Testing the Efficient Markets Hypothesis on the Romanian Capital Market

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Abstract: *Informational efficiency of capital markets has been the subject of numerous empirical studies. Intensive research of the field is justified by the important implications of the knowledge of the of informational efficiency level in the financial practice. Empirical studies that have tested the efficient markets hypothesis on the Romanian capital market revealed mostly that this market is not characterised by the weak form of the efficient markets hypothesis. However, recent empirical studies have obtained results for the weak form of the efficient markets hypothesis. The present decline period of the Romanian capital market, recorded on the background of adverse economic developments internally and externally, will be an important test for the continuation of recent positive developments, manifested the level of informational efficiency too.*

Keywords: efficient market hypothesis, informational efficiency, random walk hypothesis, capital market

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1. Introduction

Within an efficient market, prices provide accurate signals for resource allocation. While such a market exists, the main role of the capital market in allocating resources is completely fulfilled (Fama, 1970, p. 383). Capital market inefficiency will result in a significant social cost due to an inefficient allocation of resources, which may materialise in inadequate investments in the real economy (Bodie, Kane and Marcus, 2003, p. 269).

Fama (1970) defines an **efficient market** as the market in which, at any time, prices **fully reflect** available information. Specifically, such a market is called an **informationally efficient market** (Reilly and Brown, 2002, p. 177). For a market to be efficient, additional conditions related to allocative efficiency and operational efficiency must be met. Details hereto can be found in Dragotă (2005, pp. 25 – 26).

Sufficient conditions for the existence of an efficient market are (Fama, 1970, p. 387):

- There are no costs associated with trading securities;
- All available information is freely available to all participants on the market;
- All participants on the market agree on the implications of current information on the current price and on the distributions of future prices of each security.

As one may notice, these conditions are difficult to achieve in reality. Fortunately, Fama (1970, pp. 387 - 388) warrants that they are not necessarily required, as follows:

- If the market participants take into account all available information, even very high transaction costs that inhibit the flow of transactions, does not in themselves imply that when transactions occur, prices will not fully reflect available information;

- The market can be efficient if a sufficient number of investors have easy access to available information;
- Disagreement in the interpretation of available information does not by itself imply market inefficiency unless there are investors who consistently make more accurate assessments of available information than those included in market prices.

Fama (1991) indicates that the first two sufficient conditions for the existence of an efficient market, referring to the absence of transaction and information costs, relate to the strong version of the efficient markets hypothesis. This version can serve only as a reference point, as it is surely false, because in practice, transaction and information costs are charged. A weaker version of the hypothesis, which takes economic reality into consideration, requires that prices reflect information to the point where the marginal benefits of operating according to this information do not exceed the marginal costs (Jensen, 1968, cited in Fama, 1991, p. 1575).

2. Testing the efficient markets hypothesis – testing methods

Fama (1991) reviews the specialised literature in the field of market efficiency, 20 years after the publication of his 1970 article. A first finding is that a full review of the entire literature is impossible due to its very large volume.

It must be emphasized that intensive research of the field is fully justified by the importance of its practical implications. Thus, the level of informational efficiency must be considered in equity valuation, including when selecting the type of analysis applied at the valuation (technical analysis or fundamental analysis), and when choosing the investment strategy used in managing portfolios of securities (active or passive investment strategy).

Fama (1970) classified the tests regarding the efficient markets hypothesis based on the set of information involved in three categories, namely:

1. Tests for the weak form of the hypothesis in which the information package of interest is represented only by the history of prices or returns.

2. Tests for the semi-strong form of the hypothesis that focus on the speed of price adjustment to the publicly available information, other than those specific to the previous tests.

3. Tests for the strong form of the hypothesis which check if there are any investors or groups that have monopolistic access to any information relevant to pricing.

In the tests for the poor form of the efficient markets hypothesis, different testing methods were used, which can be classified as follows:

a. Statistical tests regarding the independence between the rates of return, which include: tests based on autocorrelation coefficients, stationarity tests, normal distribution analysis, runs tests and *unit root* tests;

b. Tests of trading rules, of which the best known is the test based on the filter rule.

Within the tests for the weak form of the efficient markets hypothesis, one can distinguish the tests for checking the ***random walk*** hypothesis. In the first approaches of the efficient markets hypothesis, the assertion that the current price of a security reflects all available information was assumed to imply the independence of successive price (or return) changes. In addition, it was assumed that these changes are identically distributed, and from these two assumptions, the random walk model resulted (Fama, 1970, p. 386).

The confirmation of the random walk hypothesis on a market implies that returns on assets traded on that market can not be forecast, thus the possibility of obtaining

abnormal returns being eliminated. However, the hypothesis confirmation does not also imply that asset prices coincide with their intrinsic values. Therefore, the type of random walk evolution of prices is a necessary, but not sufficient condition for informational efficiency (Dragota, Căruntu and Stoian, 2006, p. 13).

Fama (1991) re-classified empirical studies that focus on capital markets efficiency into three categories, namely:

1) Tests for return predictability. These include, in addition to tests that focus on the forecast power of past returns, included in the tests for the weak form of the hypothesis described by Fama (1970), the following tests:

a. Tests on forecasting returns, with variables such as dividend yields and interest rates;

b. Tests for seasonals in returns (such as the effect of January) and the excessive volatility of securities prices;

c. Cross-sectional return predictability tests, i.e. for asset pricing models, and the anomalies found in these tests.

2) Event studies. This category of tests is identical to that of tests for the semi-strong form of the efficient markets hypothesis, presented by Fama (1970), the only difference being their name.

3) Tests for private information. These tests are identical to those in the test category for the strong form of capital markets, as described by Fama (1970), as it is considered that the new name is more relevant.

Even if the capital market reacts like a rational market to the apparition of new information, and participants on this market can not earn abnormal returns, market prices do not necessarily fully reflect available information, implicitly the "true" values based on the rational fundamental evaluation. In this regard, Megginson (1997) completed the test categories for the market efficiency with **tests for the rational fundamental valuation** (Dragota, Căruntu and Stoian, 2006, p. 2). Therein, both volatility tests, included by Fama (1991) in tests for return predictability, and behaviour studies of noise traders are contained.

Empirical studies on the efficient markets hypothesis have confirmed this assumption in many cases. Meanwhile, they have also indicated a number of cases in which the adjustment of prices to new information does not occur quickly.

Fama (1991) highlighted the joint-hypothesis problem, which refers to the fact that market efficiency can not be tested in isolation, but only together with a model of equilibrium, an asset-pricing model. The joint-hypothesis problem occurs at tests for predictability of *cross-sectional* returns and at tests for private information. The joint-hypothesis problem also manifests itself in the case of event studies, but is a secondary issue if the event can be dated precisely and has a significant impact on prices (Fama, 1991, p. 1607).

In the context of the joint-hypothesis problem, the assignment of causes for the identified anomalies at the level of return behaviour, between market inefficiency and a weak equilibrium model, is difficult to achieve. Despite the serious nature of this problem, Fama (1991) considers that the empirical literature on efficiency and the pricing models have passed the acid test of scientific usefulness. These have changed both the outlook on the behaviour of returns and the perspectives and practices of professionals on the market.

3. The Romanian Capital Market – History and Features

The Romanian capital market operation was resumed in 1994, with the establishment of the legal framework for trading shares.

Actual trading started on the Bucharest Stock Exchange (BSE) on November 20th, 1995. If 6 companies were listed at the time of its re-opening, shares of 68 companies were admitted to trading on BSE within the equity sector at the end of 2008. Of these, shares of 21 companies were traded in Tier 1, shares of 45 companies were traded in Tier 2, shares of one company were listed in Tier 3 and the shares of a company were listed on the international category of shares. The sector of debt securities to BSE was represented at the end of 2008 by a total of 20 municipal bonds, 4 corporate bonds, 24 series of government bonds and 2 international bonds.

In September 1996, the RASDAQ market was officially opened, and trading on this market started one month later. The RASDAQ market, modelled according to the NASDAQ trading system in the United States, was created to allow trading of shares of about 6,000 companies that were partially privatised to the public in the Mass Privatisation Programme. At the end of 2008, the RASDAQ market reached, after continuous filtering efforts, a number of 1,753 listed companies. Of these companies, a total of 1,054 were marketable, and 699 were suspended from trading.

The evolution of share listed on the Romanian capital market (BSE + RASDAQ) was reflected at the end of 2008 by 9 indices, namely: BET, BET-XT, ROTX, BET-FI, BET-NG, BET-C, RASDAQ-C, RAQ-I and RAQ-II.

One can appreciate that the capital market in Romania recorded a continuous positive trend during the period 2004 - 2007, including in terms of market indicators (market capitalisation, turnover, the weight of turnover in market capitalisation - liquidity, the weight of market capitalisation to GDP, etc.). Starting with the last part of 2007, the Romanian capital market has been affected by the unfavourable trends on international financial markets and in the economies of developed states. Later on, the Romanian capital market has also been negatively influenced by adverse trends in the national economy. However, compared to the capital markets of Central and Eastern European states which joined the EU shortly before Romania (such as Poland, the Czech Republic and Hungary), significant gaps remained at the level of the main market indicators. Thus, for the capital market in Romania, the weight of turnover in market capitalisation ranged from 7% (value recorded in 2004) to 17.1% (value recorded in 2007) in 2004-2008, indicating a low liquidity of this market. For comparison, it should be noted that the lowest values of this indicator recorded in the period 2004-2008 on the capital markets in Poland, the Czech Republic and Hungary were 36.9% and 42%, recorded in 2004 and 2008, respectively, on the Polish capital market (the data analyzed resulted from our own calculations and from the following sources: www.gpw.com.pl, www.bse.hu, www.pse.cz, www.bvb.ro and http://epp. eurostat.ec.europa.eu).

Since 2007, efforts to diversify the portfolio of instruments traded on the BSE began to pay off. In 2007, trading on the derivatives market began at the BSE. In 2008, notable events were recorded at the BSE, among which: the first shares issued by an international company were listed on the BSE, the trading on the stock market of 25 series of government bonds began, and the first fund units were admitted to trading. Despite these positive developments, the maintaining of an overwhelming share of transactions in shares in the total of BSE transactions can be noticed at the end of 2008. Thus, the percentage of these transactions in the total of the transactions made in 2008 was 97%, the share of transactions in bonds was only 2.3%, of those in rights 0.5% and of those in futures contracts only 0.2%.

Low liquidity and a highly unbalanced structure of trading tools in the favour of shares are just two of the Romanian capital market shortcomings. Added to this is using a very limited extent of the capital market to finance the Romanian companies and the absence from BSE shares of major companies in the Romanian economy.

Dragotă and Mitrică (2004) and Dragotă et al. (2009) raise the issue of the noise traders present on this market. Another problem of the Romanian capital market is related to the low level of the application of the principles of corporate governance, and of the protection of minority shareholders (Dragotă et al., 2009, pp. 148 - 149).

4. Testing the Efficient Capital Markets Hypothesis on the Romanian Capital Market

The efficient markets hypothesis, as mentioned, has been intensely tested. Verification of this hypothesis has been mostly achieved on developed capital markets, but the testing also included developing capital markets. The capital market in Romania was the object of several empirical studies that test the hypotheses for efficient markets, the most relevant results trying to be comprised in the following.

Thus, Todea (2002) tested the weak form of informational efficiency using correlation coefficients and stationarity tests. The sample used is composed of ten companies listed in the first category of BSE, watched in the period between October 16th, 1997 and December 21st, 2000. Study results indicate an evolution of the random walk type of the stock prices watched and the impossibility to obtain abnormal returns.

Dragotă, Dămian and Stoian (2002) studied the evolution of 18 stocks listed in the first category on the BSE and of the Romanian capital market's indicators in the period between April 1st, 1997 and July 1st, 2002, with serial correlation tests and using the normal distribution analysis. The study concludes that the Romanian capital market is inefficient in the weak form.

Dumitru and Bucşa (2004) applied stationarity tests and the normal distribution analysis in the study of the evolution of the Romanian capital market indicators. The results obtained led to the rejection of the random walk hypothesis. However, evidence was found for an increased efficiency of the Romanian capital market as the institutional framework had been developing and the economy had been opening up more and more to foreign investors.

Dragotă and Mitrică (2004) analysed the evolution of six shares listed on the Tier I of BSE (shares with the highest liquidity) from April 9th, 1998 to October 10th, 2000. Based on various traditional tests (chart test, serial correlation tests, stationarity tests, normal distribution analysis and filter rules), it was concluded that the Romanian capital market is not efficient in the weak form. Despite the inefficiency of the market, obtaining abnormal gains is not possible because of transaction costs and the lack of liquidity. It was also found that there are significant differences between stock prices and the intrinsic values of shares. However, according to the study mentioned above, the recording of a progress is expected as a result of reducing the volatility of variables taken into account for the equity valuation because of the investors' improved financial education.

Harrison and Paton (2004) examined the evolution of capital markets efficiency on BSE from mid-1997 until September 2002, using a GARCH model applied to daily data on share price. The study found strong evidence for the inefficiency of BSE because the lagged stock price index of the share price is a significant predictor of the current price index. According to the authors mentioned, the level of inefficiency appears to be diminishing over time. In this respect, they found evidence supporting the existence of an efficient capital market in Romania since January 2000.

The study conducted by Dragotă, Dragotă and Stoian (2004) addresses the semi-strong form of the EMH. They have called on the event study technique to analyse the price reaction of the shares listed on the Romanian capital market to

announcements regarding dividends or capital increases over the period 1999 - 2003. Relatively quick adjustments of stock prices to the new information were noticed.

Dragotă, Căruntu and Stoian (2004) focus on the differences between stock prices and the intrinsic values of them. To this purpose, shares of the five financial investment companies are analysed over the period from 2002 to 2005. Based on the significant and persistent differences between market capitalisation and the intrinsic value of these companies, the authors conclude that the Romanian capital market can be inefficient.

An application of the event study technique for testing the semi-strong form of the efficient markets hypothesis is also achieved by Mînjină and Reşceanu (2008). These analysed, for the period 2003 - 2008, the adjustment speed of stock prices of companies from the drug and aluminium sectors listed on Romanian capital market to announcements of acquisition and takeover public offers. The adjustment speed was found unsatisfactory, thus infirming the existence of the semi-strong form of the efficient markets hypothesis.

Summarising the results of the studies above, one can ascertain that they mostly indicate that the efficient markets hypothesis has not been confirmed on the Romanian capital market, not even in its weak form. In interpreting these results, one must consider the development stage of the capital market in Romania over the period when these test were made. Thus, Dragotă and Mitrică (2004) draw attention to low market liquidity, the existence of uninformed traders and the lack of a reliable benchmark for the risk-free rate of return.

As progress is being recorded on the Romanian capital market, a trend towards an increase in the efficiency level is expected. The results of recent studies confirm the positive trends forecast in the studies such as Dumitru and Bucşa (2004), Dragotă and Mitrică (2004), and Harrison and Paton (2005). Thus, Pele and Voineagu (2008), examining the daily evolutions of the BET index over the period September 19th, 1997 to January 9th, 2007 with an ARMA model, concluded that the efficient markets hypothesis in its weak form can not be rejected.

Dragotă et al. (2009) analysed the daily and weekly returns of a number of 18 stocks listed on BSE in the first category and those of indices of the Romanian capital market, since the listing date of those stocks, and since the index construction date, respectively, and until the end of 2006. Using the *Multiple Variance Ratio* test for the random walk hypothesis, it was proved that the efficient markets hypothesis in its weak form can not be rejected. This finding confirms the hypothesis according to which the Romanian capital market performance has improved in recent years and that the ability of Romanian investors to adequately assess the assets has developed (Dragotă et al., 2009, p. 158). It may be considered that extending the presence of foreign investors on the Romanian capital market had a major contribution to improving the assessment capacity of the shares listed on this market.

5. Conclusions

The informational efficiency of capital markets was the subject of numerous empirical studies that have used various ways to test this. Intense research of the field is justified by the practical utility of knowing the informational efficiency level of a capital market when assessing shares and selecting a portfolio management strategy.

The Romanian capital market saw a continuous positive trend during 2003 - 2007, reflected in improved indicators of the capital market and at the level of the organisational structure and the market products. However, there remained significant differences as compared to the capital markets in the region (such as Poland, the

Czech Republic, Hungary), and since 2008, unfavourable trends recorded on foreign capital markets began to mark their presence on this market, too.

Most empirical studies devoted to informational efficiency have focused on developed capital markets, particularly the United States capital market. But there are also a large number of studies which have focused on the Romanian capital market. These empirical studies have mainly revealed the fact that the Romanian capital market is not characterised by the weak form of the efficient markets hypothesis. However, lately there has been a trend towards confirming the weak form of the efficient markets hypothesis. The current decline period of the Romanian capital market, caused by unfavourable domestic and external economic developments, will put the positive trends recorded in recent years to the test, including at the level of informational efficiency.

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