Early evidence on the efficient market hypothesis was quite favorable to it. In recent years, however, deeper analysis of the evidence suggests that the hypothesis may not always be entirely correct. Let’s first look at the earlier evidence in favor of the hypothesis and then examine some of the more recent evidence that casts some doubt on it.

EVIDENCE IN FAVOR OF MARKET EFFICIENCY

Evidence in favor of market efficiency has examined the performance of investment analysts and mutual funds, whether stock prices reflect publicly available information, the random-walk behavior of stock prices, and the success of technical analysis.

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. One common test that has been performed is to take buy and sell recommendations from a group of advisers or mutual funds and compare the performance of the resulting selection of stocks with the market as a whole. Sometimes the advisers’ choices have even been compared to a group of stocks chosen by throwing darts at a copy of the financial page of the newspaper tacked to a dartboard. The Wall Street Journal, for example, used to have a regular feature called “Investment Dartboard” that compared how well stocks picked by investment advisers did relative to stocks picked by throwing darts. Did the advisers win? To their embarrassment, the dartboard beat them as often as they beat the dartboard. Furthermore, even when the comparison included only advisers who had been successful in the past in predicting the stock market, the advisers still didn’t regularly beat the dartboard.

Consistent with the efficient market hypothesis, mutual funds also 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.¹

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.

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 also confirmed 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.²

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.

The case for random-walk stock prices can be demonstrated. Suppose that people could predict that the price of Happy Feet Corporation (HFC) stock would rise 1% in the coming week. The predicted rate of capital gains and rate of return on HFC stock would then exceed 50% at an annual rate. Since this is very likely to be far higher than the equilibrium rate of return on HFC stock (R^of + R^*), the efficient market hypothesis indicates that people would immediately buy this stock and bid up its current price. The action would stop only when the predictable change in the price dropped to near zero so that R^of = R^*.
Similarly, if people could predict that the price of HFC stock would fall by 1%, the predicted rate of return would be negative ($R^f + R'$), and people would immediately sell. The current price would fall until the predictable change in the price rose back to near zero, where the efficient market condition again holds. The efficient market hypothesis suggests that the predictable change in stock prices will be near zero, leading to the conclusion that stock prices will generally follow a random walk.\(^3\)

Financial economists have used two types of tests to explore the hypothesis that stock prices follow a random walk. In the first, they examine stock market records to see if changes in stock prices are systematically related to past changes and hence could have been predicted on that basis. The second type of test examines the data to see if publicly available information other than past stock prices could have been used to predict changes. These tests are somewhat more stringent because additional information (money supply growth, government spending, interest rates, corporate profits) might be used to help forecast stock returns. Early results from both types of tests generally confirmed the efficient market view 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.

Two types of tests bear directly on the value of technical analysis. The first performs the empirical analysis described earlier to evaluate the performance of any financial analyst, technical or otherwise. The results are exactly what the efficient market hypothesis predicts: Technical analysts fare no better than other financial analysts; on average, they do not outperform the market, and successful past forecasting does not imply that their forecasts will outperform the market in the future. The second type of test takes the rules developed in technical analysis for when to buy and sell stocks and applies

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\(^{3}\)Note that the random-walk behavior of stock prices is only an approximation derived from the efficient market hypothesis. It would hold exactly only for a stock for which an unchanged price leads to its having the equilibrium return. Then, when the predictable change in the stock price is exactly zero, $R^f = R'$.

\(^{4}\)The first type of test, using only stock market data, is referred to as a test of weak-form efficiency, because the information that can be used to predict stock prices is restricted to past price data. The second type of test is referred to as a test of semistrong-form efficiency, because the information set is expanded to include all publicly available information, not just past stock prices. A third type of test is called a test of strong-form efficiency, because the information set includes insider information, known only to the managers (directors) of the corporation, such as when they plan to declare a high dividend. Strong-form tests do sometimes indicate that insider information can be used to predict changes in stock prices. This finding does not contradict the efficient market hypothesis, because the information is not available to the market and hence cannot be reflected in market prices. In fact, there are strict laws against using insider information to trade in financial markets. For an early survey on the three forms of tests, see Eugene F. Fama, “Efficient Capital Markets: A Review of Theory and Empirical Work,” *Journal of Finance* 25 (1970): 383–416.
them to new data. The performance of these rules is then evaluated by the profits that would have been made using them. These tests also discredit technical analysis: It does not outperform the overall market.

**APPLICATION**

**Should Foreign Exchange Rates Follow a Random Walk?**

Although the efficient market hypothesis is usually applied to the stock market, it can also be used to show that foreign exchange rates, like stock prices, should generally follow a random walk. To see why this is the case, consider what would happen if people could predict that a currency would appreciate by 1% in the coming week. By buying this currency, they could earn a greater than 50% return at an annual rate, which is likely to be far above the equilibrium return for holding a currency. As a result, people would immediately buy the currency and bid up its current price, thereby reducing the expected return. The process would stop only when the predictable change in the exchange rate dropped to near zero so that the optimal forecast of the return no longer differed from the equilibrium return. Likewise, if people could predict that the currency would depreciate by 1% in the coming week, they would sell it until the predictable change in the exchange rate was again near zero. The efficient market hypothesis therefore implies that future changes in exchange rates should, for all practical purposes, be unpredictable; in other words, exchange rates should follow random walks. This is exactly what empirical evidence finds.

**Evidence Against Market Efficiency**

All the early evidence supporting the efficient market hypothesis appeared to be overwhelming, causing Eugene Fama, a prominent financial economist, to state in his famous 1970 survey of the empirical evidence on the efficient market hypothesis, “The evidence in support of the efficient markets model is extensive, and (somewhat uniquely in economics) contradictory evidence is sparse.” However, in more recent years, the hypothesis has begun to show a few cracks, referred to as anomalies, and empirical evidence indicates that the efficient market hypothesis may not always be generally applicable.

**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.

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even when the greater risk for these firms has been taken into account. The small-firm effect seems to have diminished in recent years, but is still a challenge to the efficient market hypothesis. Various theories have been developed to explain the small-firm effect, suggesting that it may be due to rebalancing of portfolios by institutional investors, tax issues, low liquidity of small-firm stocks, large information costs in evaluating small firms, or an inappropriate measurement of risk for small-firm stocks.

**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. This so-called **January effect** seems to have diminished in recent years for shares of large companies but still occurs for shares of small companies. Some financial economists argue that the January effect is due to tax issues. Investors have an incentive to sell stocks before the end of the year in December, because they can then take capital losses on their tax return and reduce their tax liability. Then when the new year starts in January, they can repurchase the stocks, driving up their prices and producing abnormally high returns. Although this explanation seems sensible, it does not explain why institutional investors such as private pension funds, which are not subject to income taxes, do not take advantage of the abnormal returns in January and buy stocks in December, thus bidding up their price and eliminating the abnormal returns.

**MARKET OVERREACTION**

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.

**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 are warranted by fluctuations in their fundamental value. In an

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10 Another anomaly that makes the stock market seem less than efficient is that the Value Line Survey, one of the most prominent investment advice newsletters, has produced stock recommendations that have yielded abnormally high returns on average. See Fischer Black, “Yes, Virginia, There Is Hope: Tests of the Value Line Ranking System,” *Financial Analysts Journal* 29 (September–October 1973): 10–14; and Gur Huberman and Shmuel Kandel, “Market Efficiency and Value Line’s Record,” *Journal of Business* 63 (1990): 187–216. Whether the excellent performance of the Value Line Survey will continue in the future is, of course, a question mark.

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.\textsuperscript{12}

**MEAN REVERSION**

Some researchers have also found that stock returns display \textit{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. Other researchers have found that mean reversion is not nearly as strong in data after World War II and so have raised doubts about whether it is currently an important phenomenon. The evidence on mean reversion remains controversial.\textsuperscript{13}

**NEW INFORMATION IS NOT ALWAYS IMMEDIATELY INCORPORATED INTO STOCK PRICES**

Although it is generally found that stock prices adjust rapidly to new information, as is suggested by the efficient market hypothesis, evidence suggests that, inconsistent with the efficient market hypothesis, stock prices do not instantaneously adjust to profit announcements. Instead, on average, stock prices continue to rise for some time after the announcement of unexpectedly high profits, and they continue to fall after surprisingly low profit announcements.\textsuperscript{14}


OVERVIEW OF THE EVIDENCE ON THE EFFICIENT MARKET HYPOTHESIS

As you can see, the debate on the efficient market hypothesis is far from over. The evidence seems to suggest that the efficient market hypothesis may be a reasonable starting point for evaluating behavior in financial markets. However, there do seem to be important violations of market efficiency that suggest that the efficient market hypothesis may not be the whole story and so may not be generalizable to all behavior in financial markets.