THE INFLUENCE OF THE CAPITAL MARKET ON ROMANIA'S ECONOMIC GROWTH

Ph.D., Associate Professor, Sorin MANOLE
"Constantin Brâncoveanu" University of Piteşti, Romania
E-mail: danielsorinmanole@yahoo.com
Ph.D., Associate Professor, Laura PANOIU
"Constantin Brâncoveanu" University of Piteşti, Romania
E-mail: laurapanoiu@yahoo.com

Abstract. *The capital market plays an important role in economic development by providing certain ways of direct financing of public or private companies and by attracting financial resources from the economy and placing them so as to increase the return on equity. For this reason, the article aims to evaluate the influence of the capital market on Romania's economic growth through a multiple linear regression. The chain index for gross domestic product was used to quantify the economic growth. Among the indicators typical of the capital market, we have chosen for the econometric model: the number of transactions, the volume of transactions, capitalization and the number of issuing companies. The model shows that economic growth is positively influenced by the factors that characterize the capital market which we have chosen. More precisely, according to the econometric model, 39% of the variation of the GDP chain index is due to the four variables specific to the capital market: the number of transactions, the volume of transactions, capitalization and the number of issuing companies.*

Keywords*: capital market, economic growth, GDP chain index, time series.*
JEL Classification: *C22, G29, G19.*

1. Introduction

Obviously, all aspects of human endeavor involve the use of money which is generated by itself or borrowed, and which increases capital accumulation, which results in economic growth (Ewah et al., 2009). The financial market plays a significant role in an economy which consists of financing various deficit units.

A well-developed financial market is an important influencing factor not only on economic growth, but also on preventing an economy from entering a crisis (Nordin and Nordin, 2016). The capital market is a component of the financial market through which financial instruments such as stocks and bonds are traded on medium and long term.

The capital market comprises the primary market and the secondary market. The primary market represents the segment of the capital market in which new issues (which are issued for the first time) of securities (financial instruments, equity securities) are traded. Specifically, if a company needs capital, it can obtain it from investors by issuing new equity securities (e.g., shares) which are sold on this primary market, thus achieving the initial transfer of money from investors to firms.

The secondary market represents the other segment of the capital market in which already issued financial instruments are traded. The general public also has access to these capital markets, being able to buy or sell equity securities. In the secondary capital market, investors sell or buy these securities from one another, not from the issuing entity.

In modern economy, the capital market is of particular importance. The capital market has the role of efficiently transferring monetary resources from those who save money to those who need capital and want to use it in a better way (Stoica, 2002). Thus, it can be said that the capital market has a significant influence on the quality of investment decisions.

To issuers, the money they need to carry out or develop their activities can be obtained through the capital market at good costs, normally lower than those obtained through the banking market or other financial institutions. To an investor, organizing the company as a joint-stock company allows for the transfer of ownership, which can be done simply, quickly and safely through the stock exchange, due to the negotiability of securities. In this context, the stock market favors investments in financial assets as well as their circulation and mobility, contributing to the financing of the economy through the primary market (Stoica, 2002).

The main functions of the capital market are: attraction of financial resources, mobilization of savings, creation of liquidity, efficient allocation of capital, and risk diversification (Yadirichukwu and Chigbu, 2014). High efficiency and effectiveness of those functions through prompt delivery of their services have a positive impact on economic growth. The capital market has the role of providing long-term, non-debt financial capital which allows companies to avoid excessive dependence on debt financing. Therefore, through the capital market, long-term funds of sectors of the economy (households, firms, government, etc.) are mobilized, capitalized and made available to different sectors of the economy (Ndako, 2010). Efficient mobilization and allocation of funds enables businesses and economies to leverage their human, material and management resources for optimal production, which results in sustainable economic growth (Yadirichukwu and Chigbu, 2014).

2. Literature Review

In the specialized literature, there are numerous studies that investigate the link between the development of capital markets and economic growth. However, there are very few works that address this aspect regarding our country.

Brasoveanu et al. (2008) analyze the correlation between capital market development and economic growth in Romania based on a regression function and VAR models. Thus, it is found that there is a positive bidirectional causal link between capital market development and economic growth, with stronger effects from economic growth towards capital market development, which suggests that economic growth determines the development of financial institutions.

Stoica (2002) states that in Romania, as in other former socialist countries, the components of the capital market appeared in an unnatural order, the secondary market being the first. He mentions that a small number of companies have procured the resources necessary to develop their activities on the capital market, with bank financing remaining the main source of financing for companies.

Barna and Mura (2010) study the relationship between capital market development and economic growth in Romania based on quarterly data from 2000-2009, using a regression function. They find that capital market development is positively correlated with economic growth, with a feedback effect, whereas a stronger link is from economic growth to capital market development, which shows that economic growth leads to the development of financial institutions.

Kolapo and Adaramola (2012) study the impact of the Nigerian capital market (using the variables market capitalization, total new issues, value of transaction and total listed equities and government stocks) on economic growth (using the GDP variable) from 1990-2010, applying Johansen co-integration and Granger causality tests, and show that there is a positive influence of the capital market on the country's economic growth.

Yadirichukwu and Chigbu (2014) investigate the impact of the capital market on economic growth in Nigeria according to data from 1985-2012, using regression analysis and multivariate co-integration, and show that market capitalization and the total number of listed securities have a significant negative influence on economic growth, while the value of shares traded and new issues have a significant positive influence on economic growth.

Nwamuo (2018) explores the impact of the capital market on economic growth in Nigeria based on data from 1981-2016, using regression functions and the Johansen co-integration test. The results revealed that the total listed equity has a positive and significant impact on economic growth, and the number of deals has a negative and non-significant impact on economic growth.

A large number of studies investigate the influence of the capital market on economic growth in Nigeria. Most of these show that the capital market has a positive and significant impact on economic growth (Edame and Okoro, 2013; Briggs, 2015; Taiwo et al., 2016). However, Ewah et al. (2009) find that the capital market does not contribute to economic growth significantly and Agu Bertram (2018) notes the existence of a negative relationship between market capitalization and Gross Domestic Product.

Francis et al. (2015) study the influence of capital market development on economic growth in Africa and state that there is a significant increase in real GDP per capita after the establishment of stock exchanges. The results also show that in the period after the launch of the stock market, there were significant improvements in the level of private investment and indicate that stock markets play a complementary role to the banking sector, contributing to the availability of private credit.

Nordin and Nordin (2016) examine the impact of the stock market and the debt market on the Malaysian economy applying the Johansen-Juselius co-integration test and show that both markets have a significant and positive influence on the annual growth rate of real gross domestic product per capita.

Tan and Mohamad Shafi (2021) analyze the influence of the capital market on economic growth in Malaysia during the period 1998 – 2018 using the autoregressive distributed lag (ARDL) co-integration bounds test and find that the stock market has a significant and positive effect on economic growth.

Sari and Widiyanti (2018) analyze the short and long-term effects of three capital market instruments on economic growth in Indonesia, based on data from January 2011 to December 2017, using the Johansen co-integration test and the error correction model. The results demonstrate that on both short and long term, the capital market has a significant positive influence on economic growth.

Coşkun et al. (2017) investigate the relationships between the development level of capital market subcomponents and economic growth between January 2006 and June 2016 in Turkey, based on ARDL models, Markov Switching regression and Kalman filter. They find that there is a long-run co-integration relationship between capital market development and economic growth, as well as a unidirectional causality from capital market development to economic growth.

Algaeed (2021) investigates the effects of capital market development on GDP per capita growth in Saudi Arabia during the period 1985-2018, applying ARDL, FMOLS models and the Johansen test. Regarding stock market indicators, he obtained the following results: capitalization and liquidity have a negative impact on economic growth and the share price index and the number of shares traded have a positive influence on economic growth.

Choong et al. (2010) study the role of stock markets as a channel through which foreign capital flows can promote economic growth in developed and developing countries.The results obtained indicate that stock markets, if they reach a certain threshold level of development, become a significant channel through which capital flows positively impact economic growth.

Durnev et al. (2004) analyze the influence of the capital market on economic growth in transition economies. The results analyzed in the paper suggest that the mere existence of a stock market itself is unlikely to support economic growth. They find that sound property rights, solid shareholder rights, stock market transparency and capital account openness contribute to efficient capital allocation and economic growth.

Oprea and Stoica (2018) investigate the impact of capital markets integration on economic growth in EU countries and identify the main factors through which capital markets' development influences economic growth based on data from the period 2004-2016 for EU countries, using the Autoregressive Distributed Lag model. The results obtained show that capital market integration has a positive influence on economic growth and the main factors through which the capital market exerts this influence are stock market capitalization, value traded, capital mobility and stock market indices.

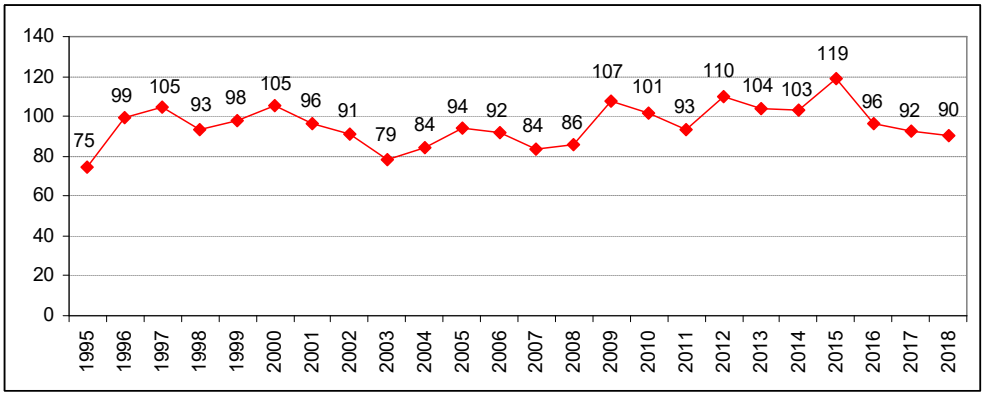
3. The Variables Used in the Analysis

The study of the influence of the capital market on Romania's economic growth was carried out via a linear regression. The economic growth is quantified by means of GDP chain index. The influence of the capital market on the economic growth is achieved through the number of transactions, the volume of transactions, capitalization and the number of issuing companies. In calculating the GDP chain indexes, the gross domestic product was used, expressed in current US dollars, by conversion from the national currency using one single year official exchange rate.

Regarding the GDP, the data source was the World Bank World Development Indicators Database and the data for the number of transactions, the volume of transactions, capitalization and the number of issuing companies were obtained from the Bucharest Stock Exchange (http://www.bvb.ro/TradingAndStatistics/Stats/GeneralStatistics).

Figure no. 1. shows the evolution of the GDP chain index in Romania in the period 1995–2018, the values being expressed as a percentage.

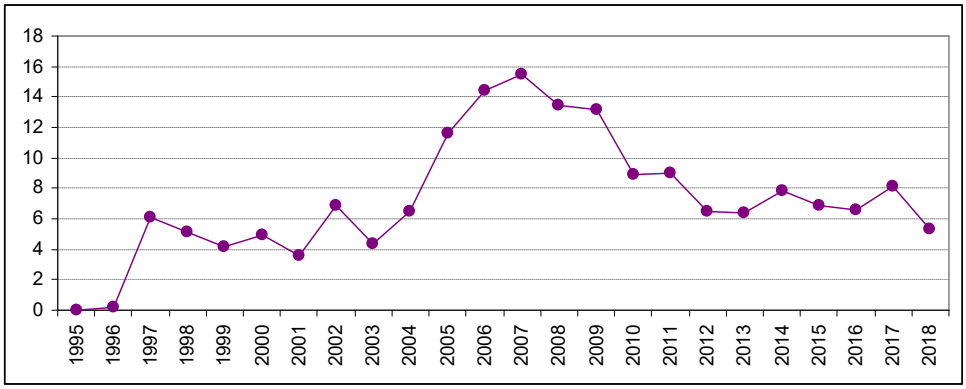
Figure no. 1. GDP Chain Index in Romania between 1995–2018



Source: Personal processing in Excel based on the data in the Annex.

In Figure no. 2. the dynamics of the number of transactions carried out in Romania between 1995 and 2018 is presented, the unit for the ordinate axis being 100,000.

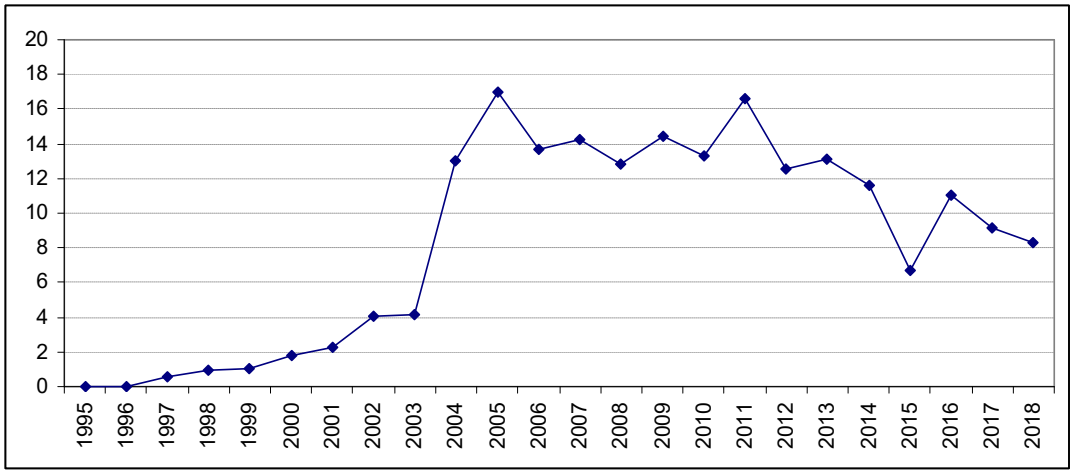
Figure no. 2. Number of Transactions Performed in Romania between 1995–2018



Source: Personal processing in Excel based on the data in the Annex.

In Figure no. 3. the dynamics of the volume of shares traded in Romania between 1995 and 2018 is presented, the unit for the ordinate axis being 1,000,000,000.

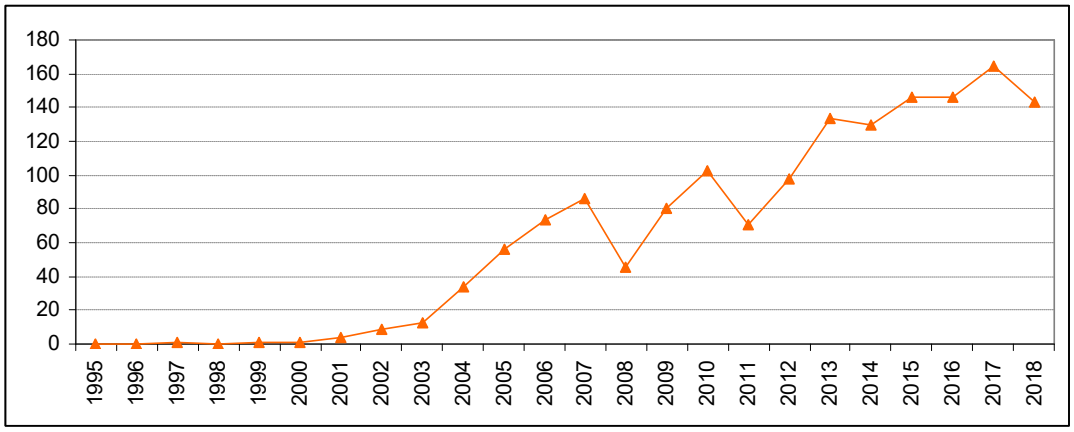
Figure no. 3. Volume of Shares Traded in Romania between 1995–2018



Source: Personal processing in Excel based on the data in the Annex.

Figure no. 4. shows the evolution of the capitalization of shares traded in Romania during the period 1995–2018, the unit for the ordinate axis being 1,000,000,000.

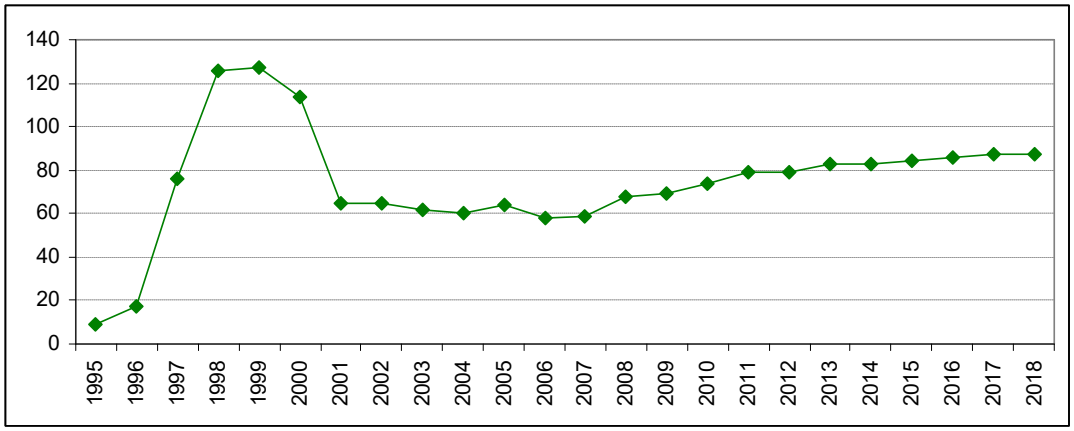
Figure no. 4. Capitalization of Shares Traded in Romania between 1995–2018



Source: Personal processing in Excel based on the data in the Annex.

Figure no. 5. provides the evolution of the number of issuing companies in Romania between 1995 and 2018.

Figure no. 5. Number of Issuing Companies in Romania between 1995–2018



Source: Personal processing in Excel based on the data in the Annex.

The variables in the model are represented using the following notation:
ci_gdp = GDP chain index
no_trans = number of transactions
vol_trans = volume of transactions
cap = capitalization
is_com = issuing companies
In the following table we present information regarding the distribution of the five time series in the model.

Table no. 1. Variable Descriptions

Variable	Observations	Maximum	Minimum	Mean	Median	Std. Dev.
ci_gdp	24	118.7193	74.75684	95.68103	94.99997	10.21235
no_trans	24	1544891	379.0000	730549.7	650622.0	400280.9
vol_trans	24	1.69E+10	42761.00	8.43E+09	1.01E+10	5.87E+09
cap	24	1.64E+11	23100000	6.41E+10	6.34E+10	5.80E+10
is_com	24	127.0000	9.000000	74.20833	75.00000	2.383792

Source: Personal processing in EViews based on the data in the Annex.

Since the time series used in the study have all positive terms and their orders of magnitude differ greatly from one series to another, their terms are expressed in logarithmic form.

4. Study of Stationarity in Time Series

Before specifying the econometric model, the stationarity in these time series must be studied and for this purpose, the Augmented Dickey-Fuller (ADF) test and the Phillips-Perron (PP) test were used.

Using the Augmented Dickey-Fuller (ADF) test, the stationarity in time series for GDP log chain index (l_ci_gdp) is tested and it is found that the series is stationary, since the probability associated with the t-statistic is lower than the significance threshold of 0.05 (Table no. 2.).

Table no. 2. Results of ADF Unit Root Test for the Logarithm of GDP Chain Index Variable

Null Hypothesis: l_ci_gdp has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.881096	0.0075
Test critical values:	1% level	-3.752946	
	5% level	-2.998064	
	10% level	-2.638752	

*MacKinnon (1996) one-sided p-values.

Source: Personal processing in EViews based on the data in the Annex.

According to the results in Tables no. 3. and 4., the logarithm of the number of transactions and the logarithm of the volume of transactions (l_no_trans, respectively, l_vol_trans) are also stationary.

Table no. 3. Results of ADF Unit Root Test for the Logarithm of Number of Transactions Variable

Null Hypothesis: l_no_trans has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-10.67800	0.0000
Test critical values:	1% level	-3.752946	
	5% level	-2.998064	
	10% level	-2.638752	

*MacKinnon (1996) one-sided p-values.

Source: Personal processing in EViews based on the data in the Annex.

Table no. 4. Results of ADF Unit Root Test for the Logarithm of Volume of Transactions Variable

Null Hypothesis: l_vol_trans has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.533192	0.0000
Test critical values:	1% level	-3.752946	
	5% level	-2.998064	
	10% level	-2.638752	

*MacKinnon (1996) one-sided p-values.

Source: Personal processing in EViews based on the data in the Annex.

Using the Phillips-Perron (PP) test, we show that the series of natural logarithms of capitalization and number of issuing companies (l_cap, respectively, l_is_com) are still stationary. Indeed, the probabilities associated with the adjusted t-statistics are lower than the significance level of 0.05 (Tables 3 and 4).

Table no. 5. Results of PP Unit Root Test for the Logarithm of Capitalization Variable

Null Hypothesis: l_cap has a unit root
Exogenous: Constant
Bandwidth: 13 (Newey-West using Bartlett kernel)

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-6.635167	0.0000
Test critical values:	1% level	-3.752946	
	5% level	-2.998064	
	10% level	-2.638752	

*MacKinnon (1996) one-sided p-values.

Source: Personal processing in EViews based on the data in the Annex.

Table no. 6. Results of PP Unit Root Test for the Logarithm of Number of Issuing Companies Variable

Null Hypothesis: l_is_com has a unit root
Exogenous: Constant
Bandwidth: 1 (Newey-West using Bartlett kernel)

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-4.966183	0.0006
Test critical values:	1% level	-3.752946	
	5% level	-2.998064	
	10% level	-2.638752	

*MacKinnon (1996) one-sided p-values.

Source: Personal processing in EViews based on the data in the Annex.

Therefore, all logged series of the variables considered are stationary, so that the model will be built according to them.

5. Model for Assessing the Influence of the Capital Market on the Economic Growth

Based on the model, we will study the dependence of the economic growth (quantified by the logarithm of the GDP chain index– l_ci_gdp) on the indicators characteristic of the capital market: the logarithm of the number of transactions (l_no_trans), the logarithm of the volume of transactions (l_vol_trans), the logarithm of capitalization (l_cap) and the logarithm of the number of issuing companies (l_is_com). Thus, we used a multifactorial linear regression as seen below:

$$l\_ci\_gdp_t = a_0 + a_1 l\_no\_trans_t + a_2 l\_vol\_trans_t + a_3 l\_cap_t + a_4 l\_is\_com_t + \varepsilon_t, \quad t = 1995,\ldots,2018$$

where

a_k – coefficients of the independent variables that must be determined, $k = 1,2,3,4$;

a_0 – intercept that must be determined;

ε_t – error terms, a variable that is normally distributed with mean 0 and variance σ^2.

6. Research Results and Analyses

For estimating the parameters of the econometric model, the least squares method was used and the following results were obtained:

Table no. 7. Regression Results

Dependent Variable: l_ci_gdp
Method: Least Squares
Sample: 1995 2018
Included observations: 24

Variable	Coefficient	Std. Error	t-Statistic	Prob.
c	-3.689559	0.281204	-13.12057	0.0000
l_no_trans	0.106807	0.050907	2.098090	0.0495
l_ vol_trans	0.112805	0.047255	2.387165	0.0275
l_ cap	0.048896	0.023266	2.101638	0.0492
l_ is_com	0.186179	0.076301	2.440060	0.0247

R-squared	0.390015	Mean dependent var	4.555483
Adjusted R-squared	0.261598	S.D. dependent var	0.108016
S.E. of regression	0.092819	Akaike info criterion	-1.733285
Sum squared resid	0.163691	Schwarz criterion	-1.487857
Log likelihood	25.79942	Hannan-Quinn criter.	-1.668173
F-statistic	3.037081	Durbin-Watson stat	2.018526
Prob(F-statistic)	0.042964		

Source: Personal processing in EViews based on the data in the Annex.

Therefore, the model for evaluating the influence of the factors characteristic of the capital market on the economic growth is the following:

$$l\_ci\_gdp_t = -3.689559 + 0.106807 l\_no\_trans_t + 0.112805 l\_ vol\_trans_t + 0.048896 l\_ cap_t + 0.186179 l\_ is\_com_t + \varepsilon_t,\ t = 1995,\ldots,2018$$

Since the probabilities associated with t - statistic are lower than the 0.05 significance level for all coefficients, we can accept the hypothesis that the model parameters are significantly different from zero.

P-value of F-statistic (0.042964) is less than 0.05, which means that we can reject the null hypothesis that all coefficients in the model are zero. Therefore, the model is significant (at least one coefficient in the regression, except for the intercept, is significantly different from 0).

The coefficient of determination (R-squared) has the value 0.390015 which shows that 39% of the variation of the logarithm of GDP chain index is due to some variables that characterize the capital market.

Another prerequisite for the acceptance of the model is the absence of autocorrelation in the residuals (prediction errors). In order to verify the absence of autocorrelation in residuals, we benefit from the Durbin-Watson test. Because the value of the Durbin-Watson statistic is close to 2, the errors are not autocorrelated.

It is also necessary to verify that different samples of the residual variable have the same variance (homoscedasticity). The essential part of the Breusch-Pagan-Godfrey test output used for homoscedasticity testing is given in Table no. 8.

Table no. 8. Results of the Breusch-Pagan-Godfrey Test

Heteroskedasticity Test: Breusch-Pagan-Godfrey

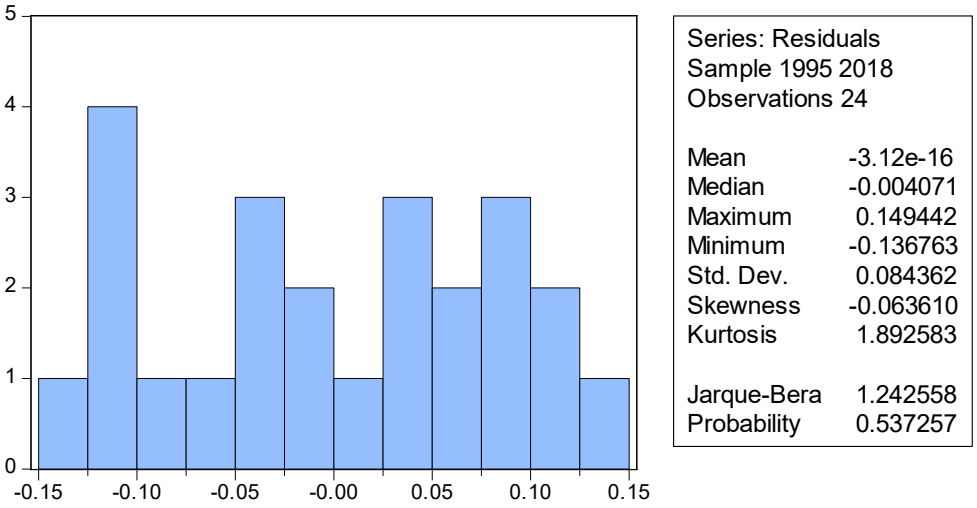
F-statistic	0.750816	Prob. F(4,19)	0.5697
Obs*R-squared	3.275800	Prob. Chi-Square(4)	0.5128
Scaled explained SS	0.916264	Prob. Chi-Square(4)	0.9222

Source: Personal processing in EViews based on the data in the Annex.

The null hypothesis of the Breusch-Pagan-Godfrey test is homoscedasticity and the alternative hypothesis indicates heteroscedasticity. All three statistics show that the null hypothesis cannot be rejected, i.e. the homoscedasticity of residuals (associated probabilities greater than 0.05).

Another condition that the errors must meet is to follow a normal distribution with mean 0. To verify the normality of the distribution of the residual variable, the Jarque-Bera test was used which provided us with the following output.

Figure no. 6. Results of the Jarque-Bera Test

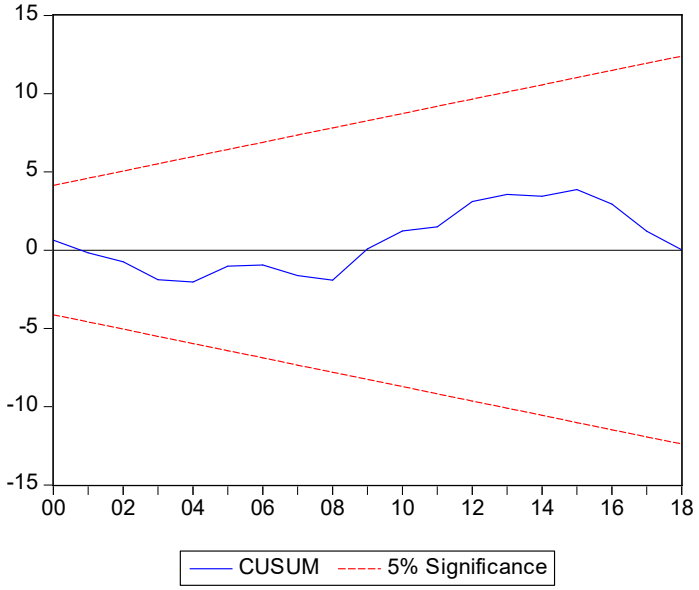


Source: Personal processing in EViews based on the data in the Annex.

According to the null hypothesis of the test, the errors have a normal distribution. The probability associated with the Jarque-Bera statistic (0.537257) is higher than the significance level of 0.05, so that the null hypothesis cannot be rejected which shows that the errors follow a normal distribution.

It is also necessary to verify that the model parameters are stable across various data samples. After applying the CUSUM test used for this purpose, we obtained the following graphical representation.

Figure no. 7. Results of the CUSUM Test

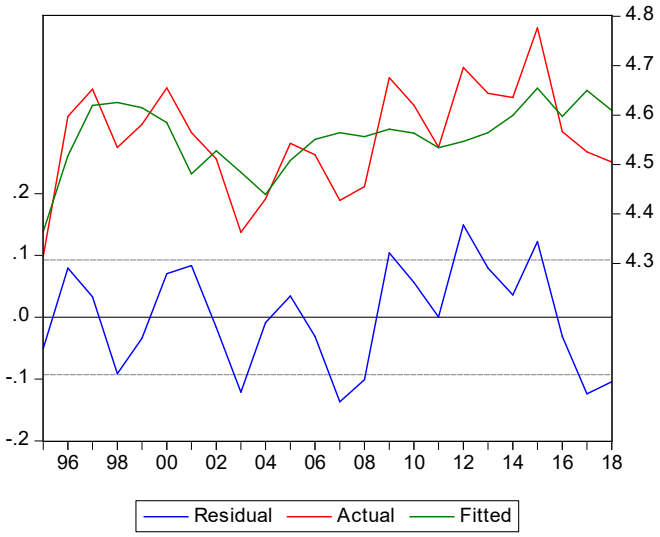


Source: Personal processing in EViews based on the data in the Annex.

From the graph above, it is concluded that the cumulative sum of the recursive residuals represented by the blue colored curve is maintained between the two red critical lines corresponding to the significance level of 5%, which shows that the parameters of the equation are stable.

In Figure no. 8. are represented the actual values and the fitted values of the natural logarithm of the GDP chain index and the values of the residual variable.

Figure no. 8. Actual Values and Fitted Values of the Natural Logarithm of GDP Chain Index and Values of Residual Variable



Source: Personal processing in EViews based on the data in the Annex.

The model shows that the number of transactions, the volume of transactions, the capitalization and the number of issuing companies have a positive influence on the GDP chain index. Thus, the estimate $\hat{a}_1 = 0.106807$ shows that a 1% increase in the number of transactions leads to an increase in the GDP chain index by 0.107%. Also, $\hat{a}_2 = 0.112805$ shows that a 1% increase in the volume of transactions produces a 0.113% increase in the GDP chain index. The estimate $\hat{a}_3 = 0.048896$ indicates that if the capitalization increases by 1%, then the GDP chain index also increases by 0.049%. At the same time, from the estimate $\hat{a}_4 = 0.186179$, it results that a 1% increase in the number of issuing companies has the effect of a 0.186% increase of the GDP chain index.

7. Conclusions

The article studies the dependence of economic growth on the capital market in Romania. The study was conducted on the basis of a multiple linear regression in which the response variable is the GDP chain index and the explanatory variables are: number of transactions, volume of transactions, capitalization and number of issuing companies.

According to the multiple linear regression model, the influence of the capital market (through the four variables considered: the logarithm of the number of transactions, the logarithm of the volume of transactions, the logarithm of the capitalization and the logarithm of the number of issuing companies) accounts for 39% of the variation of the logarithm of the GDP chain index. This suggests that the capital market must be included among the parameters that influence economic growth.

The four factors considered positively influence the GDP chain index. Specifically, an increase in the number of transactions, in the volume of transactions, in the capitalization and in the number of issuing companies by 1% (each factor being modified separately, the other

variables being kept at the same level) determines an increase in the GDP chain index by 0.107%, 0.113%, 0.049%, respectively, 0.186%.

Since the Bucharest Stock Exchange was reopened in 1995 (closed in 1945 by the communist regime), as to the time series of the variables that characterize the capital market we have values only for the period 1995-2018, which is relatively short for a consistent analysis. Additionally, the values of these time series are obtained only for one financial instrument – shares. These aspects are limitations of the study.

As the capital market has a long tradition and plays a more important role in the economies of other European countries, we intend to analyze its influence on the economic growth in the countries of the European Union in a future paper. The extension of the study to the level of the European Union will be accomplished via a panel data model.

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Annex. Dynamics of Model Indicators in Romania between 1995-2018

Year	GDP chain index, %	Number of transactions	Volume of transactions	Capitalization, lei	Number of issuing companies
1995	74.7568	379	42,761	25,900,000	9
1996	99.2132	17,768	1,141,648	23,100,000	17
1997	104.8608	609,651	593,893,605	505,600,000	76
1998	93.1620	512,705	986,804,827	392,200,000	126
1999	97.6254	415,045	1,057,558,616	572,500,000	127
2000	105.1279	496,887	1,806,587,265	1,072,800,000	114
2001	96.0372	357,577	2,277,454,017	3,857,300,000	65
2002	91.0480	689,184	4,085,123,289	9,158,000,000	65
2003	78.5040	440,084	4,106,381,895	12,186,600,000	62
2004	83.9888	644,839	13,007,587,776	34,147,400,000	60
2005	93.9628	1,159,060	16,934,865,957	56,065,586,985	64
2006	91.8329	1,444,398	13,677,505,261	73,341,789,546	58
2007	83.7456	1,544,891	14,234,962,355	85,962,389,149	59
2008	86.0956	1,341,297	12,847,992,164	45,701,492,619	68
2009	107.3125	1,314,526	14,431,359,301	80,074,496,090	69
2010	101.4881	889,486	13,339,282,639	102,442,620,945	74
2011	93.2011	900,114	16,623,747,907	70,782,200,350	79
2012	109.5266	647,974	12,533,192,975	97,720,863,603	79
2013	103.9728	636,405	13,087,904,925	133,829,707,066	83
2014	103.0809	787,753	11,615,242,311	129,958,141,655	83
2015	118.7193	685,248	6,696,750,556	146,002,473,957	84
2016	96.2201	653,270	11,048,103,360	146,549,746,292	86
2017	92.3760	808,429	9,105,130,182	164,376,159,957	87
2018	90.4863	536,222	8,290,217,224	142,986,113,235	87

Source: World Bank World Development Indicators Database – for calculation of chain index for GDP and Bucharest Stock Exchange (http://www.bvb.ro/TradingAndStatistics/Statistics/GeneralStatistics) – for the other indicators.