

# Analysis of the efficient market hypothesis



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The Efficient Market Hypothesis (EMH), one of the most prominent conjectures in finance, emerged in the 1950s due to early application of computers in analysis of time-series behavior of economic variables. A vast body of research literature on this problem has been produced since the first studies attributed to Kendall (1953). The first articles dealing with market efficiency generally were supportive of the idea that securities are priced rationally and stock prices reflect all available at the moment information. However, with the development of advanced econometric techniques and powerful computers a new breed of literature emerged: researchers started to produce evidence debunking the EMH. Nevertheless, despite significant success in finding anomalies which clash with the EMH this great idea has remained to be a hypothesis since neither supporters nor opponents could produce reliable enough evidence to finally confirm or reject it. This essay elaborates on the question of validity of the EMH and shows that there is no simple answer which could end the debate about market efficiency.

There are three forms of the EMH that are usually tested by researchers: weak form, semi-strong form and strong form. The main difference between them is contained in the information which can be used to predict future price movements of the stock. The weak form of market efficiency states that past prices do not have any influence on the current prices. In other words, it is impossible to use past price information to predict future prices since all this information is already reflected in the prices. The semi-strong form of market efficiency takes into account, besides past information about prices, publicly available information, i. e. financial reports, public announcements etc. And finally, the strong-form of market efficiency states

that all available information, including that of insiders, is reflected in prices and, therefore, cannot be useful in price forecasting. Thus, usually researchers specify which type of market efficiency they test as the methods used are different. Fama (1991) presents a slightly different categorization of tests of market efficiency: tests for return predictability, event studies and tests for private information. However, all these tests have one purpose - to find out if that is possible to develop profitable strategies based on the different kind of information which could produce significant abnormal returns. If the answer to this question is " yes" then opponents of the EMH obtain additional advantage in the debate about the EMH. On the other hand, the results testifying to validity of the EMH are generally regarded as common and do not get significant public attention.

Before proceeding to critical evaluation of the particular anomalies which are supposed to refute the EMH it can be useful to consider general shortcomings of the tests employed in these procedures. First of all, all tests of market efficiency are based on a particular model which is used to predict normal returns. This leads to the joint-hypothesis problem, i. e. it is impossible to determine whether the obtained results are due to real market inefficiency or just reflect poorly specified model for normal returns. Second, the data-mining problem is especially pronounced in the tests of market efficiency. In other words, for every reported profitable strategy there can be dozens of unprofitable strategies which were not reported due to the fact that they did not produce any sensational result. And finally, all theoretical findings should be tested practically in order to determine the real income which can be generated on the basis of theoretical strategies. Otherwise,

even very profitable strategy can be an artifact due to factors that remained unaccounted during the research.

The strong form of market efficiency has become the weakest form in terms of the number of its supporters. It is generally believed that insiders can use their information to earn significant profits from trading. Jaffe (1974) finds that insiders have information that is not reflected in the stock prices.

Moreover, he documents that outsiders can profit from the publicly available information on insider's trading up to 8 months after this information was released to the general public. However, Seyhun (1986), while confirming that insiders can use inside information to make significant profits, does not confirm that outsiders can earn significant abnormal returns using publicly available information on insider's trading. He argues that Jaffe used misspecified model for normal returns. Another type of studies of the strong form of market efficiency tests whether professional portfolio managers have access to private information. First evidence (Jensen 1969) testifies to the strong form of market efficiency and suggests that managers do not have access to private information as returns to investors in funds in 1945-1964 turn out to be 1% below the market line. On the other hand, Ippolito (1989) states that during 1965-1984 mutual funds outperformed the market line by 0.83% on average every year. This evidence, however, is not confirmed by the tests of the performance of pension funds and endowment funds. More recent evidence (Malkiel 2003) shows that for the twenty years ending December 31, 2001, the average actively managed large capitalization mutual fund performed worse than Standard & Poor's 500 large cap index by 2% annually. Therefore, it is not clear whether the EMH hypothesis can be

refuted with respect to the strong form of market efficiency as various tests demonstrate different answers to this question.

Tests of the semi-strong form of market efficiency are accomplished by means of event studies. This type of studies gives the cleanest picture of market efficiency since if the event date can be clearly specified and new information has a significant effect on prices, the models of normal returns do not influence the result to the extent observed in other forms of market efficiency studies. The opponents of the EMH believe that stock prices may underreact to new events. Therefore, purchasing (selling) stock when good (bad) information arrives at the market may produce significant abnormal returns (Gregory 1997). For instance, it is widely documented that companies accomplishing an IPO experience short-term overshooting and long-term negative performance. Another example is negative performance of bidding companies and positive performance of target companies during the process of mergers and acquisitions. These patterns, arguably, can be used to generate abnormal returns. However, as Fama (1998) demonstrates, the apparent underreaction to events is as common as overreaction and post-event continuation of abnormal returns is as frequent as post-event reversals. He also shows that the methods, long-term anomalies measured, play an important role since latter tend to disappear if reasonable changes are introduced in the test. Therefore, most of the anomalies discovered by researchers can be attributed to chance. It turns out that these anomalies do not allow investors to earn significant abnormal returns.

The studies of the weak form of market efficiency generally test the Random Walk (RW) hypothesis. According to this hypothesis, stock prices exhibit

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unpredictable behavior and the best estimate of tomorrow's price is today's price of the stock. Early studies in this area showed that prices indeed followed the RW and even if it were possible to find some predictability in price paths it would not be possible to exploit it in order to earn abnormal returns. Discovered patterns explained just up to 2% of the total variation of returns - not enough taking into account bid-ask spreads. More recent studies started to use other variables (dividends, earnings per share, term-structure variables) to explain variation in returns. However, even these studies obtained positive first-order autocorrelations of weekly returns at the level of 0.3 (Lo and MacKinlay 1988). Apparently, such low predictability power could not be used to make significant profits. Nevertheless, further research led to revelation of a number of anomalies. For instance, so-called "January effect" referred to the situation of abnormally generous returns on stocks of small companies during the first few days of January.

Unfortunately, when transaction costs were taken into account (which are substantially higher for small companies than for large corporations) it turned out that this effect could not be exploitable by ordinary investors. Moreover, the "January effect" was not pronounced every year. A number of other effects were discovered during the course of research. They, however, also were non-dependable and disappeared when transaction costs were accounted for.

Overall, it turns out that the idea of the EMH is still alive in spite of numerous facts that could refute it. The absence of the reliable theoretical model which could explain variation in normal returns does not allow one to be sure about discovered anomalies. Moreover, even anomalies which are strongly

pronounced disappear as more and more market participants find out about them. This fact testifies to validity of the EMH. This means that even when information is not reflected in prices at the particular moment, as time passes arbitrageurs use the opportunity to earn risk-free profits and gradually correct market. This correction may take a long time (as, for instance, the Internet-bubble of the 2000s) but eventually all prices come to their fair level.