk-adjusted rates of return. The strong form EMH encompasses both the weak-form and the semi strong-form EMH. Further, the strong form EMH extends the assumption of efficient markets, in which prices adjust rapidly to the release of new public information, to assume perfect markets, in which all information is cost free and available to everyone at the same time.

EVIDENCE ON THE EFFICIENT MARKET HYPOTHESIS

Evidence in Favor of Market Efficiency

1. Performance of Investment Analysts and Mutual Funds.

We have seen that one implication of the efficient market hypothesis is that when purchasing a security, you cannot expect to earn an abnormally high return, a return greater than the equilibrium return. This implies that it is impossible to beat the market. Many studies shed light on whether investment advisers and mutual funds (some of which charge steep sales commissions to people who purchase them) beat the market.

Consistent with the efficient market hypothesis, mutual funds do not beat the market. Not only do mutual funds not outperform the market on average, but when they are separated into groups according to whether they had the highest or lowest profits in a chosen period, the mutual funds that did well in the first period do not beat the market in the second period.

The conclusion from the study of investment advisers and mutual fund performance is this: *Having performed well in the past does not indicate that an investment adviser or a mutual fund will perform well in the future.* This is not pleasing news to investment advisers, but it is exactly what the efficient market hypothesis predicts. It says that some advisers will be lucky and some will be unlucky. Being lucky does not mean that a forecaster actually has the ability to beat the market.

The *Wall Street Journal*, for example, has a regular feature called “Investment Dartboard” that compares how well stocks picked by investment advisers do relative to stocks picked by throwing darts. Do the advisers win? To their embarrassment, the dartboard beats them as often as they beat the dartboard. Furthermore, even when the comparison includes only advisers who have been successful in the past in predicting the stock market, the advisers still don’t regularly beat the dartboard.

2. Do Stock Prices Reflect Publicly Available Information?

The efficient market hypothesis predicts that stock prices will reflect all publicly available information. Thus if information is already publicly available, a positive announcement about a company will not, on average, raise the price of its stock because this information is already reflected in the stock price. Early empirical evidence confirms this conjecture from the efficient market hypothesis: Favorable earnings announcements or announcements of stock splits (a division of a share of stock into multiple shares, which is usually followed by higher earnings) do not, on average, cause stock prices to rise.

3. Random-Walk Behavior of Stock Prices.

The term **random walk** describes the movements of a variable whose future changes cannot be predicted (are random) because, given today’s value, the variable is just as likely to fall as to rise. An important implication of the efficient market hypothesis is that stock prices should approximately follow a random walk; that is, *future changes in stock prices should, for all practical purposes, be unpredictable.* The random-walk implication of the efficient market hypothesis is the one most commonly mentioned in the press, because it is the most readily comprehensible to the public. In fact, when people mention the “random walk theory of stock prices,” they are in reality referring to the efficient market hypothesis. It has generally been confirmed that stock prices are not predictable and follow a random walk.

4. Technical Analysis.

A popular technique used to predict stock prices, called *technical analysis*, is to study past stock price data and search for patterns such as trends and regular cycles. Rules for when to buy and sell stocks are then established on the basis of the patterns that emerge. The

efficient market hypothesis suggests that technical analysis is a waste of time. The simplest way to understand why is to use the random walk result derived from the efficient market hypothesis that holds that past stock price data cannot help predict changes. Therefore, technical analysis, which relies on such data to produce its forecasts, cannot successfully predict changes in stock prices. Tests conducted discredit technical analysis: It does not outperform the overall market.

Evidence against Market Efficiency

1. Small-firm effect.

One of the earliest reported anomalies in which the stock market did not appear to be efficient is called the *small-firm effect*. Many empirical studies have shown that small firms have earned abnormally high returns over long periods of time, even when the greater risk for these firms has been taken into account.

2. January Effect.

Over long periods of time, stock prices have tended to experience an abnormal price rise from December to January that is predictable and hence inconsistent with random-walk behavior.

3. Market Overreaction.

Recent research suggests that stock prices may overreact to news announcements and that the pricing errors are corrected only slowly. When corporations announce a major change in earnings—say a large decline—the stock price may overshoot, and after an initial large decline, it may rise back to more normal levels over a period of several weeks. This violates the efficient market hypothesis, because an investor could earn abnormally high returns, on average, by buying a stock immediately after a poor earnings announcement and then selling it after a couple of weeks when it has risen back to normal levels.

4. Excessive Volatility.

A phenomenon closely related to market overreaction is that the stock market appears to display *excessive volatility*; that is, fluctuations in stock prices may be much greater than is warranted by fluctuations in their fundamental value. In an important paper, Robert Shiller of Yale University found that fluctuations in the S&P 500 stock index could not be justified by the subsequent fluctuations in the dividends of the stocks making up this index. There has been much subsequent technical work criticizing these results, but Shiller's work, along with research finding that there are smaller fluctuations in stock prices when stock markets are closed, has produced a consensus that stock market prices appear to be driven by factors other than fundamentals.

5. Mean Reversion.

Some researchers have also found that stock returns display **mean reversion**: Stocks with low returns today tend to have high returns in the future, and vice versa. Hence stocks that have done poorly in the past are more likely to do well in the future, because mean reversion indicates that there will be a predictable positive change in the future price, suggesting that stock prices are not a random walk.

6. The Neglected-Firm Effect and Liquidity Effects

Arbel and Strebel gave another interpretation of the small-firm-in-January effect. Because small firms tend to be neglected by large institutional traders, information about smaller firms is less available. This information deficiency makes smaller firms riskier investments that command higher returns. “Brand-name” firms, after all, are subject to considerable monitoring from institutional investors, which promises high-quality information, and presumably investors do not purchase “generic” stocks without the prospect of greater returns. As evidence for the neglected-firm effect, Arbel²⁶ divided firms into highly researched, moderately researched, and neglected groups based on the number of institutions holding the stock. The January effect was in fact largest for the neglected firms.

CAUSES OF MARKET INEFFICIENCY/ ANOMALIES

- **Insider trading**

This occurs when investors seek to obtain additional information from relatives or friends who could be working for the corporation in which they intend to purchase securities upfront. Such investors end up receiving information earlier than other investors in the market.

- **Taxation effect**

Companies that are required to pay tax are likely to report lower profits compared to those required not to pay taxes. Hence, investors may end up over valuing companies that don't pay taxes while undervaluing the security prices of those companies that pay taxes.

- **Small company effect**

Research conducted suggests that security prices of small companies tend to be undervalued, and vice versa.

AND SO, ARE MARKETS EFFICIENT?

There is a telling joke about two economists walking down the street. They spot a Ksh. 500 note on the sidewalk. One starts to pick it up, but the other one says, “Don't bother; if the note were real someone would have picked it up already.”

The lesson is clear. An overly doctrinaire belief in efficient markets can paralyze the investor and make it appear that no research effort can be justified. This extreme view is probably

unwarranted. There are enough anomalies in the empirical evidence to justify the search for underpriced securities that clearly goes on.

The bulk of the evidence, however, suggests that any supposedly superior investment strategy should be taken with many grains of salt. The market is competitive *enough* that only differentially superior information or insight will earn money; the easy pickings have been picked. In the end it is likely that the margin of superiority that any professional manager can add is so slight that the statistician will not easily be able to detect it.

We conclude that markets are very efficient, but that rewards to the especially diligent, intelligent, or creative may in fact be waiting.

Food for thought: Case for discussion

Most studies on mutual funds performance conclude that fund managers cannot consistently exceed the average return in the stock market as a whole. Why might you expect this result? Why then would investors be interested in buying unit trusts from mutual funds?