

A BEHAVIORAL FINANCE PERSPECTIVE OF THE EFFICIENT MARKET HYPOTHESIS

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Abstract: Nowadays, a central theme in the finance and economic theory is market efficiency. After several decades of research, economists have not yet reached a consensus about the existence of efficient financial markets in terms of information. In the problematized approaches regarding the treated subject, one can find the inquiries on the validity of assumptions underlying the informational efficiency theory of the financial market. The emerging discipline of behavioral economics and finance has challenged the EMH hypothesis, arguing that markets are not rational, but are driven by fear and greed instead. The paper proposes a critical analysis, based on consistency criteria, regarding the controverted current state of the informational efficiency theory of the capital market. In this sense, the critical approach is one that shows the weaknesses, the vulnerable aspects that characterize the classical form of EMH theory. Also, the paper highlights the most significant criticisms levelled against EMH by psychologists and behavioral economists.

JEL classification: G02, G14

Key words: efficient market hypothesis; informations; behavioral finance; random walk

1. INTRODUCTION

Efficient Market Hypothesis (EMH) has attracted a considerable number of studies in empirical finance, particularly in determining the market efficiency of a financial market. The Efficient Markets Hypothesis is one of the most influential ideas in the past years, the idea that market prices incorporate all information rationally and instantaneously. Considerations concerning the efficiency of financial markets lay under two theories: random walk and the theory of efficient markets. The first theory, “random walk”, is the theory of random movement of the financial assets. Elaborated during the 6th decade of the 20th century, it supports the idea that the future movement of an asset is independent from past movements of assets on a market. In 1900, in a theoretical study, Louis Bachelier anticipates the theory of efficient markets, stating that *stock market speculation* is a fair game, in which neither the sellers, nor the buyers, do not gain a net profit overall. We can thus say that the idea of an efficient market, as it is understood in today's literature, has its origins with Bachelier, which postulated the model of random steps: “Random Walk”, or “Fair Game”, reprinted in English in 1964's paper by Paul Cootner: “The Random Character of Stock Market Prices”. The origins of the EMH are also found with Paul Samuelson (1965) whose contribution is summarized by the title of its article “*proof that properly anticipated prices fluctuate randomly*”. In an informational efficient market, price movements are unpredictable, because they encompass the information and expectations of all market participants.

The second theory, which refers to the hypothesis of efficient markets, was established in the early 60s and assumes that asset markets process with great sensitivity

the economic intelligence which they receive and react quickly to adjust the course of financial assets. The theory of efficient markets justifies the need of balanced markets. Roberts (1967) and Fama (1970) [4] have operationalized this hypothesis. In his famous study, which will definitively mark the theory of efficient markets, *Efficient Capital Markets: A Review of Theory and Empirical Work*, written by Fama in 1970, he gives the following definition: "A market in which prices always reflect the available information is called an efficient market". In this paper, he realizes a synthesis of previous research concerning the predictability of capital markets, the notions of *fair game* and *random walk* becoming well formulated. The distinction between the three forms of efficiency is being made: efficiency in its hard form, semi-hard efficiency and weak efficiency.

The weak efficiency form sustains the hypothesis that the current price of stocks fully reflects all the informations concerning the stock market, such as: past prices, exchange rates, volumes of transactions and any other information concerning the markets. This involves the fact that there will be no correlations between past and future exchanges of stock rates: the rates of exchange are independent. Thus, any rule for their transaction depends on the past changes of information flows will not be useful. In an efficient market, past prices of the titles cannot be used to beat the market or to obtain adjusted rentabilities for a superior risk. In such a context, the chartist or technical analysis is useless.

Semi-hard efficiency look, in addition, to the immediate integration within the new course of any new information with a public character, concerning the firms wealth, its results, dividends, the distribution of free stocks, stock market introduction, etc. the evolution of the course is random, and eventual variations are determined by unpredictable factors, others than the history of courses and publicly broadcasted information. In an efficient market, in its semi-hard form, fundamental analysis, founded on public information, is useless.

Hard efficiency implies, more than that, the quick integration within the market prices, of all available information about the traded asset, including privileged information. On such a market, superior performances cannot be made even by people who own all the informations available on the transacted asset. Thus, nobody, not even the initiated ones, can thoroughly anticipate the future evolution of the courses, as they have already recorded all the existent information about the intrinsic value of the title, and any new information will be transparent and thus, will immediately be integrated in the price of the title. So, such efficiency (as the semi-hard one) puts into discussion the validity of the entire fundamental value analysis, as the intrinsic value is the market price itself.

The more efficient the market, the more the evolution of the price is random, and the most efficient market accounts for completely random price movements, totally unpredictable. And this is the result of the fact that market agents try to take advantage of available information, and thus, by using them quickly, they are rapidly incorporated in prices and thus they cancel the gaining opportunities of arbitration. If this is done instantly (which is doable only in a market which lacks transaction costs), then prices will always reflect all the available information. Thus, extra-profits can not be generated from having information, because such profits have already been incorporated.

The market efficiency hypothesis (EMH) is a statement about:

- the theory that stock prices reflect the true value of stocks;
- the absence of arbitrage opportunities in an economy populated by rational, profit-maximizing agents;
- the hypothesis that market prices always fully reflect available information (Fama 1970).

In Jensen (1978), an efficient market is defined with respect to an information set Φ_t if it is impossible to earn economic profits by trading on the basis of Φ_t . Fama (1970) presented a general notation describing how investors generate price expectations for stocks. This could be explained as:

$$E(p_{j,t+1} | \Phi_t) = [1 + E(r_{j,t+1} | \Phi_t)]p_{jt}$$

where E is the expected value operator, $p_{j,t+1}$ is the price of security j at time $t+1$, $r_{j,t+1}$ is the return on security j during period $t+1$, and Φ_t is the set of information available to investors at time t .

Under the efficient market hypothesis (EMH), investors cannot earn abnormal profits on the available information set Φ_t other than by chance (Islam, Clark, 2005). The level of over value or under value of a particular stock is defined as:

$$x_{j,t+1} = p_{j,t+1} - E(p_{j,t+1} | \Phi_t)$$

where $x_{j,t+1}$ indicates the extent to which the actual price for security j at the end of the period differs from the price expected by investors based on the information available Φ_t . As a result, in an efficient market it must be true that:

$$E(x_{j,t+1} | \Phi_t) = 0$$

This implies that the information is always impounded in stock prices. Therefore the rational expectations of the returns for a particular stock according to the EMH may be represented as:

$$P_{t+1} = E_t P_{t+1} + \varepsilon_{t+1}$$

where P_t is the stock price; and ε_{t+1} is the forecast error. $P_{t+1} - E_t P_{t+1}$ should therefore be zero on average and should be uncorrelated with any information Φ_t . Also $E(x_{j,t+1} | \Phi_t) = 0$ when the random variable (good or bad news), the expected value of the forecast error, is zero:

$$E_t \varepsilon_{t+1} = E_t (P_{t+1} - E_t P_{t+1}) = E_t P_{t+1} - E_t P_{t+1} = 0$$

It is certain that the Efficient Market Hypothesis is a widely accepted paradigm and has become part of financial and economic mainstream since at least the late 1950's. As Jensen (1978) points out in the financial field this concept is under the category of the "theory of random walks" and "rational expectations theory" in the economic field.

2. THE CRITICAL ANALYSIS – A BEHAVIORAL APPROACH

The concept of market efficiency refers to information: at a certain moment, prices reflect all available information. This involves the fact that no processing, no matter how deep, can predict future trends. The interest of every investor is to obtain informations about the actions of the quoted companies. These informations will allow it to evaluate the perspective of each investment opportunity and to invest in the portfolio which has the best perspectives. All information channels are efficient if they spread intelligence quickly and if every new information becomes public very quickly.

Many practical observations concerning the reaction of investors to new intelligence, but also the mechanisms for their encompassing in the price of stocks, come to highlight the aspects of "market inefficiency" and refer, among others, to:

- The appearance of time gaps in incorporating information – certain financial investors can present a defensive attitude concerning important public informations, which they hesitate to use, so as not to "fall pray" to better informed agents;

- There is a quickness of reaction which is not the same for all additional or unpredictable information;
- Investors have a different perception, more or less profound, or selective, concerning information;
- The appearance of action inertia – some investor imitates those who react first to intelligence. This phenomenon, of bringing new and new investors in the “professionals net” continues, until the first, considering the course is over-evaluated, retire from the market. The contrary movement carries the same inertia.

An important argument concerning the impossibility of the existence of a perfectly efficient informational market is that information has a price and it is not available to all investors in the market at a given moment [5]. So, the price reflected within the informations of professional investors (the informed), by only partially; as these informed investors pay to obtain information, it is normal that the price does not fully reflect the informations which they own, because on the contrary it would not be possible for them to cover the costs of obtaining the information in the first place. As a result, any model of capital market equilibrium must take information costs into account.

As an alternate research direction, with the purpose of studying information integration mechanisms within the price of market assets, one must classify informations according to Fama (past intelligence – public intelligence – privileged intelligence) by realizing a new parametric type classification of the informations with the impact on financial decisions, criteria such as: the origin of information (x), type of information (y), type of financial impact of the information (z), credibility of information (t), the truth value of the information (p), the legitimacy of the information (authority level r): $I(x,y,z,t,p,r)$.

As a synthesis of the most important premise of the informational efficiency concept concerning financial markets, these are:

- Investors are rational. Investors have risk aversion and only desire actives which have the highest yield for a certain degree of risk. Still, contrary to the general perception, EMH does not imply that all market participants are rational. Indeed, markets can become efficient if a group of investors have an irrational behaviour and are correlated in behaviour, as long as there are rational investors looking for arbitrary opportunities [10];
- Markets are efficient, meaning that current courses reflect all public and available information;
- Yields are independent. The exchange of courses can be determined only by new information. The yield in day t is not correlated with the yield in day t+1;
- Markets have a ”random walk”. The probability of yield distribution is the same with the normal distribution (Gauss bell).

But, in reality, the prerequisites which lay at the basis of the theory of efficient markets are not real. The hypothesis that investors are fully rational agents which instantaneously process information in a correct manner in most unrealistic, and rationality is hard to define, human behaviour is often unpredictable. The rationality of investors appears as a result of the fact that orthodox economic science still remains the prisoner of the mechanical paradigm, in which values, irrationality, lack of direct interest, intuition, are not considered valuables of the economic process [1]. Information can be difficult to interpret, technology and institutions are constantly changing, and also, the gathering and processing of information, as well as the realization of transactions require significant costs.

Investors will always have a risk aversion and also, they do not react to immediate informations, but in most cases, they react late, guiding themselves to the trend (which implies past intelligence) in the reaction of present strategies. We presented, in the above, several practical observations concerning the reaction of investors to the new information, but also mechanisms of incorporating them in the price of assets, which come to highlight aspects of market “inefficiency” and refers to: the occurrence of time gaps in incorporating information; the quickness of reaction is unequally distributed to any additional or unpredicted information; action inertia. One can distinguish between two categories of participants on the stock market, which obtain various portfolio investments, as they are either rational investors (“*smart money*”) which operate with relevant information, but also with regular participants (“*noise traders*”) which react to rumours and fashion.

People will not always behave in a linear way to new information, encompassing them immediately, as the EMH requires; people behave non-linear. Because of this, the prerequisite that investors are rational and thus, the modifications of courses is independent and that markets have a random stepped movement can not be accepted. The irregular assimilation of information, as it happens in reality, could lead to a tendency of random movement – “biased random walk”, called a fractal time series.

But the most enduring critiques of the EMH revolve around the preferences and behavior of market participants. Several strays have been identified from the classical paradigm of EMH bound by investor behavior, of which we mention: *over-confidence* (supreme trust) (Gervais and Odean, 2001); *overreaction* (DeBondt and Thaler, 1986: they revealed that when assets are ordered by their rentability in the last 3 – 5 years, assets which during the past period had a high yield tend to have a low yield during the following time span and vice-versa. They attribute these anomalies to the over-reactions to information. In the formation of expectations, investors grant a high importance on past performances of companies and a low importance to the fact that these performances can be inverted; *loss aversion* (which refers to the tendency of people to strongly avoid loss as they lack to seek gains), *herding*, *regret* (the theory of the late Bell, 1982). These critics of the EMH argument the fact that investors are often irrational. Speculative economic bubbles are an anomaly, because the market appears to be driven by buyers operating on irrational exuberance, who take little notice of underlying value.

3. CONCLUSIONS

Behavioral psychology approaches to stock market trading are among some of the more important alternatives to EMH. The adaptive market hypothesis, as proposed by Andrew Lo [7] is an attempt to reconcile economic theories based on the efficient market hypothesis with behavioral alternatives by applying the principles of evolution (competition, adaptation, and natural selection) to financial interactions. Lo argues that much of what behavioralists cite as counterexamples to economic rationality (loss aversion, overconfidence, overreaction, mental accounting, and other behavioral biases) are, in fact, consistent with an evolutionary model of individuals adapting to a changing environment via simple heuristics.

Orthodox economic science considers three external methodological premises which are debatable: the rationality of the individual, the idea that the methodological anchor in economic science is globally efficient (minimization of opportunity costs), the idea that the economic process must be cast away, at least as a tendency, towards equilibrium [1]. But, in reality, the prerequisites which lay at the basis of the theory of efficient markets are not real. The hypothesis that investors are completely rational and

they always process instantaneously and correctly all the available information which is surely unrealistic, as rationality is hard to define and human behaviour is unpredictable at many times. The more and more important influence of information factors, but also the acknowledgement – which became an axiom – is in general non-linear and even more so in human behaviour, economic processes and stock market activity have lead to the non-linear approach of stock market processes.

In order to succeed as a theory of efficient information of the financial markets, and thus, operational, we must consider certain additional structures, except for the way in which the price of a stock completely reflects available information, which have not been considered by the classical version of the theory, such as: investor preferences, their will, their attitude concerning risk, the structure of impact information of stock prices, the conditions of the economic environment, the state of the economy, etc. However, in this new context, it becomes an issue to test efficient market hypotheses, because it will also become a test for auxiliary hypotheses, and a non-confirmation of this mix of hypotheses will not state a great deal of things on the aspects which are not linked to existent data.

AKNOWLEDGEMENTS

This article has benefited by financial support through the project “Studii Post-Doctorale in Economie: program de formare continua a cercetatorilor de elita - SPODE”, financing contract nr. POSDRU/89/1.5/S/61755, project financed by the European Social Fund Sectorial Operational Programme Human Resources Development 2007-2013.

REFERENCES

1. Dinga, E. Studii de economie, Editura Economică, Bucureş ti, 2009
2. Dragotă, V., Dragotă, M., Dămian, O., Mitrică, E. Gestiunea portofoliului de valori mobiliare, Ed. Economică, Bucureşti, 2003
3. Fama, E. Efficient Capital Markets: a Review of Theory and Empirical Work, Journal of Finance, 25 may, 1970
4. Grossman, S., Stiglitz, J. On the Impossibility of Informationally Efficient Markets, The American Economic Review, vol 70, issue3, June 1980, pg. 393-408, 1980
5. Lo, A. W. Long-Term Memory in Stock Market Prices, Econometrica, Volume 59, Issue 5, 1991
6. Lo, A. W. The Adaptive Market Hypothesis: Market Efficiency from an Evolutionary Perspective, <http://web.mit.edu/alo/www/Papers/JPM2004.pdf>, 2004
7. Stancu, I. Finanţe, Ed. Economică, Bucureşti, 2003
8. Shleifer, A. Inefficient Markets: An Introduction to Behavioral Finance. Oxford, UK: Oxford University Press, 2000