

---

## **RISK MANAGEMENT ON THE CAPITAL MARKET AND USE OF MULTI-FACTORIAL MODELS FOR ESTIMATING THE STOCKS RETURN**

**Adelina-Monica Moraru**<sup>1</sup>

*The Bucharest University of Economic Studies, Bucharest, Romania*

---

### **Abstract**

In the last period, the study of the risk and the return of stocks continues to be a very important area of research due to the increasing attention that the investors give to the trend of the capital market.

The scope of this paper is to identify the significant determinants of the return of stocks, but also the modelling of the capital market risk. Taking into consideration the previous researches, we identified some microeconomic and macroeconomic factors which can change the return of stocks. As respects the macroeconomic determinants, we took into consideration the interest rate, the inflation rate, the contagion effect and the exchange rate. In addition to this, we used as microeconomic factors the return on equity rate, the return on assets rate, and some other indicators as price earnings ratio, price to book value, the financial leverage, the illiquidity, the market capitalisation and the trading volume. Also, this paper presents a method of risk modelling for the romanian capital market, in order to identify the impact of the historical volatility on the present volatility and the speed of the volatility absorption.

**Keywords:** rentability, risk, volatility, macroeconomic factors, microeconomic factors

**JEL Classification:** G10, G11, G15

---

### **Introduction**

The paper presents a research for a very important area, the study of the capital market and the relation between risk and rentability of the stocks. First, I choose this topic for the difficulty of finding studies which contains the characteristics of the Romanian market, but also because I am really interested in investing my capital on the capital market. So, I felt a motivation for investigating the trend and the characteristics of the Romanian market.

---

<sup>1</sup>Corresponding author, **Adelina- Monica Moraru** - moraru.adelina.m@gmail.com

This article focuses on studying the determinants of the return of stocks, taking into consideration 30 Romanian companies listed at Bucharest Stock Exchange (annex 1). The purpose of the paper is to analyse the reactions of the stock exchange rentability to the evolution of some macroeconomic or microeconomic external factors as the case may be, but also to identify the influence of past volatility on the present volatility and to find a method for modelling the volatility on the domestic capital market.

The classic theory in finance shows that for a higher level of risk assumed by the equity holder, the return should increase considerably in order to remunerate the investors according to the level of the risk assumed. Taking into account that recent events in other countries have led to increased global instability, we have tried to determine their impact on the Romanian capital market by including the contagion effect with the euro area as a determinant of return of stocks, which is one of innovative ideas of the paper, compared to other studies for the Romanian market. Another element of novelty is the comparative analysis of the financial and industrial sectors in terms of the impact of the factors considered on the rentability of the stocks from the two categories.

The paper is divided in four chapters structured as follows. The first chapter summarizes the conclusions drawn from other articles that capture the impact of some factors on the stocks return and the relationships between the dependent and the independent variables. I also emphasized the factors that, from my point of view, quantify the risk associated to the companies analysed, in order to establish the relationship between rentability and risk. I used the conclusions of the first chapter as assumptions to be tested. The second chapter includes the methodology and the details referring to the database and the applied models. The third chapter includes the interpretation of the obtained results regarding the risk capital market modelling in Romania and the determination of the influencing factors of the financial securities rentability. At the same time, the chapter is intended to verify the validity of the working hypotheses regarding the capital market in Romania, but also to interpret the financial and statistical results obtained by applying the econometric models. The last part of this paper summarizes the conclusions obtained and highlights the directions for future research.

## **1. Literature review**

The main objective of the literature review focuses is identifying the determinants of the stock rentability and also to find a method to modulate the volatility on the capital market.

The role of the capital market in the economy is to allocate the existing capital surplus, aiming at supporting the financial needs of companies in order to increase their productivity. When an investor decides to invest, he wishes to maximize his return on each unit of risk he assumes, as evidenced by Markowitz's efficient portfolios. Thus, the literature suggests that there is a positive relationship between the assumed risk and the return generated.

The reasons for giving particular importance to modelling the volatility and the realization of predictions are those of the implications in the risk management on the capital market, the impact on the decision on the allocation of assets. Much of the capital market risk management actions refer to ways to predict the volatility trend. Regarding risk capital modelling on the capital market, the previous studies recommends the use of Generalized

ARCH (GARCH) models developed by Bollerslev (1986), based on which stock price trends can be estimated. There are also many researches suggesting the use of asymmetric GARCH models in estimating volatility (Dima, A., Haim, S., Rami, Y., 2008, for the Tel Aviv-TASE capital market). Hansen and Lunde (2005) argued that, in addition to asymmetric GARCH models, the GARCH (1,1) model is extremely useful in estimating the volatility of financial returns. GARCH models have also been used to model volatility and determine the characteristics of the capital market in Egypt (Floros, 2008).

As we first said, the other objective of the literature review was to identify the significant macroeconomic and microeconomic determinants of the stock return. The studies highlight as macroeconomic factors the interest rate, the inflation rate, the contagion effect and the exchange rate. In addition to this, the studies emphasize as microeconomic factors, the return on equity rate, the return on assets rate, beta for quantifying the systematic risk, the market capitalisation, the illiquidity, the trading volume, the price to book value, the price earnings ratio and the financial leverage. Based on the conclusions from the literature review, we built out assumptions, which are specified in the table 1, from methodology.

## 2. Methodology

The current study examines the impact of the determinant variables on the rentability of the Romanian companies' stocks. Thus, in the case study, we focused on the understanding of the evolution and shocks that had effects on the evolution of the prices of the shares. We started our analysis from the idea that the Romanian capital market is rather weakly developed compared to the markets analysed in other researches. However, for estimating the models we started from hypotheses emphasized in the literature review (Table1).

**Table no. 1. Summary of the utilized hypotheses**

| Nr. | Variable                          | Effect | Previous researches   |
|-----|-----------------------------------|--------|---|
| 1   | Inflation rate                    | (-)    | Geske si Roll (1983), Fama( 1981), Tripathi & Seth( 2014)             |
| 2   | Interest rate                     | (-)    | Tibebe A. Assefa, Omar A. Esqueda and André Varella Mollick(2017)     |
| 3   | Exchange rate                     | (-)    | Chao, Hu, Tai and Wang (2011)   |
| 4   | Contagion effect( CISS, VIX, FSI) | (-)    | Chiang & Chen (2016)  |
| 5   | Volatility (Beta)                 | +      | Duffee(1995), Chirilă & Chirilă(2012)                                 |
| 6   | Leverage                          | (-)    | Campello (2003)   |
| 7   | Illiquidity                       | (-)    | Paresh Kumar Narayan & Xinwei Zheng (2011), Pastor & Stambaugh (2003) |

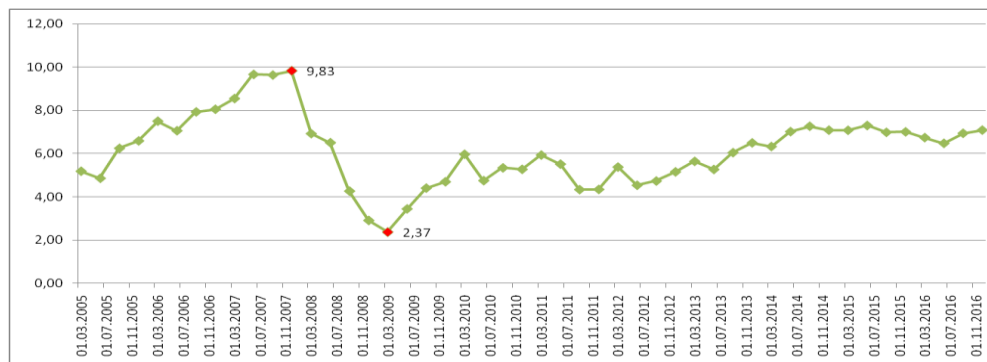
|    |                        |   |  |
|----|------------------------|---|--|
| 8  | Market capitalisation  | + | Stancu & Stancu (2014)   |
| 9  | Volume of trade        | + | Chordia & Swaminathan (2000), Epps & Epps, (1976), Rogalski, (1978), Harris,(1986) |
| 10 | Price to book value    | + | Chui & Wei (1998), Lam (2001)  |
| 11 | Price earnings ratio   | + | Lam (2001)   |
| 12 | Return on Equity (ROE) | + | Stancu & Stancu (2014)   |
| 13 | Return on assets (ROA) | + | Stancu & Stancu (2014)   |

Source: own processing based on the literature review

For estimating the multi-factorial regression models, we took into consideration quarterly data for the analysed variables, between 2005 and 2016. From the 85 companies listed at Bucharest Stock Exchange, we considered a total of 30 companies, which we divided in two smaller samples, depending on the activity. So, we analysed the impact of the factors on the return of 9 financial companies, but also, we surprised the impact of independent variables on the rentability of 21 other companies in different industries(Annex1). Due to the fact that the Romanian market is not a developed one, the lack of reported data made it impossible to include in the analysis a larger number of firms. That is why we excluded from the analysis the companies that were not traded for more than 3 quarters, as well as those listed after the 1st quarter of 2005.

At the same time, in addition to the above explanatory variables, we have used a dummy variable in order to identify the effect that the 2007-2009 financial crisis could have on stock market profitability. The variable was constructed to take the value 1 during the period of its financial crisis and 0 in the rest of the periods. To obtain the results, we used panel data models, so we estimated models with fixed effects and variable effects, then, based on the Hausman test, we appreciated that it is recommended for the present analysis to use models with variable effects.

In order to identify the period of financial crisis, we started from the closing prices of the BET index, considered to be the most representative of the capital market in Romania. Thus, we have identified the maximum and the minimum recorded by the closing price of the BET index, and we considered the period between them as the period of the financial crisis in Romania. Starting from the above presented algorithm, we identified the period of crisis between the 4th quarter of 2007 and the 1st quarter of 2009 (Figure no. 1).



**Figure no. 1. Evolution of the closing prices for BET index**

Source: own processing

We used panel data models for the impact of the determinants on the stocks rentability and GARCH (1,1) for modelling the volatility of the capital market.

### 3. Empirical results

The analysis assumed the estimation of 5 models, described below, due to the correlation between the variables.

$$R_t = \beta_0 - \beta_1 \times \text{change\_in\_RON\_EUR} - \beta_2 \times \text{interest rate} - \beta_3 \times \text{VIX} - \beta_4 \times \text{CISS} - \beta_5 \times \text{financial crisis} \quad (1)$$

$$R_t = \beta_0 - \beta_1 \times \text{change\_in\_RON\_EUR} - \beta_2 \times \text{inflation rate} - \beta_3 \times \text{VIX} - \beta_4 \times \text{CISS} - \beta_5 \times \text{financial crisis} \quad (2)$$

$$R_t = \beta_0 - \beta_1 \times \text{change\_in\_RON\_USD} - \beta_2 \times \text{interest rate} - \beta_3 \times \text{VIX} - \beta_4 \times \text{CISS} - \beta_5 \times \text{financial crisis} \quad (3)$$

$$R_t = \beta_0 - \beta_1 \times \text{change\_in\_RON\_USD} - \beta_2 \times \text{inflation rate} - \beta_3 \times \text{VIX} - \beta_4 \times \text{CISS} - \beta_5 \times \text{financial crisis} \quad (4)$$

$$R_t = \beta_0 + \beta_1 \times \text{ROE} - \beta_2 \times \text{Levier} + \beta_3 \times \text{PBV} + \beta_4 \times \text{change\_in\_trading\_volume} + \beta_5 \times \text{change\_in\_market\_capitalisation} + \beta_6 \times \text{PER} \quad (5)$$

As mentioned above, the analysis included 30 companies and it was first conducted globally, then at the level of the financial companies and the industrial sector. The synthesis of the results obtained from the analysis of the impact of macroeconomic variables for the global series prove that all the hypothesis are checked. We can observe that the probabilities associated with the estimated coefficients do not exceed the confidence level of 10%, which shows that they are statistically significant, and their evolution affects the rentability of the stock exchange.

The percentage change in the RON / USD exchange rate has a negative impact on the rentability of listed securities on the capital market, an increase of 1%, resulting in a fall of 0,86% in the stocks rentability. The existence of a significant relationship between

exchange rate changes and exchange rate rentability justifies using the exchange rate as a way of protecting capital during periods characterized by high capital market volatility. At the same time, we appreciate that the percentage change in the RON / EUR exchange rate has a negative impact on the rentability of the financial securities, and an increase of this variable by 1% will generate a decrease of 1,06% in rentability.

Also, as we expected, the shocks manifested on the European market will have greater impact on the Romanian capital market. An increase in the VIX index rentability will lead to a fall of 0,05% in return of stocks, and a CISS increase of 1% will lead to a fall of 0,25% in the stock market return. At the same time, the financial crisis had a negative impact on rentability, which led to a fall in the registered stock rentability. It is also important to note that the negative effects of the financial crisis begin to manifest immediately, with no gaps. Thus, the results show that shocks on international markets generate fears and stress at national level, causing declining returns on stocks. As for the interest rate, its increase by 1% will result in a decrease of 3,42% in the stocks and the rentability. The relationship between these is predictable, explaining the fact that when the national bank promotes an expansionary monetary policy that involves higher interest rates, investors will be tempted to invest more in deposits and return on the capital market will fall. Also, the reverse relationship between the two variables can also be explained by the fact that the discount rate follows the same trend as the interest rate, therefore the negative relationship is explained based on the discount rate effect. There is also a negative relationship between the inflation rate and the exchange rate rentability, with an increase in the inflation rate by 1%, resulting in a decrease of 1,50% in the return. The above-mentioned models were also replicated for the companies in the financial and industrial sectors and the results were similar.

In addition to the impact of macroeconomic variables, we have estimated the impact of microeconomic variables on the rentability developments of financial securities. As statistically significant microeconomic variables, we identified the return on equity rate, the price to book value, the leverage, the price earnings ratio, the percentage change in stock market capitalization, the sensitivity coefficient (beta), and the percentage change in trading volume. Also, as with macroeconomic models, we have estimated both for the globally regarded series and then for the companies in the financial and industrial sectors respectively. As we expected, the relationships obtained are the same in all three cases, the coefficients being quite close. Thus, we have achieved a positive relationship between the return on equity on financial securities, PER, PBV, percentage change in stock market capitalization, percentage change in trading volume and beta and the stock rentability in the previous quarter, and a negative relationship between rentability and financial leverage.

The comparison of the two sectors analysed showed that there is a greater influence of the macroeconomic variables for the financial sector companies, explained by the fact that the financial companies are subject to several restrictions imposed by the state. For the industrial sector we found out that the microeconomic variables explain better the trend of the prices. Also, the microeconomic factors have a significant impact on the evolution of stock prices of the financial companies.

Table no. 2. Macroeconomic models

| Independent variable          | Eq. 1      | Eq. 2      | Eq. 3      | Eq. 4      |
|-------------------------------|------------|------------|------------|------------|
| <b>Change in RON/EUR</b>      | -1,6285*** | -1,7197*** |            |            |
|                               | (0,0000)   | (0,0000)   |            |            |
| <b>Change in RON/USD</b>      |            |            | -0,8221*** | -0,9379*** |
|                               |            |            | (0,0000)   | (0,0000)   |
| <b>Interest rate</b>          | -4,5433*** |            | -4,5181*** |            |
|                               | (0,0000)   |            | (0,0000)   |            |
| <b>Inflation rate</b>         |            | -1,1032*   |            | -1,6822**  |
|                               |            | (0,0999)   |            | (0,0128)   |
| <b>VIX</b>                    | -0,0710*** | -0,0870*** | -0,0628**  | -0,0830*** |
|                               | (0,008)    | (0,0022)   | (0,0203)   | (0,0035)   |
| <b>CISS_DIFF</b>              | -0,2405*** | -0,2033*** | -0,1968*** | -0,1630**  |
|                               | (0,0002)   | (0,0018)   | (0,0019)   | (0,0107)   |
| <b>Financial crisis</b>       | -0,1472*** | -0,2109*** | -0,1632*** | -0,2217*** |
|                               | (0,0000)   | (0,0000)   | (0,0000)   | (0,0000)   |
| <b>Adjusted R<sup>2</sup></b> | 0,1572     | 0,1323     | 0,1583     | 0,1369     |

Source: own processing in Eviews

Note: \*\*\* - 1% level of confidence , \*\* - 5% level of confidence , \* - 10% level of confidence

Note: The values in brackets are the probabilities of the estimated coefficients.

Note: Some factors were excluded from the analysis due to correlation with the other variables that did not allow their inclusion in the analysis to avoid alteration of the results

Tabele no. 3. Microeconomic models

| Variabila independentă          | Global results | Financial sector | Industrial sector |
|---------------------------------|----------------|------------------|-------------------|
| ROE(-1)                         | 0,0371**       | 0,1014           | 0,0319*           |
|                                 | (0,0216)       | (0,0587)         | (0,0766)          |
| PBV                             | 0,1554***      | 0,1714           | 0,1732***         |
|                                 | (0,0000)       | (0,0000)         | (0,0000)          |
| Levier                          | -0,0256***     | -0,0221          | -0,0343***        |
|                                 | (0,0000)       | (0,0211)         | (0,0000)          |
| PER                             | 0,0236**       | 0,0004           | -0,0262***        |
|                                 | (0,0001)       | (0,0605)         | (0,0002)          |
| Change in market capitalisation | 0,2121**       | 0,0683           | 0,1890***         |
|                                 | (0,0000)       | (0,0234)         | (0,0000)          |
| Change in trading volume        | 0,0064***      | 0,0181           | 0,0083***         |
|                                 | (0,0050)       | (0,0914)         | (0,0036)          |
| Beta                            | 0,0040***      |                  | 0,0046**          |
|                                 | (0,0384)       |                  | (0,0362)          |
| Adjusted R <sup>2</sup>         | 0,3934         | 0,3106           | 0,3828            |

Source: own processing in Eviews

Note: \*\*\* - 1% level of confidence, \*\* - 5% level of confidence, \* - 10% level of confidence

Note: The values in brackets are the probabilities of the estimated coefficients.

Note: Some factors were excluded from the analysis due to correlation with the other variables that did not allow their inclusion in the analysis to avoid alteration of the results

In order to highlight the validity of the above detailed models, we considered useful to interpret the R<sup>2</sup> and adjusted R<sup>2</sup> indicators. Thus, for macroeconomic models, the best model is the third one, which expresses the return on shares according to the percentage change in the RON / USD exchange rate, the interest rate, the rentability of the VIX stock index, the contagion index with the Euro-CISS area, and the dummy variable that captured



the impact of the financial crisis. In the global series, we obtained an  $R^2$  value of 0,1894, which means that the determinants explain only 18,94% of the changes in rentability, and a value of the adjusted  $R^2$  indicator of 0,1865, which shows that more precisely the proportion in which factor variables determines the rentability is 18,65%, the remainder up to 100% being attributed to other variables that were not included in the study<sup>2</sup>. At the level of the financial companies we obtained a higher coefficient of determination, 0,4376, which means that approximately the factor variables explain 43,76% changes in return on shares. At the same time, the adjusted determination coefficient shows that only 43,09% of variations of the dependent variable are explained by the changes in the factors. At the level of the industrial sector, we also obtained a value of the low coefficient of determination, 0,1626, in the variations in rentability are explained by the factors included in the model in the proportion of only 16,26%, the rest being attributed to some factors not included in the estimated models.

As far as the microeconomic model is concerned, we obtained higher values of the coefficient of determination. Thus, for the global series, we obtained a value of 0,3964 of the  $R^2$  indicator, which means that 39,64% of stock exchange rate variations are due to factor variations, and a value of 0,3934 of the adjusted determinant, which points out that exactly 39,34% of the rentability trend can be explained based on the influence of the determinants. At the level of the companies in the financial sector, we obtained lower values of the  $R^2$  and adjusted  $R^2$  indicators, 0,3208 and 0,3106, which shows that only about 31,06% of the profitability variations are explained by the evolution of the factors. In the case of the industrial sector computerized model, the value of the adjusted determination coefficient shows that approximately 37,71% of the rentability trend is explained by the variations in the factors, with the remaining up to 100% being attributed to some factors that were not included in the estimated model.

On the basis of the comparative analysis of the two sectors, we have identified that for financial sector companies the rentability of the stock exchange is influenced more by the macroeconomic factors than in the industrial sector, which means that they are more affected by the changes in the economy and less by the unfavourable evolutions of microeconomic indicators, as they are subject to strict rules on capital requirements. Regarding the industrial sector, we have concluded that the rentability of the actions of the companies in this category is influenced by the evolution of the microeconomic indicators rather than by the macroeconomic developments.

Regarding the volatility on the Romanian capital market, we used GARCH models. In order to model the volatility for the Romanian capital market, we estimated, based on the rentability of the BET index, a GARCH model (1,1). We choose the BET index because it is the one that most reflects the trend of the national capital market, because it contains the 10 most traded companies on the market, one of the criteria on which the composition of the index is established is that of liquidity. At the same time, the use of the BET index for modelling the volatility of the national capital market based on GARCH models is

---

<sup>2</sup> Note:  $R^2$  is not necessarily an indicator on the basis of which the models could be compared, this being affected by the number of variables included in the model. The adjusted determination coefficient, adjusted  $R^2$ , can be used to compare models as it penalizes the number of independent variables included in model

suggested by previous articles focusing on the Romanian capital market (Acatrinei, M., Gorun, A., Marcu, N., 2013).

**Table no. 4. GARCH Model**

| Variable    | Coefficient | Standard Deviation | z-Stat | Probability |
|-------------|-------------|--------------------|--------|-------------|
| C           | 0,0000      | 0,0007             | 0,0650 | 0,9482      |
| RESID(-1)^2 | 0,3808      | 0,2032             | 1,8741 | 0,0609      |
| GARCH(-1)   | 0,6423      | 0,1452             | 4,4238 | 0,0000      |

Source: own processing in Eviews

The ARCH term shows the reaction rate or volatility adjustment, and the GARCH term describes the persistence of past volatility over current volatility. In order to appreciate that the volatility response speed is very high, the ARCH coefficient should be as small as possible, in this case its value showing that the Romanian capital market has a high rate of adjustment. The GARCH coefficient, according to the model, is 0.64, which means that the Romanian stock market volatility in the past has a significant impact on the future. Thus, if the last volatility increases by 1% on average, then the present volatility will increase by approximately 0.64%.

### Conclusions and Recommendations

The Romanian capital market is not a developed one, being characterized by a fairly high level of volatility compared to the return associated with the stocks. However, in recent years, particular attention has been paid to the development of the national capital market, which is considered a good alternative to the realization of capital investments. In the theory are mentioned models for estimating the return on financial assets, but they are not considered useful in identifying the factors with significant impact on the stocks price. In this respect, it is recommended to use multi-factorial models, which involve a higher level of complexity, by including in the analysis a variety of indicators which may affect the evolution of rentability. The factors considered can be divided into two large categories, microeconomic or macroeconomic. Through this paper, we aimed at identifying the existing relations between the shares of listed companies on the Bucharest Stock Exchange rentability and microeconomic and macroeconomic determinants. The analysis included macroeconomic factors such as interest rate, inflation rate, exchange rate fluctuations, contagion effect, but also microeconomic factors, including financial rentability, price earnings ratio (PER.), price to book value (PBV), stock market capitalization, trading volume, beta coefficient, financial leverage. We mention that all the assumptions made at the stage of knowledge regarding the determinants of the stocks return influence were confirmed by the analysis performed at the global level.

Regarding the future researches is recommended to extend the analysis at the level of the entire Romanian capital market. It is also recommended to introduce VaR models for the purpose of studying volatility, being more useful in modelling volatility.

### Bibliography

- [1] Acatrinei, Marius, Gorun, Adrian, Marcu, Nicu,(2013). „A DCC-GARCH model to estimate the risk to the capital market in Romania”, Romanian Journal of Economic Forecasting, (1/2013), pg. 136- 148, online: [http://www.ipe.ro/rjef/rjef1\\_13/rjef1\\_2013p136-148.pdf](http://www.ipe.ro/rjef/rjef1_13/rjef1_2013p136-148.pdf).
- [2] Chirilă, V., Chirilă, C., (2012), „Relation between expected return and volatility at Bucharest Stock Exchange on business cycle stages”, Annales Universitatis Apulensis Series Oeconomica, 14(1), pg. 149- 163
- [3] Dornbusch Rudiger, Chul Park Yung, Claessens Stijin, (2000), „Contagion: understanding how it spreads”, World Bank Res Observer, 15(2), pg. 177- 197.
- [4] Epps, T. W., & Epps, M. L. (1976), „The stochastic dependence of security price changes and transaction volumes: Implications for the mixture distributions hypothesis”, Econometrica, 44, pg. 305-321.
- [5] Fama E (1981), „Stock Returns, Real Activity, Inflation, and Money”, American Economic Review, Vol. 71, pg. 545-565.
- [6] Floros, C., (2008), „Modeling Volatility using GARCH MODELS: Evidence from Egypt and Israel”, Middle Eastern Financial and Econometrics, 2, pg. 31 – 41.
- [7] Geske R and Roll R (1983), „The Fiscal and Monetary Linkages Between Stock Returns and Inflation”, The Journal of Finance, Vol. 38, pg. 1-33.
- [8] Koima, J.K., Mwita, P.N., Nassiuma, D.K., (2015), „Volatility Estimation of Stock Prices using Garch Method”, European Journal of Business and Management, vol.7, no. 19, pg. 108- 113.
- [9] Kurihara, Y., (2006), „The relationship between exchange rate and stock prices during the quantitative easing policy in Japan”, International Journal of Business, 11(4), pg. 375-386.
- [10] Lam, K. S. K., (2001), „The conditional relation between beta and returns in the Hong Kong stock market”, Applied Financial Economics, Vol. 11, Issue 6, pg. 669-680.

- [11] Lam, K.S., & Tam, L.H., (2011), „*Liquidity and asset pricing: Evidence from the Hong Kong stockmarket*”, *Journal of Banking & Finance*, 35(9), 2217-2230
- [12] Marshall, B. R., & Young, M., (2003), „*Liquidity and stock returns in pure order-driven markets: Evidence from the Australian stock market*”, *International Review of Financial Analysis*, 12, pg. 173-188.
- [13] O'Brien, M. A., Brailsford, T., & Gaunt, C., (2010), „*Interaction of size, book-to-market and momentum effects in Australia*”, *Accounting & Finance*, Vol. 50, Issue 1, pg. 197-219.
- [14] Paresh Kumar Narayan, Xinwei Zheng, (2011), „*The relationship between liquidity and returns on the Chinese stock market*”, *Journal of Asian Economics* 22, pg. 259 – 266
- [15] Pastor, L., & Stambaugh, R., (2003), „*Liquidity risk and expected stock returns*”, *Journal of Political Economy*, 111, pg. 642-685.
- [16] Patel Sandeep, Sarkar Asani, (1998), „*Crises in developed and emerging stock markets*”, *Financial Analysts J.*, 54(6), pg. 50-61.
- [17] Reider, R., (2009), „*Volatility Forecasting I: GARCH Models*”, online: [cims.nyu.edu/~almgren/timeseries/Vol\\_Forecast1.pdf](http://cims.nyu.edu/~almgren/timeseries/Vol_Forecast1.pdf).
- [18] Rogalski, R. J., (1978), „*The dependence of prices and volume*”, *The Review of Economics and Statistics*, 60, pg. 268-274.
- [19] Roll R., (1988), „*The international crash of October 1987*”, *Financial Analysts J.*, 44(5), pg. 19-35.
- [20] Stancu I., Stancu A.T., (2014), „*Revisiting multifactor models on the Bucharest Stock Exchange*”, *Economic Computation & Economic Cybernetics Studies & Research*, Vol. 48, Issue 30, pp. 309-324, online:  
a. [http://www.ecocyb.ase.ro/eng/Articles\\_3-2014/Stancu%20Ion,%20Stancu%20Andrei.pdf](http://www.ecocyb.ase.ro/eng/Articles_3-2014/Stancu%20Ion,%20Stancu%20Andrei.pdf).
- [21] Rizaldi Fauzi, Imam Wahyudi, (2016), „*The effect of firm and stock characteristics on stock returns: Stock market crash analysis*”, *The Journal of Finance and Data Science*, Vol. 2, Issue 2, pg. 112-124.
- [22] Thorbecke, W., (1997), „*On stock market returns and monetary policy*”, *The Journal of Finance*, 52(2), pg. 635-654.
- [23] Tibebe A. Assefa, Omar A. Esqueda, André Varella Mollick, (2017), „*Stock returns and interest rates around the World: A panel data approach*”, *Journal of Economics and Business* 89, pg. 20-35.
- [24] Tudor, C., (2008), „*Gestiunea portofoliilor internaționale: selecție, analiza,*

*managementul riscului*”, The Bucharest University of Economic Studies.

- [25] Wahyudi Imam, Sani Gandhi A.,(2014), „*Interdependence between Islamic capital market and money market: evidence from Indonesia*”, *Borsa Istanbul Review*,14(1), pg. 32-47.