

## Return on securities of the listed banks, using BET and BET-C indices of the Bucharest Stock Exchange

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**Abstract.** *The present work has great importance for the economic and financial area due to the fact that targets the relevance of the financial indicators in anticipation of the stock variation. The aim is to measure the correlation, the type and intensity, between the variation of stock market profitability and the profitability of the securities traded by banks in Romania, listed on the BSE. The research is approached transversely (banks in Romania listed on the stock market) as well as longitudinally (from the date of listing on the Stock Exchange of each bank until 31.12.2016). Using the econometric model Eviews we tested the correlation between the profitability of BRD, BT, BCC bank's securities and the profitability of Bucharest Stock Exchange, by BET and BET-C. The results show that the research hypothesis isn't validated for any of those banks.*

**Keywords:** stock market indices, stock market rates, securities, profitability, correlation.

**JEL Classification:** D81, E44, G21.

### 1. Introduction

Of particular importance in the analysis of financial market information is the correlation that exists between the variation of the return on securities versus the variability of the overall market efficiency, as the establishment of a portfolio takes into account the risk of each of the securities, but especially the correlation with the evolution of the market. As far as the present represents a certainty, the investment in securities consists of the exchange between a certain immediate advantage and an uncertain advantage.

Thus, Stancu and Huidumac (1999, p.31) consider the risk embedded in a security represents, for an investor, uncertainty that exists regarding the future value of the item.

### 2. Objectives and research method

The main objective of the paper is to determine the profitability of the securities of the three banks listed on the Romanian Stock Exchange (the Romanian Development Bank - BRD, Transilvania Bank - TLV, Carpathian Commercial Bank - BCC) and to identify the its correlation with the profitability of the stock market.

The epistemology of this particular research is positioned in the sphere of scientific knowledge regarding the correlation of the performance of the banks that trade shares in the stock market with the profitability of the capital market. We consider that any scientific development is a response to a concise, realistic and relevant

question related to the chosen research field.

It was not arbitrary that Decartes said it was harder to ask a question than to answer a well-asked question. The same opinion shared by Claude-Levi Strauss, noting that the scientist is not the one who gives the real answers, is the one who puts the real questions. Specifically, the question that underlies the present research may be: "Does the profitability of the capital market in our country have an impact on the profitability of the securities traded by the listed banks?"

The investigation of the specialized literature shows that there are many studies that looked into this topic and tried to establish whether the accounting values created within the enterprise are recognized by the market. Lev (1989) believes that the relevance of financial indicators is defined by their ability to create value for investors. In many studies (Munteanu, 2014) the relevance of financial indicators is measured by the exchange rate volatility when the financial statements of a listed company are published. Entities listed on the stock exchange are powerful if they have useful and timely information and if they know how to use them in anticipating the market quotations in a given economic climate.

This research is mainly quantitative, because it is based on the data collected from the websites [www.ktd.ro](http://www.ktd.ro), [www.bvb.ro](http://www.bvb.ro), from the financial statements of the three banks under study, on statistical methods, on the logical formulation of assumptions. By collecting the information on the aforementioned sites on the evolution of the exchange rates, throughout the period from the listing of the banks under study, our research also has a qualitative dimension. Moreover, the scientific research can be included within the positivist trend, whose assumptions lead to results obtained under its peculiar requirements. In the view of the French philosopher Auguste Comte positive is the same thing as real and useful, meaning that empirical observations have universal value.

### **3. The State of Knowledge**

By using the model elaborated in 1952 Markowitz claimed that the variation in the course of a title or portfolio of securities is determined by the market. In the context of the difficulties in applying this model, in 1964, Sharpe develops another more simplified, unifactorial model that determines a correlation between individual returns on securities and a macroeconomic factor. The relationship between the return on equity and market profitability is highlighted by the market model, which quantifies the linear correlation between the individual return on securities and the overall profitability of the stock market. The most important parameter of the regression function is the beta coefficient (volatility coefficient). The relationship between the capital market and the macroeconomic variables has been the subject of many specialized studies, analyzing the influence of the variables on the listed securities.

One of the earliest researches on efficiency issues on the Romanian market suggested that movements in financial asset prices could well be described by a random walk process, with an important part of the available information being incorporated into these prices. There are, however, a number of features of the financial market that do not respond to the assumption of efficient markets (Dragotă and Mitrică, 2004). Other subsequent studies on efficiency in the Romanian capital market have not formulated clear conclusions of informationally efficient markets. A synthesis of these is done by Dragotă, Căruntu and Stoian (2006).

The share price is influenced by certain events, such as the publication of

annual results, announcements of dividends, divisions, spitting, mergers, takeovers, or public purchase bids. A reference paper on this topic belongs to Dragotă (2005), which supports the idea that companies with dispersed shares have a dividend payment rate higher than those with concentrated shareholders around a significant shareholder.

The analysis of the significance of the financial indicators for measuring the performance of the enterprise and the relevance of the value creation management for the shareholders, analyzed by Dumitrescu, Dragotă, Ciobanu (2002, p.86), contributes to the understanding of the usefulness of the fundamental analysis in the valuation of listed companies on BVB. In the enterprise assessment, as a measure of value creation for shareholders, the Gordon Shapiro model can be considered in its evolved forms, which take into account different growth rates, corresponding to the specific periods of the company's evolution. In order to have a highly discriminatory representation of the intrinsic value of the shares and until the rate reaches the equilibrium price level, the investors could identify, with the help of the fundamental analysis, the undervalued or overstated actions (Stancu, 2007, p.117). Dumitrescu, Dragotă, Ciobanu (2002, p.26) conclude that for evaluation, future events are uncertain, but their nature is known and any investment model should reflect these events in a probabilistic way. The investor will thus associate a level of uncertainty with his own assessment. In addition to actual data, such as a limited valuation method, such as a net asset, the investor will also associate emotional, personal logic elements when contemplating including or excluding an investment title from the individual portfolio. Since the judgment and the human decision are not infallible but susceptible to different personal changes and interpretations at the time of public dissemination, the past price does not in any way indicate the subsequent price (Mitroi, 2014, p.84). In our paper, in order to deeply explore the topic, we analyzed the type and intensity of the correlation between the variation in the return on securities traded by the listed banks and the market return volatility on the Bucharest Stock Exchange.

#### **4. Empirical deepening and developments regarding the stock exchange profitability**

The financial market has an important economic role because it contributes to the development of a nation, and from a social point of view it allows to make some gains by transferring funds from investors to those in need of financing. This transfer between the supply of funds (the investors) and the capital demand is done with the help of the securities and the institutions that have been institutionalized for financial investments (Anghelache, 2000, p.29).

The profitability of the stock market informs us to what extent it contributes to the development of the national economy through an efficient capitalization of the transfer of funding resources to those facing a deficit. The main indices reflecting the performance of the capital market are:

➤ The BET (Bucharest Exchange Trading) index is a weighted index with stock market capitalization and includes the shares of the 10 most liquid companies listed on the BSE regulated market, in categories I and II, with the exception of financial investment companies traded on the regulated market administered by BVB, Investment funds and other entities assimilated to them. The BET has been used on the Romanian capital market since September 19th, 1997, with a starting value of 1,000 points, in order to record the overall price trend of the 10 most liquid shares traded on the BSE. The companies taken into account in the calculation of the BET

index shall be established taking into account:

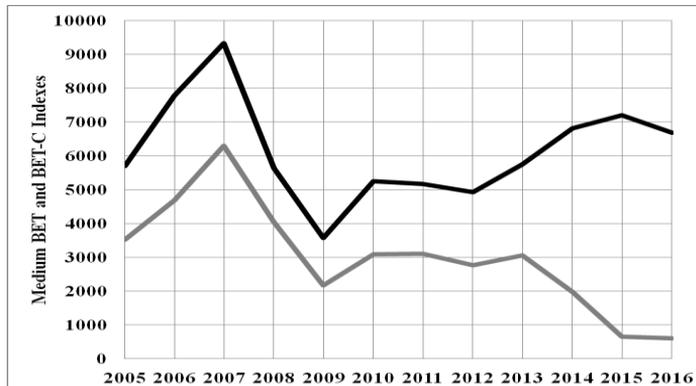
- liquidity, which, according to the BET index manual, denotes the share of the value of the transactions carried out by a listed company in the total amount of transactions within the regulated market within a certain timeframe;
- the interest of market participants.

We consider that this index should include more companies listed on the Stock Exchange in order to reflect more accurately the overall profitability of the Romanian capital market.

➤ The BET-C (Bucharest Exchange Trading) index is a composite index, functioning on 16.04.1998, to reflect the overall evolution of all companies listed on the BVB, the regulated market segment. The calculation of the index is based on the weighted average of the stock market capitalization of the shares in the index portfolio.

This index has a limit in that its value can be significantly distorted when it is also comprises companies with low liquidity on the value of transactions and high price variations.

Based on BET and BET-C exchange rates, taken from the Bucharest Stock Exchange website ([www.bvb.ro](http://www.bvb.ro)), we determined their average annual stock exchange rates (as a simple arithmetic mean) for the period 2005 - 2016 (the common period of the three banks surveyed, taking as reference the date of their listing on the BSE). The chart below highlights the evolution of the BET and BET-C indices, which during the period 2005-2016 reach the maximum value in 2007, the impact of the financial crisis being fully in 2009, when the two indices reach the bottom value. From 2009 to 2016, the BET index has been slightly recovering, reaching the values recorded in 2005-2009, while the BET-C index is similar to the BET index until 2013, after which, starting in 2013, decreases strongly until 2016;



**Chart 1** The Evolution of BET and Average BET-C Indexes in the Period 2005-2016

➤ The Bucharest Exchange Trading Investment Fund (BET-FI), functioning from October 31, 2000, consists of financial investment companies and other entities assimilated to them, admitted to trading on a regulated market managed by BSE. It is the first sector index released reflecting the overall trend of the stock prices of fund units (of investment funds) traded on the stock exchange.

## 5. Aspects and positions regarding the profitability of the Romanian banks listed on the BSE

In order to reflect the profitability of the three banks surveyed, we determined the profitability of their securities based on exchange rates (taken from the BSE website of BSE), using the mathematical formula:

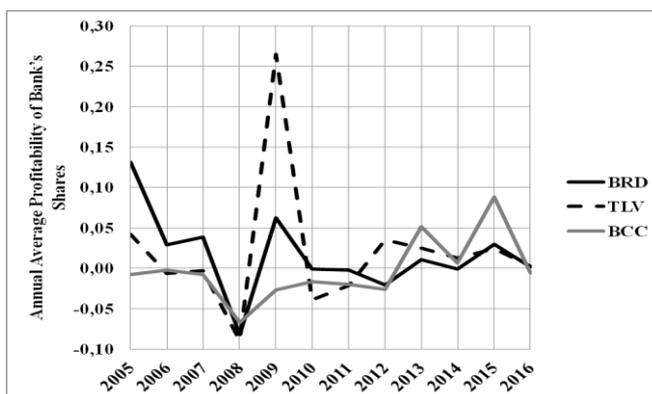
$$\Delta R_{CB} = \frac{CB_1 - CB_0}{CB_0},$$

where:

- $\Delta R_{CB}$  - the variation of the exchange rate profitability;
- $CB_1$  - current month exchange rate;
- $CB_0$  - previous month exchange rate.

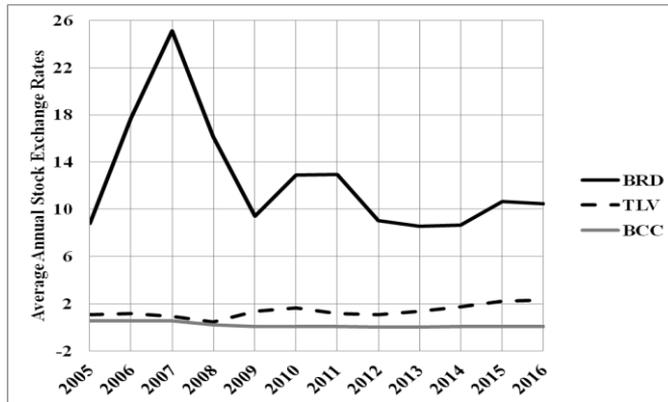
The share, as a security, is a quota of the social capital of the listed economic entity, and gives its owner patrimonial and non-patrimonial rights.

The chart below shows the comparative evolution of the average annual return on securities traded by the three banks surveyed for the period 2005-2016. It reveals the decrease in the profitability of the shares of the three banks during the period 2005 - 2008, after which they recorded increases in 2009, more significant being those of Transilvania Bank's shares. In 2010-2012, negative annual returns on the shares of the banks surveyed were recorded, except for the TLV shares that were in the positive area starting in 2012 and throughout 2013-2016.



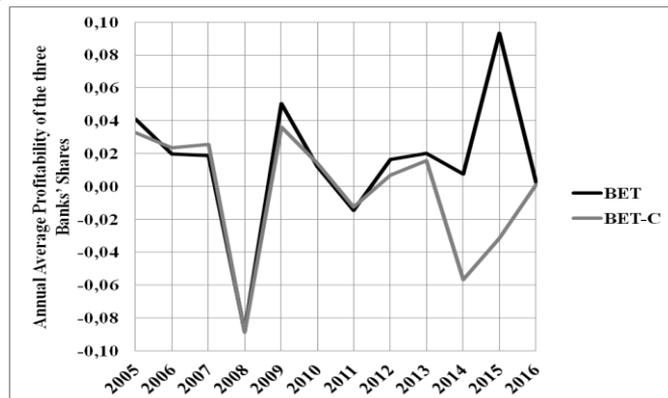
**Chart 2** The Evolution of the Annual Average Profitability of the three Banks' Shares in the Period 2005-2016

The comparative evolution of the average annual stock exchange rates of the three banks surveyed for the period 2005-2016 is shown in the following graph. It is noticed that up to 2007 the average stock exchange rate of BRD shares registered significant increases, followed by an equally significant decrease until 2009, continued with a steady increase in 2010-2011, a decrease in the period 2012-2014 And growth over the past two years of the time horizon under analysis. Instead, the average stock exchange rates of Transilvania Bank and Carpathian Commercial Bank, respectively, were characterized by relatively constant evolutions in the period 2005-2016, mentioning that in the last two years of the time horizon under study, the evolution of the shares of the TLV registered a higher growth compared to the previous period.



**Chart 3** Evolution of the Average Annual Stock Exchange Rates of the three Banks in the Period 2005-2016

The evolution of the profitability of the two BET and BET-C indices over the period 2005-2016 is shown in Chart no. 4, which shows the drastic decrease and the entry into the negative territory of the profitability of the two indices until 2008, followed by a recovery in 2009, 2010, negative values of the returns of both indices in 2011, and subsequently positive trend for the BET index by the end of the time horizon analyzed, i.e. 2012-2016.



**Chart 4** Evolution of the BET and BET-C Profitability in the Period 2005-2016

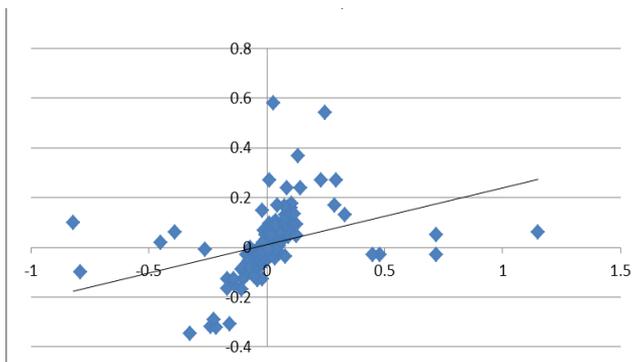
## 6. Empirical study on the validation of the formulated research hypothesis

### 6.1 Correlation of the profitability of BRD shares with market profitability (BET)

The impact of the change in market profitability on the variability in the profitability of a security is also captured graphically, by plotting the regression line of the intersection points of returns recorded by the market and the respective share over a certain period of time. The more the regression line is closer to the Y axis, the higher

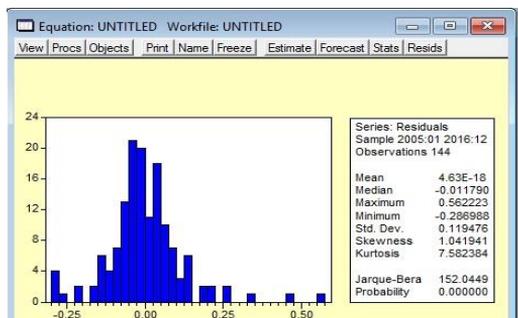
the correlation level, and the title is more volatile. For example, we chose to represent the correlation between BRD's return on securities and market profitability.

Testing the relationship between the two variables, the market volatility - the independent variable and the variance of the BRD shares' return - dependent variable, is achieved using the econometric program leading to the results presented in the chart below. The level of the coefficient of determination R2 represents the extent to which the variability of the individual profitability of a title is explained by the market's profitability by using the linear model.



**Chart 5** The Correlation of the Variation of Market Efficiency (BET) with the Variation in the Return on BRD Shares

The relationship between the variance of the market return (the independent variable of the regression model) and the variance in the profitability of the BRD shares (the dependent variable of the regression model) is described by the linear regression function:  $BRD = a + b * BET + \epsilon$  (where  $\epsilon$  is the residual).



Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.012416	0.010020	1.239167	0.2173
BET	0.227639	0.050520	4.505934	0.0000

R-squared	0.125096	Mean dependent var	0.015822
Adjusted R-squared	0.118934	S.D. dependent var	0.127733
S.E. of regression	0.119896	Akaike info criterion	-1.390588
Sum squared resid	2.041266	Schwarz criterion	-1.349341
Log likelihood	102.1224	F-statistic	20.30344
Durbin-Watson stat	1.659416	Prob(F-statistic)	0.000014

Subsequently, there are verified the hypotheses corresponding to Least Squares Method are tested for validation (table no.1).

**Table 1. The hypotheses corresponding to Least Squares Method (in case of the BET parameter)**

The Durbin-Watson statistical test			The statistical test $\chi^2$		The statistical test t		The statistical test F
Dc	D1	D2	JB	$\chi^2$	a	b	Fc
1,66	1,5	1,58	152,05	9,21	0,012416	0,227639	20,30
The calculated value of the test is higher than the theoretical value ( $Dc \geq D2$ ), so the assumption of error independence is verified			The error normality hypothesis is not verified		The BRD parameter estimator is not significantly different from zero	The BET parameter estimator is significantly different from zero	Market profitability is an important factor for the profitability of BRD's shares

After testing and (in)validating the four hypotheses, the resulting econometric model for BRD has the following equation:

$$BRD = 0.0124 + 0.227 * BET \quad (R^2 = 0.1251)$$

Increasing BET profitability with a unit results in an increase in the return on BRD shares by an average of 0.23 units. The determination coefficient (R-squared = 0.125096) shows that approximately 12.5% of the variation in the return on BRD shares is explained by the variation in BET profitability, the remaining variance of about 87.5% being explained by factors not included in the model. Between the two variables there is a direct and weak link. Adjusted R-squared = 0,118934 takes into account the number of observations and the exogenous variables. The correlation coefficient ( $r = 0,353689$ ) tending toward 1 demonstrates that the estimated regression model approximates the observation data well, with a degree of reliability suggesting that the model can be developed in future research to obtain better results.

For Transilvania Bank (TLV) and Carpathian Commercial Bank (BCC), the results of the calculation performed with the Eviews program are presented in table no. 2.

**Table 2. The parameters' coefficients for the analysis of the correlation between the profitability of the three banks' return on capital market return (BET)**

	a	b	R-squared	Ajusted R-squared	r (Correlation. Coef)
BRD	0.012416	0,227639	0,125096	0,118934	0,353689
TLV	0,020359	0,076078	0,00535	-0,00166	0,0728
BCC	-0,00118	0,254108	0,081617	0,07515	0,2857

After testing and (in)validating the four hypotheses, the resulting econometric model for TLV has the following equation:

$$TLV = 0,02035+ 0,0760*BET \quad (R^2 = 0,0053)$$

An increasing BET profitability with one unit results in an increase in the profitability of Transilvania Bank's shares by an average of 0.076 units. The coefficient of determination ( $R$ -squared = 0.00535) shows that approximately 1% of the yield variation in Transilvania Bank's shares is explained by the variation in BET profitability, the remainder of the variance of about 99% being explained by factors not included in the model. There is an indirect and weak link between the two variables. Adjusted  $R$ -squared = -0.001655 takes into account the number of observations and the exogenous variables. This model can be developed in future research to achieve better results.

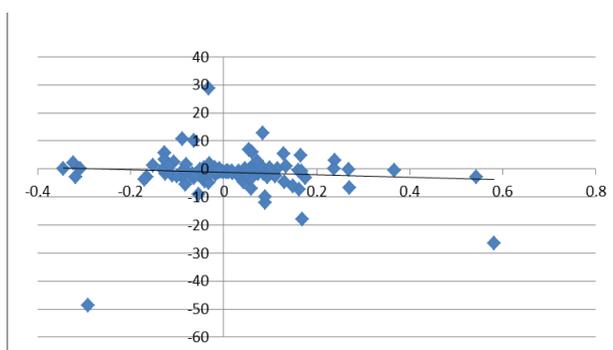
Concerning the Carpathian Commercial Bank, following the verification of the four hypotheses, the econometric model follows:

$$BCC = - 0.0011 + 0.2541 * BET \quad (R^2 = 0.0816)$$

Therefore, increasing BET profitability with a unit determines the profitability of CBC shares on average by 0.25 units. The determination coefficient ( $R$ -squared = 0.081617) shows that approximately 8% of the BCC profitability variation is explained by the BET profitability variation, the remainder of the variance of about 92% being explained by factors not included in the model. Between the two variables there is a direct and weak link. The Adjusted  $R$ -squared coefficient = 0.07515 takes into account of the number of observations and the exogenous variables. The correlation coefficient ( $r = 0.2857$ ) demonstrates that the estimated regression model has a poor correlation, suggesting that the model can be developed in future research to achieve better results.

In conclusion, the hypothesis tested by us lead to the following results: there is a direct and strong correlation between the variation in the profitability of the titles of the listed banks on the Bucharest Stock Exchange and the change in the market value (BET), which is not valid for the Romanian Development Bank (BRD); it is invalidated for Transilvania Bank (TLV) or Carpathian Commercial Bank (BCC).

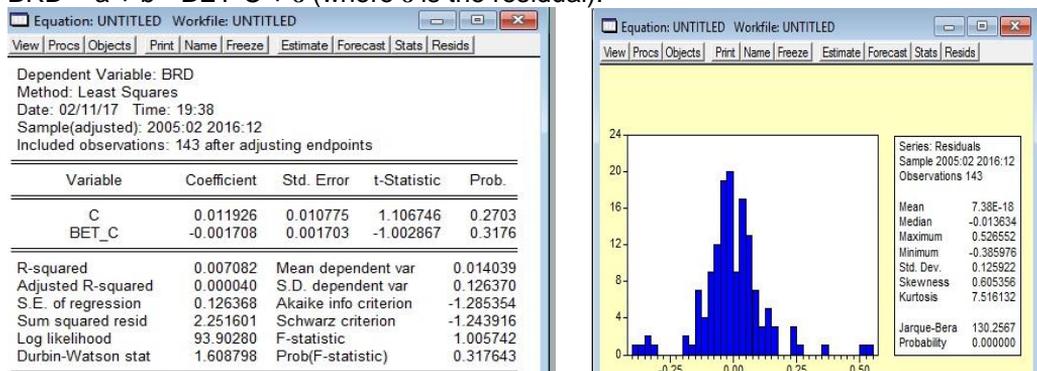
## 6.2. Correlation of the profitability of BRD shares with the profitability of the capital market (BET-C)



**Chart 6** Correlation of the Return on Capital Market (BET-C) with the Variation in the Return on BRD Shares

Testing the relationship between the two variables, the market volatility and the variance of the BRD shares' return, is achieved using the econometric program leading

to the results presented in the Chart 6. The relationship between the BET-C profitability volatility (the independent variable of the regression model) and the variance of BRD (regression model dependent variable) is described by the linear regression function:  $BRD = a + b * BET-C + \varepsilon$  (where  $\varepsilon$  is the residual).



Subsequently, the hypotheses corresponding to Least Squares Method are tested for validation (table no. 3).

**Table 3. The hypotheses corresponding to Least Squares Method (in case of the BET-C parameter)**

The Durbin-Watson statistical test			The statistical test $\chi^2$		The statistical test t		The statistical test F
Dc	D <sub>1</sub>	D <sub>2</sub>	JB	$\chi^2$	a	b	F <sub>c</sub>
1.61	1.5	1.58	130,26	9,21	0,00119	-0.0017	1.06
The calculated value of the test is higher than the theoretical value (Dc ≥ D2), so the assumption of error independence is verified			The error normality hypothesis is not verified		The BRD parameter estimator is not significantly different from zero	The estimator of the parameter BET- C is not significantly different from zero	Market profitability is an important factor for the profitability of BRD's shares.

Following the verification of the four hypotheses, the econometric model equation for BRD is:

$$BRD = 0.00119 - 0.0017 * BET-C \quad (R^2 = 0,0071)$$

An Increasing BET-C's profitability with one unit results in a decline in ROE's return on average by 0.0017 units. The correlation coefficient ( $r = 0.0843$ ) tends to 0, which shows that there is a weak link between the two variables. Approximately 1% of the variation in the stock exchange rate of BRD shares is justified by the BET-C

exchange rate variation, the remaining 99% by the variation of other factors not included in the model.

For Transilvania Bank (TLV) and Carpatica Commercial Bank (BCC), the results of the calculation performed with the Eviews program are presented in table 4.

**Table 4. The parameters for the analysis of the correlation between the three banks' return on securities and the capital market return (BET-C)**

	a	b	R-squared	Ajusted R-squared	R (Corelation Coef.)
BRD	0.011926	-0,00171	0,007082	0,00004	0,0843
TLV	0,018108	0,97068	0,001482	-0,0056	0,1755
BCC	-0,00026	-0,02302	0,000001	-0,00709	0,0686

After testing and (in)validating the four hypotheses, the resulting econometric model for TLV has the following equation:

$$TLV = 0,0181 + 0,97068 * BET-C \quad (R^2 = 0,0015)$$

Increasing the BET-C profitability with one unit determines the profitability of Transilvania Bank's shares on average by 0.9706 units. The correlation coefficient ( $r = 0.1755$ ) suggests that the link between the two variables: the return on equity of Transilvania Bank and return on the capital market (BET-C) is indirect and weak. Approximately 1% of the variation in the return on shares of Transilvania Bank is justified by the BET-C exchange rate variation, the remaining 99% by the variation of other factors.

In regard of the Carpathian Commercial Bank, the verification of the four hypotheses leads to the following econometric model:

$$BCC = -0.00026 - 0.02302 * BET-C \quad (R^2 = 0,000001)$$

An increasing of BET-C profitability with one unit results in a decline in CAB profitability by an average of 0.023 units. The correlation coefficient ( $r = 0.0686$ ) shows that there is an indirect and weak link between the two variables. Approximately 1% of the variation in return on CBC shares is justified by the change in BET-C profitability, the remaining 99% by the variation of other factors not included in the model.

In conclusion, the hypothesis tested by us conclude that: there is a direct and strong correlation between the variance in the return on equity of the listed companies on the Bucharest Stock Exchange and the change in the market return (BET-C) not valid for any of the banks surveyed.

## 7. Conclusions

In the scientific approach of our empirical study, we sought to validate the research hypotheses formulated within this paper. Hammersley (1987) regards that a research study is valid or true if we really measure what we want to measure. Based on the study, we noted that the variation in market profitability influenced the value of the securities traded on the Bucharest Stock Exchange by the banks under observation, either with high or low intensity. To conclude, our research hypothesis: *there is a direct and strong correlation between the variation in the profitability of the*

*securities of the banks listed on the Bucharest Stock Exchange and the variation in market profitability* is valid for none of the sample banks analyzed (BRD, TLV, BCC).

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