

THE THEORY AND PRACTICE OF THE EFFICIENT CAPITAL MARKET HYPOTHESIS

В статті розглянуто основні тенденції розвитку гіпотези ефективного ринку, визначено її зміст і форми, проведено аналіз емпіричних тестів, практичного застосування та критики основ даної гіпотези.

Ключові слова: ефективний ринок, гіпотеза ефективного ринку, публічна інформація, фундаментальний аналіз, технічний аналіз, поведінкова теорія.

В статье рассматривается развитие гипотезы эффективного рынка, определяются ее содержание и основные формы, проводится анализ эмпирических тестов, практического применения и критики основ данной гипотезы.

Ключевые слова: эффективный рынок, гипотеза эффективного рынка, публичная информация, фундаментальный анализ, технический анализ, поведенческая теория.

Efficient market hypothesis, the stages of its development and forms are studied. The empirical tests, practical implication and critics of the EMH are discussed.

Keywords: efficient market, efficient market hypothesis, public information, fundamental analysis, technical analysis, behavioral finance.

Statement of the problem. The one of the most influential and criticized concept in financial economics today is the efficient market hypothesis (EMH). After the last global financial crisis it was blamed in underestimation of asset bubbles by market participants and overestimation of self-regulating abilities of financial markets by governments. However, many researches have provided supports for the basics of EMH pointing out that the fundamental problem is in practical implication of this concept by market agents.

The purpose of this paper is to provide the description of efficient market hypothesis and its forms, main stages of its development, to examine the EMH assumptions and their drawbacks and to assess the possibility of practical implication of EMH by summarizing and analyzing the previous theoretical and empirical studies.

Statement of basic material. In general, the efficient market hypothesis asserts that financial markets are efficient but what is an efficient market?

Efficient capital market is such a market in which prices for the different securities adjust very fast to the all incoming information and as a result current prices for those securities capture all possible information. Such markets are often called as informationally efficient markets. The presence of efficiency on capital markets are very important for individual and institutional investors and portfolio managers and have significant real world implications. Basically, for the investor this means if he buys at these informationally efficient prices he has to receive a rate of return that corresponds to the perceived risk of the stock and its current price will reflect this level of risk.

EMH is associated with the idea of a "random walk" of stock prices. This term is used in financial economics to describe price series where all future price changes represent random deviations from previous prices. The random walk concept is based on the idea that next day price changes will reflect only new information from tomorrow's news and will not depend on the stock prices changes today if the information is free and immediately reflected in asset prices. As a result, prices fully reflect all available public information, and even if investor just buy a diversified portfolio at market prices he will obtain a respective rate of return like the one that will be achieved by the experts.

According to some papers [4, p.2], the beginning of history of the efficient capital market hypothesis can be referred to 16th century when the Italian mathematician Girolamo Gardano wrote his "The book of Games of Chance" where he pointed out that "the most fundamental principle of all in gambling is simply equal conditions" [4, p.2]. Later, in 19th century many researches start to publish first description of the random walk and Brownian motion concepts. During the first half of 20th century economists started to talk about performance of investment profes-

sionals on stock market and their ability to forecast assets' prices. The publication by E. Fama his classic paper "Efficient Capital Markets: A Review of Theory and Empirical Work" where he has defined an efficient capital market was the highest point for the EMH development [5]. The origin of EMH is also traced to the second well-known economist – P. Samuelson who has independently developed the same basic notion of market efficiency from the different research agenda [6]. He came to the same idea of efficient markets through his interest in temporal pricing models of storable harvested commodities that are subject to decay. In contrast to Samuelson, Fama was primarily interested in measuring the statistical characteristics of stock prices, and in resolving the discussion between technical and fundamental analysis. After Fama's and Samuelson's research papers publications many others extended EMH framework in different directions including the incorporation of non-traded assets, heterogeneous investors, asymmetric information and transactions costs [7, p.3]. However, all those studies were based on the same grounds that individual investors have rational expectations, information is aggregated efficiently on the markets and market prices rapidly adjust to all publicly available information.

As all other hypothesis EMH grounds on a set of assumptions:

- there are a large number of an independent agents that analyze and value securities on the market in order to maximize their profit;
- all new information that is related to the securities, may impact their value and was known before is coming in a random way and cannot be predicted;
- profit-maximizing agents on the market will rapidly adjust prices of the assets to this new incoming information and this price adjust is assumed to be unbiased, i.e. nobody can predict at which moment prices will be overadjusted or underadjusted on the market.

According to R. Ball, the basic idea behind EMH is very simple and merges two main insights: 1) that competition enforces a correspondence between revenue and costs, so that any excessive profit will be reduced or eliminated by new entry; 2) changes in security prices are viewed as a function of the flow of information to the marketplace [1, p.9]. As a result competition among investors causes the return from using information to be commensurable with its costs [1, p.9].

Originally Fama distinguished three forms of efficient market hypothesis depending on the information set that is available to the wide set of market agents:

1. Weak-form efficient market hypothesis;
2. Semistrong-form efficient market hypothesis;
3. Strong-form efficient market hypothesis.

According to the weak form of the EMH information on the past movements of stock prices and volumes cannot be used by market participants to predict future stock prices because it assumes that current market prices already reflect all past returns and any other security market information (like trading volume data, odd-lot trading volume data, block trades, etc.) [2, p.89]. There were done two types of tests for the validity of this hypothesis: 1) statistical tests of interdependence between rates of returns; 2) comparison of risk-return results for trading rules based on past market information with a simple buy and hold strategy. There were drawn two conclusions by most of the researches with regard to the weak form of the EMH after the tests:

- it is a valid description of the market for anyone who is interested in developing profitable investment strategies from historical price or volume information;
- it does not support the basic assumption of technical analysis that future stock-price movements can be predicted from the diligent study of historical stock market information. As a result pure technician will not be able to make money by investigating market behavior of stocks [2, p.89].

The semistrong-form EMH assumes that assets prices will adjust very quickly to the new public information release each time it will be done; thus analysis of any publicly available information is meaningless because all such information is already reflected in stock prices [2, p.90]. The semistrong hypothesis contains in itself the weak-form hypothesis because all the market information considered by the weak-form EMH is public. According to semistrong-form of the EMH market analyst is not able to develop useful earning forecast because common practice to build projections of future earnings on their historical patterns has no value. There are already a lot of competent analysts on capital market that in general make accurately earnings forecasts. As a result unexpected changes in companies' earnings will be anticipated by the market and reflected in stock prices.

There were done two types of tests for the validity of this hypothesis: 1) studies that investigate how fast asset prices adjust to specific significant economic events; 2) studies that examine if it is possible to forecast future rates of return using additional public information that is beyond pure market information considered in weak-form tests. Semistrong-form of EMH was supported from the event studies but the mixed results have been received after the time-series studies on risk premium, calendar patterns, quarterly earnings surprises and cross-sectional stock predictors showed some nonefficiency [3, pp.78-79]. There were made two conclusions by most of the researches after the tests:

- in general it does not support the basic assumption of fundamental analysis that ones can predict stock prices future behavior using in his analysis "fundamental" factors;
- there are individual exceptions, like dividend changes and professional opinions on stock, to an efficient market setting.

According to the strong-form the efficient market hypothesis holds even when there are investors with privileged information or, stated another way, asset prices adjust rapidly to both public and private information. This means that no group of investors, even investors with privileged information, should be able to develop profitable investing strategies with above average rate of return. The strong-form hypothesis contains in itself both the weak and semi-strong forms of the EMH. There are two main assumptions according to this form of EMH: 1) there is a perfect capital market in which all information is free and available to everyone at the same time (i.e. no investors group has access to private information); 2) asset prices have to adjust rapidly to new public information. As one

might expect, this strong form EMH was not supported by the tests that analyzed returns for different investment groups, including corporate insiders, stock exchange specialists, professional money managers, etc. [3, pp.79-83].

At the beginning of 21st century efficient market hypothesis started to lose its popularity while many economists began to talk that asset prices can be somewhat predicted on the basis of their past patterns and some "fundamental" factors. One of the major thrusts to EMH backgrounds have been done by the behavioral finance. Advocates of behavioral finance have been studying a number of psychological traits and biases that negatively affects investors' performance. They pointed out that the standard model of rational and profit maximization behavior will not hold in certain cases and it is possible to make above the average rate of returns by trading on market agents' biases. The most commonly referred biases of market investors are:

- to sell bad assets too late and to sell good assets too early. This behavior was explained by prospect theory which states that investors' fear of losses is greater than their value gains;
- overconfidence in forecasts for growth companies. Analysts and many investors overestimate growth rates for growth companies because they put more attention on positive information and neglect negative information for these types of companies;
- confirmation bias that leads to stocks mispricing for the popular companies. This happens because investors usually are looking and paying more attention to those kinds of news that support their previous decisions;
- noise traders' effect on the volatility of close-end mutual funds. These nonprofessionals with no special information increase the volatility of securities during trading hours;
- escalation bias which describes that investors tend to put more money into a failure than into success because they feel responsible for their previous investment decision. Instead market participants have to investigate deeper the bad news and consider their negative impact during the valuation [3, p.83-84].

Main assumptions and statements of EMH that were the most criticized can be grouped in the next way:

1. One of the strongest criticisms was that market prices cannot reflect all the available information. For example, J. Stiglitz and S. Grossman pointed out that obtaining new information is time-consuming and costly. As a result, if someone can just rely on market prices why he would have to spend time and money looking for this information. If all investors will follow the same logic knowledge creation on capital markets will stop [7, pp.175-191]. However, looking deeper into this EMH assumption one would see that according to EMH if all investors act independently they will collect and analyze all possible information on the market and only after this assets prices on the market will be in equilibrium. But still EMH is limited by the assumptions that capital markets are costless to operate, i.e. there are no transaction costs, and that information processing or interpretation costs are very low. In reality, some pricing errors may not be fixed in the market because they are smaller than transaction costs required to correct them and in some cases interpretation of new information requires specialists with high-quality education and experience that also puts constraints on investors' ability to efficiently utilize new information.

2. Second group of critics is related to development of behavioral finance and evidence that sometimes investors make their decisions based on emotions, insufficient knowledge and lack of logic. These types of psychological factors will influence investors' decisions and security

prices. However, if one is looking for a long term investment strategies there is no way how he can reliably use any behavioral anomalies to make above the average rate of return. As was stated by Graham B. "while the stock in the short run market may be a voting mechanism, in the long run it is a weighting mechanism" [8, p.61].

3. It was also highlighted that one of the principal limitation of EMH is that it says nothing about the shapes of the distribution of assets' return. According to EMH if prices have already adjusted to the available information on the market, no future reaction to this news is necessary and market participants should not expect future price variability arising from that information [1, p.10]. However, the EMH does not say anything about the stationarity over time of returns distribution. In reality there is considerable evidence that risk is "non-stationary" to some degree, so the approach to calculate future risks entirely from recent historical data that is commonly used is misleading.

4. After the 2008 crisis a lot of researchers and politicians started to blame efficient market hypothesis in the lack of government regulation of financial markets during the latest decades. According to the 2009 report of the U.K.'s market regulator "the predominant assumption behind financial market regulation – in the US, the UK and increasingly across the world – has been that financial markets are capable of being both efficient and rational and that a key goal of financial market regulation is to remove the impediments which might produce inefficient and illiquid markets... In the face of the worst financial crisis for a century, however, the assumptions of efficient market theory have been subject to increasingly effective criticism, drawing on both theoretical and empirical arguments" [9, p.39-40]. According to the EMH it is very important to provide unimpeded access of reliable public information to all market agents because only in this case markets can do a good job in incorporating this information in assets prices. Holding this view, EMH would imply that market regulators have to ensure adequate and fair public disclosure. As have need noticed by Ball R. "if regulators had been true believers in efficiency, they would have been considerably more skeptical about some of the consistently high returns being reported by various financial institutions" [1, p.12]. Market regulators have to concentrate their attention more on supporting smooth information flow on the markets, properly and timely examination, investigation investing high-return and high-risky strategies that confirm or reject their legitimacy and promote the level of knowledge of the average investor.

In conclusion we would say that efficient market hypothesis is just the theoretical framework that under some assumptions describes the reality like many others do. In general it is somehow similar to another very popular theoretical framework today – innovative entrepreneurship theory that first was introduced by Schumpeter J. According to this theory the innovation and technological change of a national economy come from the entrepreneurs (small individuals or big companies) or wild spirits. Some of the entrepreneurs are committed to reformation; they will strive for innovations, like looking for new products, new methods in producing goods or develop new raw materials. Those innovative entrepreneurs who comes up with new ideas and puts them into practice according to the theory would be followed by other replicative entrepreneurs until there is an increase in investment. The impacts are increasing in

society's income and consumption. Some entrepreneurs who cannot compete with innovative entrepreneurs will subsequently fail in their business and lost their market and have to close their business. Taking into account the other microeconomic framework – the zero-profit theorem, according to which in the long-run all firms in a competitive environment will earn zero economic profits or average return ones can see the common line with EMH. The Zero-Profit Theorem states that entry into a competitive industry will continue until all opportunity for positive economic profit is reduced to zero. This does not basically mean that there is no incentive to entry the industry for the new firms; this just explains why each average company or entrepreneur cannot make above the average return.

The same is true for EMH which does not say that all market participants will behave rationally or it is completely impossible to earn above the average rate of return. It just states that in general investors in long run will be profit oriented rational market participants and an average investor does not have to expect to receive abnormal returns. However, in the short run individual behavior may be not entirely rational and individual rationality may not ensure collective rationality and some investors may be able to make above the average rate of returns because of their unique knowledge, big experience or luck in respect to average investor (or even non legal actions, but this case is not discussed in the current paper). Ball R. has hit the nail on the head when he said about EMH that "it is not welcomed by most money managers because it states what they are not honest enough to admit to their clients: that they operate in a fiercely competitive world, populated by a large number of capable and ambitious people just like themselves, and thus superior investment returns are generally (though not exclusively) attributable more to luck than insight. To justify their fees, active money managers have to argue they are "above average" and consistently beat the market, but the EMH...suggests otherwise" [1, p.9].

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