



ANALYSIS MODEL OF THE CAPITAL MARKET IN ROMANIA

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Abstract *This article aims to use the existing statistical-econometric instrument in order to achieve a complex analysis of the Romanian capital market evolution as well as to identify certain econometric models capable to reflect the correlation between the main indicators and, mainly, to identify some general tendencies concerning their subsequent evolution. Actually, we accomplished an analysis of the characteristic, the actual modality to organize the financial instruments being used and of the activity carried on by the capital market in Romania during the year 2014. In this respect, there are submitted aspects concerning its structure as well as the value and the monthly evolution of the main indicators recorded. Since the stock exchange capitalization represents one of the most significant indicators utilized for featuring a stock exchange market, by applying the regression econometric model we have studied the correlation between this one and other analysed indicators.*

Key words:

financial instruments, stock exchange indices, stock exchange capitalization, regression model, the least squares method.

1. Introduction

The capital market means an essential component of any national economic system which aims to secure the necessary frame for the transfer of capital between the holders of financial resources and those entities wishing to draw the respective resources which are willing to offer in exchange a series of financial instruments. In the frame of the stock exchange markets there is a large number of economic entities, having as goal to get a profit as high as possible under the circumstances of a steady development of the stock exchange market in Romania which, since the moment of the re-opening of the Bucharest Stock Exchange in 1995 up to date, became a complex structure characterized by an extremely underlined dynamism of the investment activity implying the setting up of certain statistical-mathematical models through which the main processes occurring on this market can be modelled, allowing an easier administration of all the operations involved by the investing activity.

2. Research methodology

In the frame of the research we aimed to demonstrate the significance of the application of statistical-econometric models in the capital market analysis, emphasizing the opportunities offered by such a system of indicators for performing complex and pertinent analyses. In order to demonstrate, both

theoretical and practical, the utility of applying econometric models, we used a series of notions, indicators and models specific to a number of sciences such as finances, statistics and econometrics, achieving thus a study of the outcomes of the activity run by the Bucharest Stock Exchange monthly recorded for the year 2014.

3. The analysis of the outcomes of the Bucharest Stock Exchange indicators in 2014

The main market operator in Romania is the Bucharest Stock Exchange which is a stock exchange of medium size in the region and which role is to supply an organized market for transacting assets, to contribute to the increase of the assets liquidity through concentrating in the market an as large as possible volume of financial assets, to contribute to the forming of prices reflecting adequately the relation between the demand and the offer typical for the capital market and to disseminate these prices to the public.

A short characterization, in figures, of the BSE activity outcomes in the year 2014, shows the following:

- By the end of the year 2014, the stock exchange capitalization counted for 28.987 billion euro, of which 8.384 billion euro represented the stock

exchange capitalization of the listed Romanian companies, respectively 63.42%;

- On the regulated market a volume of transactions amounting almost 3,2 billion euro has been recorded, meaning by 7.2% more as comparatively the year 2013 (2.985 billion euro);
- The daily average value of transactions on shares recorded on the regulated market, including the offers as well, counted for almost 11.7 million euro, by almost 16% over the average for 2013;
- The offers values decreased slightly, by 3.7%, to 921.6 million euro as against 957 million euro in 2013.

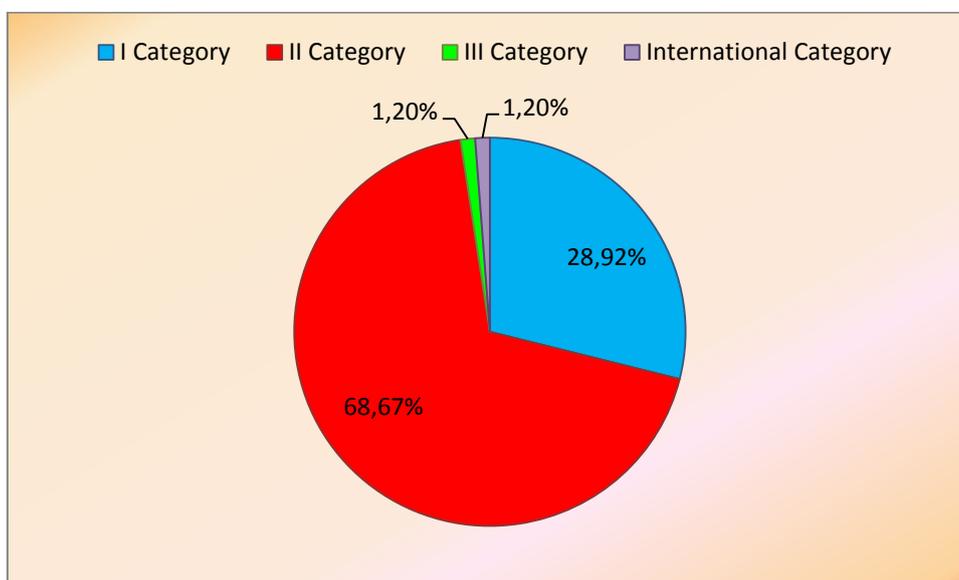
In the frame of the Bucharest Stock Exchange financial instruments from the following categories are transacted: capital assets, credit assets, collective placement organisms, structured products. In order to be admitted for transaction on the regulated market, the financial instruments must comply with the following conditions:

- To be registered with the Authority for Financial Surveillance;
- To be transferable;
- To be issued in a de-materialized form;

- To be integrally paid and underlined through account registration;
- The shares must be of the same class.

In order to be admitted for transaction a company must comply with a series of conditions, namely: to be a company organized by shares; to have an anticipated capitalization/self-capitals of minimum 1 million Euro; to have a free-float of minimum 25% (shares being not held by the company or by strategic investors); to be functioning over the last 3 years and to provide audited financial reports for the last 3 years.

The shares quoted at the Bucharest Stock Exchange are structured in four classes, the classification criteria being based on the values recorded by several specific indicators. In the year 2014, according to the data published by the Bucharest Stock Exchange, the structure of the 83 shares quoted on the regulated market is the following: category I, 24 shares; category II, 57 shares; category III, 1 share; International category, 1 share – Erste Group Bank AG (pointing out that starting with the year 2015, the classes of shares are structured in the categories Premium, Standard, Other intl, Int'l). In 2014, as well as in the previous year precedent, the shares of the category II are dominating, holding a weight of 68.67%, a graphical representation of the composition by types of shares being submitted below:



Graphic no. 1. The structure of shares within BSE in the year 2014

A relevant aspect which must be taken into account in order to achieve a pertinent analysis of the capital market in Romania is given by the development of the

transactions on financial instruments concluded through the Bucharest Stock Exchange (BSE).

Table no. 1. The indicators concerning the transactions on shares in the frame of BSE during the year 2014

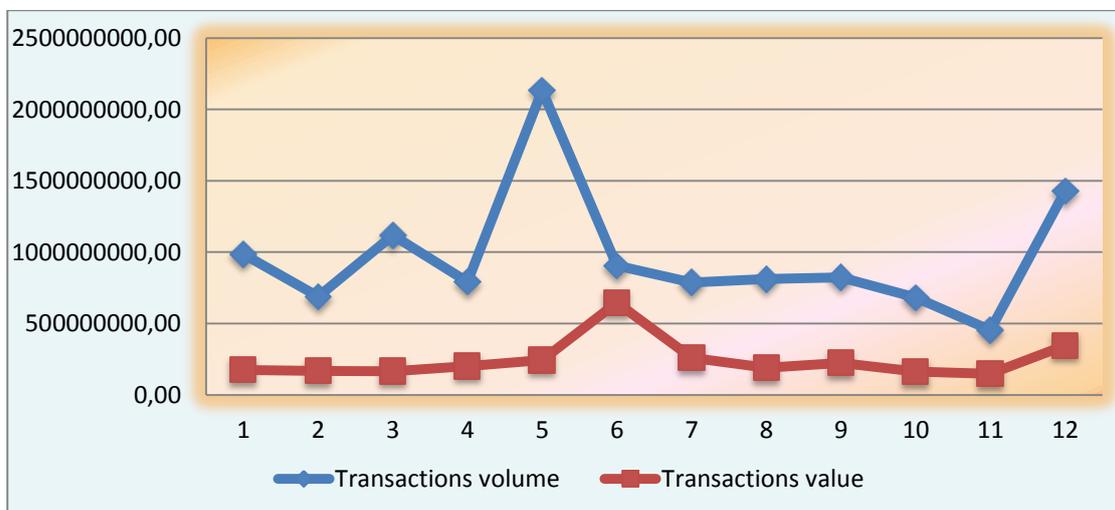
Month	Transactions volume		Transaction value (euro)	
	Absolute value	Δ% **	Absolute value	Δ%**
January	987,179,032	-	175,210,225	-
February	689,970,338	-30.11	167,363,367	-4.48
March	1,118,447,090	62.10	164,899,457	-1.47
April	791,909,476	-29.20	200,790,473	21.77
May	2,134,092,883	169.49	243,229,460	21.14
June	906,543,488	-57.52	646,614,473	165.8
July	787,423,902	-13.14	259,034,035	-59.94
August	811,231,894	3.02	190,564,863	-26.43
September	823,432,252	1.50	223,579,470	17.32
October	681,309,992	-17.26	163,177,978	-27.02
November	453,360,006	-33.46	148,821,878	-8.80
December	1,430,334,615	215.50	347,475,378	133.48

*Data taken over from the monthly BSE Bulletins, January – December 2014

**Fluctuation as against the previous month. Self-calculations

The biggest increase of the transactions values against the previous month is stated out for the June month, by 165.8% comparatively with May 2014; in fact, out of the period making the subject of the analysis, in this month the maximum transacted value recorded for the section shares, respectively

646,614,473 Euro, a fact due to the accelerated private placement achieved by the Property Fund S.A. to Romgaz S.A., as well as to the initial public offer developed on Electrica S.A., both achieved in June 2014.



Graphic no. 2. Monthly evolution of transactions on shares within BSE in 2014

In order to let the bonds be admitted for transactions, the minimum value of the issue should equal in RON the sum of 200.000 EUR. In case that the issue value is below this threshold, the Authority for Financial Surveillance may grant a special approval so that the issue is admitted for transactions. In the year 2014, the

bonds issued by the 71 companies transacted on the regulated market were structured by the following categories: state equities, municipalities, corporative bonds and International (European Bank for Reconstruction and Development)

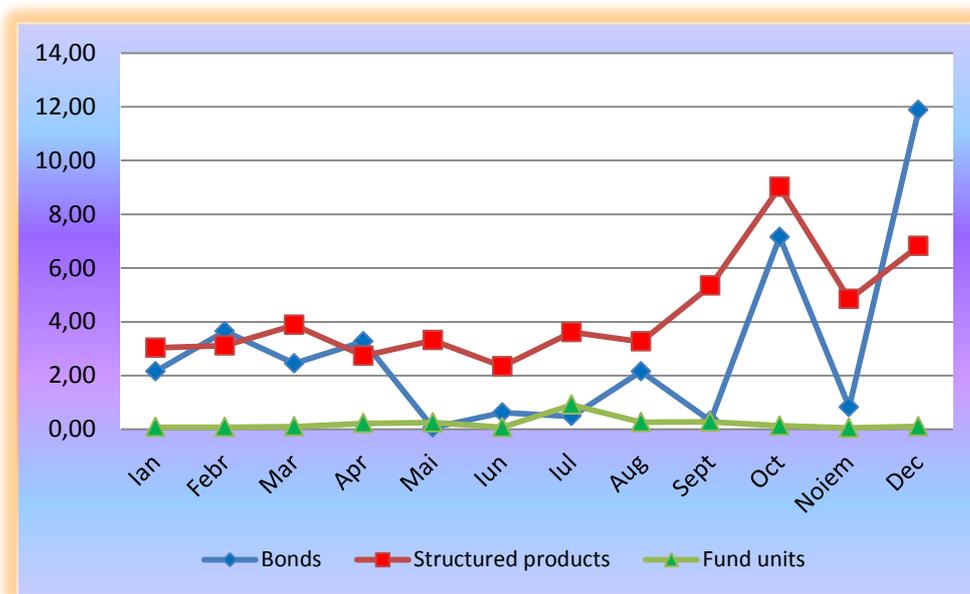
Table no. 2– Centralization of the equities transacted on the regulated market, other than shares*

Month	Transacted value (million Euro)			
	Bonds	Structured products	Fund units	Futures
January	2.15	3.03	0.08	0
February	3.65	3.11	0.08	0
March	2.45	388	010	0
April	3.27	2.73	0.22	0
May	0.06	3.31	0.25	0
June	0.62	2.34	0.07	0
July	0.48	3.61	0.91	0
August	2.15	3.26	0.26	0
September	0.31	5.34	0.28	0
October	7.15	9.01	0.13	0
November	0.82	4.84	0.05	0
December	11.88	6.82	0.11	0

* Data taken over from the monthly BSE Bulletins, January – December 2014

During the first half of 2014, on the BSE bonds market there have been 4 new instruments admitted for transactions, namely: 1 government securities and 3 corporative bonds, which public offers addressed mainly to the institutional investors. The number of the transactions on the secondary market of the bonds has been extremely low, under the conditions of a reduced liquidity. The activity itself has been a low one, the weight of the transactions on bonds within the total

circulation of BSE being insignificant. As far as the activity on structured products is concerned, to note the diminishing of their number simultaneously with the significant decrease of the transacted value although the number of transactions increased comparatively with the last months of the year 2013. The certificates transacted on the regulated market are structured in the categories Index, Turbo, Bonus and protected capital.



Graphic no. 3. The monthly evolution of the transactions on financial instruments, other than shares, in the frame of BSE in 2014

The main index of the capital market in our country, BET (Bucharest Exchange Trading), is a price index weighted with the free-float capitalization which reflects

the overall tendency of the shares issued by the first ten companies, classified depending on their liquidity. As a result of the quarterly adjustment of the BET index

for the year 2014 (December 12th), its structure was the following: OMV PETROM S.A. (SNP): 19.99%; FONDUL PROPRIETATEA (FP): 19.98%; S.N.G.N. ROMGAZ S.A. (SNG): 15.65%; BANCA TRANSILVANIA S.A. (TLV): 13.93%; BRD - GROUPE SOCIETE GENERALE S.A. (BRD): 9.57%;

ELECTRICA SA (EL): 7.98%; S.N.T.G.N. TRANSGAZ S.A. (TNG): 5.91%; C.N.T.E.E. TRANSELECTRICA (TEL): 4.20%; S.N. NUCLEARELECTRICA S.A. (SNN): 1.81; BURSA DE VALORI BUCURESTI S.A. (BVB): 0.98%.

Table no. 3. BET index in the frame of BSE in 2014

Month	Absolute value (euro)	$\Delta\text{BET}_{(01)}^*$ (%)	ΔBET^{**} %
January	4,939.04	-	-
February	4,980.97	0.85	0.85
March	4,942.98	0.08	-0.76
April	5,027.32	1.79	1.71
May	5,322.41	7.76	5.87
June	5,567.63	12.73	4.61
July	5,452.88	10.40	-2.06
August	5,639.50	14.18	3.42
September	5,733.81	16.09	1.67
October	5,550.42	12.38	-3.20
November	5,459.46	10.54	-1.64
December	5,494.86	11.25	0.65

* Percentage fluctuation of BET index during the current month as against the January month

** Percentage fluctuation of BET index during the current month as against the previous month

One of the factors with a significant influence on the value of the BET index is given by the stock exchange capitalization which is an indicator of the potential of an exchange stock market as it is reflecting

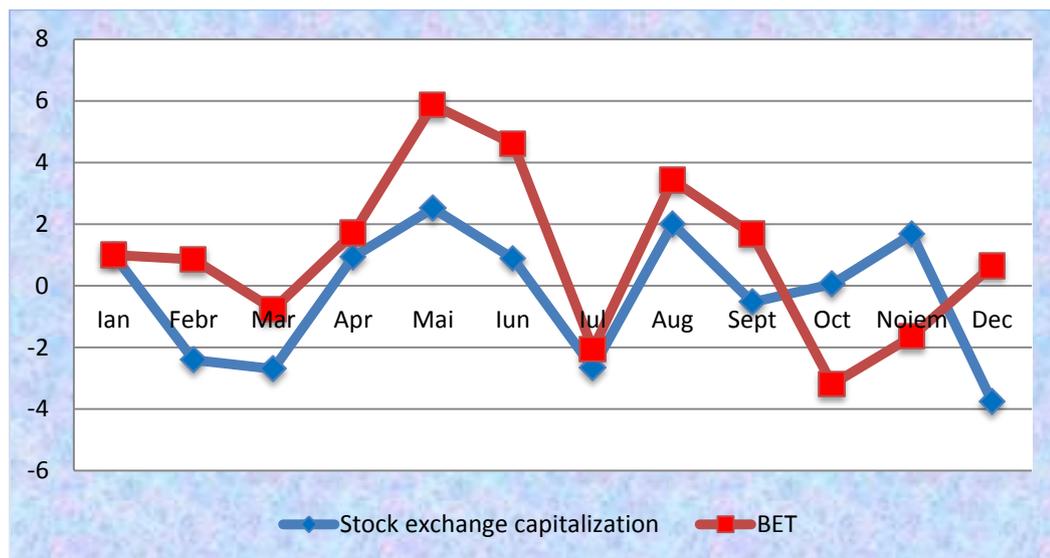
the market value of the listed companies. This is set up as a sum of the products between the number of shares issued by each of the listed companies and the market price corresponding to these shares.

Table no. 4. Stock exchange capitalization in the frame of BSE during the year 2014

Month	Absolute value (euro)	$\Delta_{(01)}^*$ (%)	Δ^{**} %
January	30,254,457,179.69	-	-
February	29,526,327,859.06	-2.41	-2.41
March	28,727,868,271.87	-5.05	-2.70
April	28,998,968,633.42	-4.15	0.94
May	29,726,180,450.86	-1.75	2.51
June	29,990,839,353.37	-0.87	0.89
July	29,189,497,881.06	-3.52	-2.67
August	29,772,446,158.59	-1.59	2.00
September	29,613,189,485.44	-2.12	-0.53
October	29,629,524,897.26	-2.07	0.06
November	30,123,407,524.26	-0.43	1.67
December	28,986,515,067.83	-4.19	-3.77

*Percentage fluctuation of the stock exchange capitalization during the current month as against the January month

** Percentage fluctuation of the stock exchange capitalization during the current month as against the previous month



Graphic no. 4. The monthly evolution of the stock exchange capitalization and BET index in 2014

4. The utilization of the econometric regression model in the analysis of the activity of the Bucharest Stock Exchange for the year 2014.

In order to study the relation existing between the stock exchange capitalization and the BET index for the year 2014, we used the econometric regression model, by applying, at a first stage, statistical tests on two series of submitted data, statistical tests which outcomes are submitted below:

Table no. 5. Statistical tests related to the stock exchange capitalization index in the frame of BSE for the year 2014

Series: Capitalizarea bursieră	
Mean	29480433235
Standard Error	134445432.3
Median	29613189485
Standard Deviation	445905053.6
Sample Variance	1.98831E+17
Kurtosis	-0.959096468
Skewness	-0.329017992
Range	1395539252
Minimum	28727868272
Maximum	30123407524
Sum	3.24285E+11
Confidence Level(95.0%)	299563091.1

The distribution of this series of data does not correspond to the normal distribution, a situation which is specific to most of series of data for the financial domain so that it does not implies signs of concern.

Table no. 6. Statistical tests related to the index Bucharest Exchange Trading in the frame of BSE for the year 2014

Series: Indicele BET	
Mean	5379.2945
Standard Error	83.09325
Median	5459.46
Standard Deviation	275.58913
Sample Variance	75949.37
Kurtosis	-1.003714
Skewness	-0.664092
Range	790.83
Minimum	4942.98
Maximum	5733.81
Sum	59172.24
Confidence Level(95.0%)	185.1433

The same finding is valid also in the case of the series concerning the monthly evolution of the index BET in 2014, the distribution of the recorded values differing from the normal distribution.

Meantime, the series of data regarding the monthly evolution of the two indicators, during the specified period are graphically represented as a points' cloud, in order to establish the regression model which must apply for identifying the connection existing between them. In the frame of the chosen model, the stock exchange capitalization is considered as the explicative variable while the index BET is considered the dependent variable. The analysis of the correlation graphic is emphasize a direct connection, of linear type, between the two indicators subject of the analysis

so that the model to be utilized is the model of simple linear regression which presents the following form:

$$BET = \alpha + \beta * CAPITALIZARE + \varepsilon$$

where:

α , β = the parameters of the linear regression model;

ε = the residual value of the regression model.

In order to estimate the parameters of the regression econometric model the least squares method is applied, the outcomes being submitted in the Table no. 7.

Table no. 7. The estimation of the parameters of the regression model „BET – Stock exchange capitalization”

SUMMARY OUTPUT									
<i>Regression Statistics</i>									
Multiple R	0.998709								
R Square	0.99742								
Adjusted R Square	0.906511								
Standard Error	283.8035								
Observations	12								
ANOVA									
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>				
Regression	1	3.43E+08	3.43E+08	4253.212	1.7492E-14				
Residual	11	885988.6	80544.42						
Total	12	3.43E+08							
	<i>Coefficient</i>	<i>Standard Err</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>	
Intercept	1023.723	5511.869	0.185731	0.856369	-11257.4863	13304.93	-11257.486	13304.9331	
X Variable 1	1.81E-07	2.77E-09	65.21666	1.37E-15	1.74719E-07	1.87E-07	1.7472E-07	1.8692E-07	

On the basis of the resulting data, the values of the two parameters of the regression model, α and β , are established as follows: $\alpha = 1023.723$ and $\beta = 1.81 \cdot 10^{-7}$. Through the recorded value of 99.87%, the multiple correlation coefficient indicates a direct and strong connection between the value of the index BET and that of the stock exchange capitalization. The values recorded by *R-squared* (the coefficient of determination) and *Adjusted R-squared* (the adjusted coefficient of determination) are showing the extent to which the dependent variable is explained by the independent variable so that, at a ratio of over 90% of the value of the index BET is explained through the value recorded by the stock exchange capitalization. *Standard Error* is showing that the values being observed for the index BET are deviating, as an average, with ± 283.80 from the theoretical values existing on the regression line. The values recorded by the liberty degrees *df* are explained as follows: *k* is representing the number of explicative variables, in this case, considering a simple regression, there is only one explicative variable *x*, consequently, $k=1$; for the residuals: $n-k-1= 12-1-1 = 10$ liberty degrees; (*n* represents the number of observations, $n = 12$); for the total variation: $n-1= 12-1= 11$ liberty degrees; $\text{df Regression} + \text{df Residual} = \text{df Total}$ ($1 + 10 = 11$). *SS* is the shortening from Sum Square and represents the

sum of the deviations' squares, while *MS* coming from Modified Sum (modified sums – modified dispersions). Lower 95% and Upper 95% represent the inferior and superior limits of the confidence interval for the considered parameter. Thus, the parameters of the analysed linear model are included in the intervals - 11257.48 and 13304.93 for α , and for β in the interval 1,7471E-07 and 1,87E-07.

The validity of the analysed regression model is studied on the basis of the *F-statistic* test which value is exceeding the tabled level of reference and of the *Significance F* test - almost zero – confirming thus that the model taken into consideration describing the relation between the stock exchange capitalization and the value of the main index of the Romanian capital market is a correct one and that variable is significant from statistical point of view.

This analysis of the capital market is thoroughly studied through the evaluation of the relation between the stock exchange capitalization (the dependent variable) and the transactions value (the independent variable) made each month on shares and concluded through the Bucharest Stock Exchange during the year 2014, again by using the regression econometric model, acting in a similar way as previously, the outcomes after applying the least squares method being the following:

Table no. 8. The estimation of the parameters of the regression model „The stock exchange capitalization – value of the stock exchange transactions”

SUMMARY OUTPUT								
<i>Regression Statistics</i>								
Multiple R	0.8797237							
R Square	0.7739138							
Adjusted R Square	0.6830047							
Standard Error	286.38962							
Observations	12							
<i>ANOVA</i>								
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>			
Regression	1	8.10859E+21	8.11E+21	37.65402	0.000110292			
Residual	11	2.36879E+21	2.15E+20					
Total	12	1.04774E+22						
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	5160.5977	173.3855335	29.76372	4.28E-11	4774.270643	5546.92473	4774.27064	5546.92473
X Variable 1	93.556147	15.2463774	6.136287	7.35E-05	59.99909657	127.113197	59.9990966	127.1131974

When analysing the outcomes we get, we find out that between the two indicators there is a strong connection (Multiple R = 87.97%), at a ratio of 77.39% the value of the stock exchange capitalization being explained through the value of the performed transactions, the difference up to 100% representing the influence of other factors, not included in the present model. Meantime, the connection between the two variables is a direct one, showing that for the increase by one monetary unit of the value of the performed transactions, the value of the capitalization records an increase 93.55 lei. Intercept (the free term of the model) is recording a high value, reflecting the image of high enough influence of the factors being not included in the construction of the model on the stock exchange capitalization. The values recorded by the *F-statistic* and *Significance F* tests (almost zero) confirm the validity of the model, the variable being significant statistically.

5. Conclusions

The analysis of the structure by categories of financial instruments and of the value of the transactions performed at the Bucharest Stock Exchange in 2014 is indicating an almost exclusively shares market., the transactions on bonds, structured products and fund units counting for 1% only out of the total stock exchange volume of transactions. The Bucharest Stock Exchange keeps on being dominated by the companies of the financial domain (companies of financial investments, crediting institutions, Property Fund) and by Petrom, followed by the companies of utilities (Transelectrica, Transgaz etc). Despite the fact that new listings have been successfully finalized, the

transactions on financial instruments out of the category bonds and government securities have been sporadic.

The regression model allows the identification of some functional dependence between the components of the capital market, providing a real possibility to forecast the analysed phenomena over a well-established time horizon. The two models of linear simple regression submitted previously confirm, based on real data recorded on the capital market from our country the allegations of the literature of speciality as regards the fact that this type of econometric model can be successfully utilized in order to define and systemize in a mathematical form the relations existing between the various financial indicators specific to the stock exchange system.

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