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Correlation of the Indicators of the Financial system and Gross Domestic Product in European Union Countries

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At the end of the 20th century and beginning of the 21st century the tendencies of development of the financial system and problems arising in this sector are more and more often becoming the object of scientific research as successfully functioning financial sector in every country is an important precondition for the growth of economy. Upon analyzing the development of the financial system and the influencing factors the problem of influence of the formed financial structure on economic processes cannot be dissociated from it. Indicators of development of the bank sector were used in the research to establish the correlation of the financial sector and gross domestic product of the countries of the European Union:

Central bank assets/ Total financial assets, Deposit money bank assets/ Total financial asset, Other financial institutions assets/Total financial assets, Deposit money bank/(Deposit money bank + Central bank) assets, Liquid liabilities/GD, Central bank assets/GDP, Deposit money bank assets/GDP, Other financial institutions assets/GDP, Bank deposits/GDP, Financial system deposits/GDP, Private credit by deposit money banks/GDP, Private credit by deposit money banks and other financial institutions /GDP, Overhead costs and Net interest margin. Indicators of development of the market are: Stock market capitalization/GDP, Private bond market capitalization/GDP, Public bond market capitalization/GDP, Stock market total value traded/GDP and Stock market turnover ratio. Indicators of development of the insurance are: Life insurance penetration and Non - life insurance penetration.

The obtained results do not confirm the researches of other authors, who analyzed the dependency of the financial sector and the growth of economy of the "old" European Union countries, as it is stated that the growth of economy determines the formation of the structure of a market-based financial system, and with the domination of a strong bank sector in the Baltic States even in rapidly growing economy, dominant strong banking sector and law average GDP per capita, does not create conditions for the formation of a market-based financial structure.

Keywords: *financial system, financial sector, growth of economy, indicators of the development of the bank sector, indicators of the development of the market, indicators of the development of the insurance.*

Introduction

A successfully functioning financial sector is an important condition for the growth of economy in every country. However how and through which segments of the financial system economic processes and their results are influenced, on what other factors of environment such influence depends, are still open questions, as the development of economy of every country as well as the development of the financial system also have their specific features. Numerous scientific researches and scientific publications reflecting their results have been analyzed and evaluated as well as the similarities of the structures of financial systems and the influence of the level of development of the financial sector on the economy of the country. With dynamic changes of the economic environment itself, more intensive integration processes of countries, more noticeable influence of globalized financial systems are being transformed inevitably, therefore the evaluation of their influence on the development of an individual country becomes especially relevant, but at the same time it becomes a more complex task. Economists have been trying to establish advantages of bank-based over market-based financial structures recently and to evaluate the influence on the development of economy in both developed and developing as well as in rapidly economically developing countries, where the financial structures are just forming. One of the most important factors stressed in scientific researches is the formed bank-based and market-based type financial structures, the interaction of which with the growth of economy can be different. In his research R. Levine (1997) presented a theoretical model, according to which costs of acquisition of information and conclusion of transactions determine the development of financial markets and financial institutions, and thus stimulate the formation of different financial structures. The importance of the model of R. Levine (1997) was also confirmed by C. Merton, Z. Bodie (1995), who stated in their researches that financial market and financial institutions, by effectively managing the costs of information acquisition and conclusion of transactions, perform their primary function at the same time – perform distribution of resources through space and time in an insecure environment. Continuing his researches together with Zervos (1998), R. Levine analyzed whether security markets or banks stimulate growth of economy, thus underlining the importance of the formed financial structure. The scientists determined that liquidity of the market is strongly related to the growth of economy, growth of capital and productivity, while the size of securities market is not strongly correlating with the growth of economy. Odedokun (1996) analyzed 71 developing

countries and established that financial development of a bank-based financial system more often has a positive effect on growth of economy in developing countries with lower income than in ones with higher income. Harris (1997) determined that securities markets have a smaller effect on developing countries than on economically strong countries. Such results of research were also seconded by Boyd, Smith (1998), who presented a model, in which formation of capital is financed both by capital and loans in order to prove how the financial market and real economy influence one another. The obtained results show that in case of a low level of economic development capital markets are seldom used, and loans are used more often as the main source of financing, as when economy is developing the costs of capital decrease causing increase of inspection costs. Deidda and Fattouh (2002) concentrated on whether the correlation of the development of the financial sector and growth of economy changes taking into account the level of development of economy and finances. The scientists came to a conclusion that a positive correlation between bank-based financial development and growth of economy exists in countries with higher income, and in countries with low income such correlation is statistically insignificant. Pavara (2003) established that in case of an average level of financial development bank-based finances there is a positive correlation with growth. In cases of low and high level of financial development this correlation is negative. More (2003) grouped countries into the countries with a high and low level of financial development according to capitalization of securities market. An interesting aspect of this work is that More (2003) uses bank and securities indicators. Financial indicators have a positive and significant influence on the countries with high capitalization and a negative and insignificant one in countries with low capitalization. Greenwood and Jovanovic (1990) provided a model, which proves that financial brokers can invest more productively than an individual person due to the fact that financial brokers are able to better establish possibilities of investment. Thus financial brokerage stimulates economic growth, as it allows the capital to earn more income, and growth in its turn provides resources for the development of the financial structure. It was attempted to distinguish the importance of the influence of bank-based and market - based financial structures on peculiarities of development of economy in scientific research. Many researches were carried out in the countries, in which the structure of the financial system was not characterized by distinct changes, i.e. remained for the whole period of research of a bank-based or market-based type. In the countries, in which the development of the financial sector is especially rapid and affected by globalization such researches were not carried out. The European Union as a model striving for voluntary unification of countries with historically formed different models of economy and financial systems and level of development today best reflects the processes of integration and globalization taking place in the world, and namely the research of these countries is important in the context of the analyzed problem. As integration processes in the financial sector of the European Union have been and are rapid and due to the active process of consolidation and acquisition of banks encouraging potential investors to join the single space of EU, development strategies are transferred to other regions, it is likely that the majority of peculiarities of development may chronologically repeat themselves in countries, such as Lithuania, Latvia and Estonia, that reach the new phase of development. Therefore **the aim of this article** is to analyze correlation between financial system development indicators and economy growth indicator - Gross Domestic Product, in European Union countries, distinguishing those financial sector indicators, which have the strongest relation with GDP per capita.

Research methods. Researching and analyzing the theoretical and methodological aspects of evaluation of the dependency of the growth of economy on the development of the financial sector, general scientific methods of research were employed: systemic, comparative and logical analysis of scientific literature. The results of the research were obtained by applying mathematical statistical methods and software packages (MS Excel, SPSS).

Indicators of development of the financial system

Important research analyzing the tendencies of development of the financial sector and economy underlining the influence of the structure of the financial system on the growth of economy carried out by a group of scientists A. Demirgüç - Kunt, R. Levine and T. Beck gave rise to heated discussions already in 1999 and they last till this day. Upon performing analysis of types of structures formed in the financial system among a large number of countries of the world scientists were the first to notice the changes of the structure of the financial market influencing the growth of the economy of the country. This research contributed to the research of Goldsmith (1969) when the scientist measured only the size of the financial system, not taking into account efficiency. The research of R. King and R. Levine (1993) analyzed two parameters – size and efficiency - where the value of financial development in the research of these scientists was expressed as a percentage of liquid loans of the financial system in GDP and as a percentage of loans supplied to private companies in the number of all loans. Efficiency of financial development shows the correlation of loans provided by private banks with the loans provided by the central bank and the percentage of loans given to private non - financial companies in the number of all loans.

However T. Beck, A. Demirgüç - Kunt and R. Levine (1999) on the basis of researches carried out by King and Levine (1993a,b), Levine and Zervos (1998), Levine, Loayza and Beck (1999), Rousseau and Wachel (1998), Demirgüç - Kunt and Maksimovic (1998) as well as Rajan and Zingales (1998) were the first researchers of the financial sector who performed a thorough and comprehensive (as stated by scientists themselves) evaluation of the influence of the development of the financial sector and formed financial structures on the growth of economy grouping countries into four groups according to average gross domestic product per capita. This research was very important as it distinguished financial indicators characterizing the size, activity and efficiency of financial institutions and capital markets that have a long-term influence on the

growth of economy. Though analyzing financial structures the majority of authors are inclined to consider the financial system of the countries of European Union as bank-based, A. Demirgüç - Kunt and R Levine (1999), A. Demirgüç - Kunt and H. Huizinga (2000), R. Levine (2002), C. Girardone, J. C. Nankervis and E. F. Velentza (2006) used the method of calculation of the index of the financial structure in their later works and distinguished the financial structure of every country of the European Union. However when analyzing scientific research it can be noticed that countries analyzed during different periods had different structures of the financial system. Structurized results of the researches of scientists during 1990-1995 and 1998-2003 are presented in Table1.

Table 1

Financial structure of European Union countries during the period of 1990-1995 and 1998-2003

Period of 1990 - 1995				Period of 1998 - 2003			
Countries with bank – based structure	**Index of financial structures**	**Countries with market – based structure**	**Index of financial structures**	**Countries with bank – based structure**	**Index of financial structures**	**Countries with market – based structure**	**Index of financial structures**
Austria	-0.73	Sweden	0.91	Austria	-0.510	Greece	0.077
Belgium	-0.66	Denmark	0.15	Belgium	-0.298	Netherlands	0.081
France	-0.17	Netherlands	0.11	Denmark	-0.247	Spain	0.132
Greece	-0.34	Spain	0.02	France	-0.049	Sweden	0.513
Ireland	-0.06	United Kingdom	0.92	Germany	-0.290	United Kingdom	0.174
Italy	-0.228			Ireland	-0.244		
Finland	-0.53			Italy	-0.142		
Germany	-0.10			Luxembourg	-0.119		
Portugal	-0.75			Portugal	-0.385		

Source: A.Demirgüç - Kunt ir R Levine (1999), A. Demirgüç - Kunt ir H. Huizinga (2000), R.Levine (2002), C. Girardone, J. C. Nankervis ir E. F. Velentza (2006).

According to the researches of these scientists, financial structures change during different periods, i.e. when the economy of the country developed, the financial structure of the country changed. Such countries as Greece moved from a bank-based structure during the period of 1990-1995 to a market-based structure during the period of 1998-2003, while Denmark on the contrary: the market-based structure of the country transformed into a bank-based structure. Meanwhile stable financial structures dominated in other countries. It is interesting to note that in the researches carried out by A. Demirgüç - Kunt and H. Huizinga (2000) in 1990 - 1997 the tendencies of the development of financial structures in all European Union countries remain the same as during the period of 1990-1995, except for Netherlands, the index of the structure of which was negative (-0.012), and it was attributed to the group of countries with bank-based structures. R. Levine (2002), who analyzed many countries during the period of 1980-1995, also attributed Germany and Ireland to the group of the countries with a market-based structure, as calculations showed the index of the structure to be – respectively 0.17 and 0.33, and Spain was put to the group of countries with bank-based structures (- 0.31). So it can be stated that the elements of the market-based system exist in EU, but they are differently distributed in different countries of the European Union and change depending on the economic processes taking place in every country. Therefore T. Beck, A. Demirgüç - Kunt and R. Levine (1999) in their researches paid a lot of attention to the dependence of the indicators of the size, activity and efficiency of the financial sector on macroeconomic factors, in which GDP per capita and inflation are distinguished as the most important. A. Demirguc - Kunt and R. Levine (1999) calculated correlation coefficients of all discussed financial indicators with GDP per capita (GDP per capita) and established that all size indicators of bank-based financial structures show a positive correlation, and efficiency indicators present a negative correlation with GDP per capita. The same method, as was used to evaluate the bank-based system, was applied to establish that the size and activity of the market-based financial structure increases when the income of the country grows, and all three (size, activity and efficiency) indicators show a positive correlation with GDP per capita. Positive correlation of GDP and capital markets was also confirmed by R. La Portą, F. Lopez – de - Silanes, A. Shleifer, R. Vishy (1997). Results showed that countries with rapidly developing economy have larger capitalization of share markets. Another important fact is that the growth of GDP is not associated with a larger number of listed companies. This means that larger capitalization of the market is associated with the evaluation of the shares of existing issuers (R. La Portą, F. Lopez - de - Silanes, A. Shleifer, R. Vishy (1997)). After having analyzed the financial structure and the structure of financing companies of 19 developed and 11 developing countries V. Maksimovic and A. Demirguc - Kunt (1998) also established that the size of market - based and bank - based structure is directly dependant on GDP per capita. Structurizing the researches of scientists indicators of development of the financial sector can be distinguished. They are provided in Table 2.

Concluding it can be stated that the financial system of the country may be subdivided into market-based or bank-based depending on the level of its *size*, *activity* and *efficiency*.

The development of the market-based financial system is reflected by large capitalization of the share market and high level of its liquidity in comparison to GDP of the country. While the bank-based system is reflected by the size of bank assets, large scope of financing of the private sector and competitive interest rate and low costs.

Table 2.

Indicators of development of financial system

Indicators	Value
Central bank assets/ Total financial assets	***Size*** indicator shows what size of capital of the whole financial capital of the country is constituted by the capital of the Central bank.
Deposit money bank assets/ Total financial assets	***Size*** indicator shows what size of capital of the whole financial capital of the country is constituted by the capital of commercial banks.
Other financial institutions assets/Total financial assets	***Size*** indicator shows what size of capital of the whole financial capital of the country is constituted by the capital of other financial institutions (pension funds, insurance companies, etc.).
Deposit money bank/(Deposit money bank + Central bank) assets	***Size*** indicator shows what size of capital of commercial banks and the Central bank together is constituted by the capital of commercial banks.
Liquid liabilities/GDP	Bank sector ***size*** indicator evaluates the value of realizable obligations of banks and other financial institutions with respect to the economy of the country.
Central bank assets/GDP	One of ***size*** indicators that evaluates the size of the Central bank with respect to the economy of the country.
Deposit money bank assets/GDP	Bank sector ***size*** indicator shows the general size of the bank sector with respect to the economy of the country.
Other financial institutions assets/GDP	One of ***size*** indicators that shows the size of other financial institutions with respect of the economy of the country.
Bank deposits/GDP	***Size*** indicator evaluates the value of bank deposits with respect to the economy of the country.
Financial system deposits/GDP	***Size*** indicator evaluates the value of deposits of the whole financial system with respect to the economy of the country.
Private credit by deposit money banks/GDP	Bank sector ***activity*** indicator evaluates the value of credits provided by commercial banks to the private sector with respect to the economy of the country. The bigger the value, the better.
Private credit by deposit money banks and other financial institutions/GDP	One of ***activity*** indicators that evaluates the value of credits provided by commercial banks and other financial institutions to the private sector with respect to the economy of the country.
Overhead costs	Bank ***efficiency*** indicator that shows what part of the capital of banks was used to cover the additional or operational and management costs of banks. Decreasing value shows increasing efficiency of banks.
Net interest margin	Bank ***efficiency*** indicator that shows what income is generated by banks from their activities. The lower the value, the bigger the efficiency of banks, but profitability is low.
Life insurance penetration	***Activity*** indicator evaluating permeability of life market with respect to the economy of the country.
Non - life insurance penetration	***Activity*** indicator evaluating the permeability of not life market with respect to the economy of the country.
Stock market capitalization/GDP	Indicator showing the ***size*** of the share market evaluating the value of shares of the country, which are traded in the local stock market, with respect to the economy of the country.
Private bond market capitalization/GDP	Indicator shows the ***size*** of the market of private obligations evaluating the value of private obligations not paid by the country, which are traded in the local stock market, with respect to the economy of the country.
Public bond market capitalization/GDP	Indicator showing the ***size*** of market of state obligations evaluating the value of state obligations not paid by the country, which are traded in the local stock market, with respect to the economy of the country.
Stock market total value traded/GDP	***Activity*** indicator evaluating the value of share transactions with respect to the economy of the country, often used for evaluation of liquidity of the share market.
Stock market turnover ratio	***Efficiency*** indicator evaluating the value of share transactions with respect to the size of the market.

Research of correlation of indicators of the financial system and gross domestic product per capita

Integration processes in the financial sector have taken place and still are developing rapidly within the European Union and due to active process of consolidation and acquisition of banks are intriguing potential investors to unite into a single area of EU. Thus development strategies are transferred into other regions. So it is likely that many peculiarities of development can chronologically recur in countries that reach a new phase of development, such as Lithuania, Latvia and Estonia. Therefore the tendencies of change of the indicators of development of bank-based and market-based financial sector in 15 "old" European Union countries – Germany, Great Britain, France, Portugal, Spain, Italy, Greece, Finland, Sweden, Netherlands, Luxembourg, Denmark, Ireland, Austria and Belgium, where development of economy has slowed down during the period of the last 5 years, and the three Baltic States – Lithuania, Latvia and Estonia, where growth of economy is rapid, are analyzed during the research of dependence of indicators of the financial sector and gross domestic product. In order to distinguish the dependence of tendencies of change of financial indicators and this macroeconomic indicator more clearly, the research is carried out classifying the countries according to the index of financial structures calculated by scientists T. Beck, A. Demirguc-Kunt, R. Levine (1999), A. Demirguc - Kunt, R. Levine (1999), R. Levine (2002), G. Girardone, J. C. Nankervis, E. F. Velentza (2006) according to the data of 1998-2003, grouping all countries into those with bank-based and market-based structures of the financial system and countries with still forming financial structures in order to establish peculiarities of correlation of the indicator of development of the financial sector with the growth of economy expressed as GDP change. This research underlines two very important component parts of the research, enabling to establish the indicators characterizing the influence of the *size*, *activity* and *efficiency* of the bank sector and capital markets on the economic processes taking place in every country expressed as GDP change.

As shown by the analysis of research of foreign authors in order to evaluate the dependence of the financial sector and growth of economy and to evaluate the correlation, information flows of a large scope are necessary for the research. In order to carry out the analysis of the economic environment of the "old" European Union countries, Latvia and Estonia information from macroeconomic reviews from Central banks of the countries, statistical reports,

reports of the European Central Bank and the World Bank, Eurostat data base, data provided in online data bases by International Monetary Funds as well as statistical reports for the period of 10 years from online data bases of the Central banks of every analyzed country is necessary. To carry out the analysis of the indicators of development of the financial sector data is taken from Financial Structure Dataset, which was updated on 20 March 2007 by the author of many scientific researches Thorsten Beck and Ed Ai- Hussainy. The research uses data covering a period of ten years, which sufficiently reflects peculiarities of development. The collected information is classified according to countries and the analyzed period. On the basis of the index of the financial structure calculated by scientists T. Beck, A.Demirguc - Kunt, R. Levine (1999), A. Demirguc - Kunt, R. Levine (1999), R. Levine (2002), G. Girardone, J. C. Nankervis, E. F. Velentza (2006), the research is carried out by classifying the countries into three groups: countries, whose structure of the financial system is bank-based, countries, whose structure of the financial system is market-based and countries, where the structure of the financial system is just forming.

In order to establish the correlation of the indicators of the financial sector and gross domestic product per capita, the research is carried out applying the method of multiple correlation. However before that it is necessary to carry out a research providing characteristics of spread of data and to establish whether the population of dependant variables selected for the research is distributed according to the normal distribution. Normal distribution of the values of the take of inflation and GDP per capita is analyzed on the basis of the presumption of linear regression, where it is established that for every fixed value x_i of independent variable there are values Y_i of the dependant variable, which have to be distributed according to the normal law. Statistical reliability is indicated upon presenting the results. The following reliability levels were employed: $p > 0.05$ – statistically unreliable, $p < 0.05$ – statistically reliable. As the linear methods of the measure of dependence of two variables – correlation coefficient r depends from the scale of variables, then for interval variables distributed according to the normal law Pearson R correlation coefficient is calculated, and Spearman correlation coefficient is calculated for variables measured according to the rank scale. As the variables of the research are interval, Pearson correlation coefficient is used for measuring the strength of correlation.

The obtained results of the performed correlation analysis showed the dependence correlation of every indicator of development of the financial sector and GDP per capita, which is characterized by Pearson coefficient. The results of correlation analysis were structurized according to the results of scientific researches, grouping countries according to the index of the structure calculated by foreign authors, attributing every country to the group of bank-based or market-based financial structures, and presented in Tables 3 and 4. The third group of countries, the index of the structure of which has not been calculated and capital markets are not developed, consists of the three Baltic States, and the results of their correlation analysis are presented in Table 4.

Table 3 presents structurized research data from countries with bank-based financial structures. Upon analyzing the dependence of GDP per capita and financial indicators it was established that in Ireland all indicators of development of the bank sector, except for the indicator of *Deposit money bank/(Deposit money bank + Central bank) assets*, have a statistically reliable both direct and reverse correlation, but out of capital market indicators only the indicator of *Public bond market capitalization/GDP* has a strong statistically reliable reverse correlation (-0.929) and the indicator of *Private bond market capitalization/GDP* has a statistically reliable direct correlation (0.882) to GDP per capita. But in Belgium only one indicator of the development of the bank sector – *Central bank assets/GDP* - has a strong statistically reliable reverse correlation (-0.938) to the indicator of GDP per capita, while all market indicators, except *Stock market turnover ratio,* and the indicators of life and non-life insurance have statistically reliable direct and reverse correlations. In France a statistically reliable correlation with the indicators of the capital market also dominate. Out of all indicators of the countries, obtained in the context of values of dependence on GDP per capita, Luxembourg is distinguished, where a statistically reliable reverse correlation with the indicators of *Central bank assets/GDP* (-0.691), *Stock market capitalization/GDP* (-0.659) and *Net interest margin* (-0.789) was established, and a statistically reliable direct correlation was established with indicators *Life insurance penetration* (0.711). In other countries statistically reliable correlations were established both with the indicators of the bank sector and the capital market. However it can be distinguished that in all countries with bank-based financial structures a statistically reliable reverse correlation with the indicator of *Central bank assets/GDP* was established as well as in all countries, except Luxembourg, where a statistically reliable correlation with the indicator of *Private bond market capitalization/GDP* was established. In some countries the correlation was direct (Austria (0.995), Denmark (0.853), Ireland (0.882), Italy (0.690), Portugal (0.942)), and in other countries it was reverse (Belgium (-0.969), Germany (-0.711), France (-0.613), Finland (-0.771)). Concluding the performed correlation analysis of the countries with bank-based financial structures, it can be stated that in this group of countries the indicator of *Central bank assets/GDP* to GDP per capita shows a strong correlation.

Table 4, which reflects the data of countries with market-based financial structures, provides structurized data from the carried out research of dependence of GDP per capita and the indicators of the development of the financial system. It was established that the financial indicators of all countries with market-based financial structures equivalently correlate with the indicators of development of both the bank sector and the capital market. However it was established that in case of correlation of GDP per capita with the indicator of *Central bank assets/GDP* all countries have a statistically reliable reverse correlation. Also in all countries, except for Netherlands, a statistically reliable linear correlation with the indicators of *Deposit money bank assets/GDP* was established. So in this group of countries, the development

Table 3.

Dependence of indicators of development of the financial sector and GDP per capita in European Union countries with market-based financial structures

Indicators	Austria	Belgium	Denmark	Germany	Ireland	Italy	France	Luxem-bourg	Portugal	Finland
Central bank assets/ Total financial assets					**-0.881**					
Deposit money bank assets/ Total financial assets					**-0.862**					
Other financial institutions assets/ Total financial assets					**-0.884**					
Deposit money bank/(Deposit money bank + Central bank) assets	**0.801**	0.240	**0.929**	**0.859**	-0.225	**0.968**	0.188	-0.265	**0.969**	**0.965**
Liquid liabilities/GDP	**0.987**	0.477	-0.430	**0.954**	**0.928**	0.025	0.266	0.304	0.031	-0.235
Central bank assets/GDP	**-0.839**	**-0.938**	**-0.975**	**-0.914**	**-0.928**	**-0.969**	**-0.909**	**-0.681**	**-0.984**	**-0.983**
Deposit money bank assets/GDP	**0.994**	-0.013	**0.896**	0.419	**0.969**	**0.893**	0.240	0.456	**0.925**	0.260
Other financial institutions assets/ GDP					**-0.723**					
Private credit by deposit money banks/GDP	**0.992**	0.286	**0.908**	**0.679**	**0.977**	**0.927**	0.238	0.468	**0.959**	**-0.565**
Private credit by deposit money banks and other financial institutions/GDP	**0.992**	0.286	**0.908**	**0.679**	**0.968**	**0.927**	0.238	0.468	**0.959**	**-0.565**
Bank deposits/GDP	**0.985**	0.489	-0.403	**0.950**	**0.946**	0.008	0.250	0.296	-0.301	0.253
Financial system deposits/GDP	**0.985**	0.489	-0.403	**0.950**	**0.941**	0.008	0.250	0.296	-0.301	0.253
Overhead costs	0.380	0.020	-0.248	**0.547**	0.227	0.065	**0.656**	0.274	-0.337	**0.509**
Net interest margin	-0.005	-0.136	**-0.892**	-0.352	**-0.782**	**0.925**	**-0.644**	**-0.789**	-0.158	0.453
Life insurance penetration	-0.275	**0.985**	**0.920**	**0.967**	**0.598**	**0.954**	**0.555**	**0.711**	0.231	**0.860**
Non - life insurance penetration	0.268	**0.942**	**0.654**	0.470	**0.792**	**0.914**	**0.524**	-0.044	**0.532**	-0.234
Stock market capitalization/GDP	**0.925**	**0.727**	**0.739**	0.375	0.496	**0.729**	**0.775**	**-0.659**	**0.672**	**0.894**
Stock market total value traded/GDP	**0.990**	**0.580**	**0.765**	**0.777**	0.121	**0.878**	**0.879**	-0.439	0.388	**0.854**
Stock market turnover ratio	**0.891**	-0.215	**0.783**	**0.552**	0.345	**0.871**	**0.751**	-0.397	0.242	0.491
Private bond market capitalization/GDP	**0.995**	**-0.969**	**0.853**	**-0.711**	**0.882**	**0.690**	**-0.613**		**0.942**	**-0.771**
Public bond market capitalization/GDP	**-0.986**	**-0.802**	**-0.934**	**0.990**	**-0.929**	**0.914**	**0.923**		0.354	0.336

of the financial structures of which is market-based, indicator of *Central bank assets/GDP* alone has a strong statistically reliable reverse correlation to GDP per capita. The structurized data of the research of the Baltic States provided in Table 4 show that all indicators of development of the bank sector have a strong statistically reliable correlation with GDP per capita, however no correlation with the indicator of *Central bank assets/GDP* was not established in Latvia. Other efficiency indicators in all Baltic States have a statistically reliable reverse correlation to GDP per capita, which shows that increasing efficiency of activities of banks positively influences the growth of GDP per capita. Out of indicators of the capital market only the indicator of *Stock market capitalization/GDP* correlates with GDP per capita.

Summarizing the results of linear correlation it is stated that in all analyzed countries a strong linear dependence and statistically significant correlation was established between GDP per capita and the indicators of the development of the financial sector. After evaluating the strength of correlation between variables, it is necessary to establish the causal nature of this correlation and the indicators of development of the financial sector influencing changes of GDP. Linear regressive analysis was used for this purpose, and as there are more independent variables, i.e. financial indicators, than one, regression of many factors (multiple) was employed. The model of multiple regression is applied when there are more than one independent variables. Presumptions of linear regression are as follows: for every fixed value x_i of independent variable *(x_i = countries financial indicators)* there are values Y_i of the dependant variable (Y_i = *countries GDP per capita)*, which have to be distributed according to the normal law, dispersion of the dependent variable Y_i has to be equal in cases of all values of the independent variable (requirements of homoscedacity), correlation between the dependant variable and independent variable has to be linear. Multiple correlation coefficient R (square root of determination coefficient) is provided for evaluation of the influence of *Y* values acquired by independent variables. Null hypothesis H_0 is rejected (coefficients statistically significantly differ from 0), if p – value $p < a$, where a is the selected level of significance ($a=0.05$). All independent variables are included into calculation in blocks, upon choosing the most widely applied *Stepwise* method, where independent variables are processed together in every step.

Table 4.

Dependence of indicators of development of the financial sector and GDP per capita in European Union countries with market-based and still forming financial structures

Indicators	Countries with market-based financial structures					Countries with still forming financial structures		
	Greece	Netherlands	Spain	Sweden	United Kingdom	Lithuania	Latvia	Estonia
Central bank assets/ Total financial assets		**-0.807**		**-0.923**				
Deposit money bank assets/ Total financial assets		**-0.800**		**-0.525**				
Other financial institutions assets/Total financial assets		**-0.803**		**-0.916**				
Deposit money bank/(Deposit money bank + Central bank) assets	**0.964**	0.216	**0.969**	**-0.808**	**0.956**	**0.597**	**0.791**	**0.688**
Liquid liabilities/GDP	0.389	-0.266	**0.934**	**0.720**	**0.984**	**0.961**	**0.946**	**0.973**
Central bank assets/GDP (dydžio)	**-0.930**	**-0.940**	**-0.956**	**-0.951**	**-0.962**	**-0.570**	-0.219	**-0.705**
Deposit money bank assets/GDP	**0.963**	-0.197	**0.946**	**0.866**	**0.956**	**0.928**	**0.959**	**0.940**
Other financial institutions assets/GDP		**-0.864**		**-0.943**				
Bank deposits/GDP	**0.875**	-0.239	**0.947**	**0.764**	**0.983**	**0.845**	**0.968**	**0.937**
Financial system deposits/GDP	**0.875**	-0.239	**0.947**	-0.261	**0.983**	**0.845**	**0.968**	**0.937**
Private credit by deposit money banks/GDP	**0.994**	-0.096	**0.974**	**0.876**	**0.969**	**0.961**	**0.945**	**0.976**
Private credit by deposit money banks and other financial institutions/GDP	**0.994**	**-0.768**	**0.974**	-0.192	**0.969**	**0.961**	**0.945**	**0.976**
Overhead costs	-0.309	**0.684**	0.058	**0.678**	**0.858**	**-0.920**	**-0.842**	**-0.800**
Net interest margin	0.088	0.359	0.312	**0.758**	0.146	**-0.806**	**-0.824**	**-0.843**
Life insurance penetration	0.492	**0.568**	0.315	**0.855**	0.466	**0.865**	-0.405	**0.865**
Non - life insurance penetration	**0.970**	**0.879**	**0.507**	0.374	0.418	**0.858**	-0.287	**0.830**
Stock market total value traded/GDP	-0.058	0.433	**0.721**	**0.765**	**0.967**	**0.864**	**0.974**	**0.884**
Stock market turnover ratio	-0.316	**0.558**	0.437	**0.963**	**0.956**	0.439	0.139	0.150
Stock market capitalization/GDP	0.282	0.133	**0.888**	0.317	-0.067	-0.090	-0.215	0.157
Private bond market capitalization/GDP	**-0.664**	**0.987**	**0.803**	**-0.862**	0.259			
Public bond market capitalization/GDP	**0.902**	-0.475	**-0.534**	**-0.778**	**-0.827**			

statistically reliable ($p<0.05$)

After carrying out the econometric research and evaluating whether the values of the take of GDP per capita of every country are distributed according to the normal law, it was established that in all analyzed countries the values of GDP per capita are distributed according to the normal distribution, as the normality criterion $p>a$, i.e. the values were higher than 0.05, so it is possible to apply linear multiple regression for further researches.

Based on the results of multiple regression it is stated that indicators of the capital market are only significant to GDP per capita in France, Germany and Austria, and in Finland, Portugal, Ireland, Luxembourg and Italy changescan be influenced only by the indicators of development of the bank sector, where an especially important role is played by the correlation of Assets of the central bank and GDP (except for Ireland, where Credits provided by commercial banks to the private sector and their correlation with GDP are important). Only in Belgium changes in the bank, insurance sectors and capital markets will influence changes of GDP per capita. It is also important to note that only in Luxembourg changes of the net margin of interests reflecting efficiency of the activities of banks are important to GDP per capita. After analyzing the results obtained from the research of countries with market-based financial structures it was established that GDP per capita can be influenced by both the indicators of the capital market and the bank sector, where also in this group of countries the importance of the correlation of the Assets of the central bank with GDP or with all financial assets is distinguished. In the Baltic States changes of GDP per capita can be influenced by the indicators of both the bank sector and the market. But in Estonia the correlation of the scope of contributions of life insurance and bank deposits to GDP can influence GDP per capita, which characterizes the growth of economy in the country.

Upon summarizing the results obtained from the research indicators of the financial sector can be distinguished, the changes of which will also influence the economic processes that are taking place, as expressed by tendencies of change of GDP per capita. This way the indicators of development of the financial sector which have the strongest correlation with GDP per capita can be identified (Tables 5 - 7).

As can be seen from the summarized results of the research provided in Table 5 out of 22 indicators characterizing the development of the financial sector the in countries with bank-based structures of the financial system, in Belgium only four, in Luxembourg, France, Germany, Ireland, Denmark and Austria only two, and in Italy, Portugal and Finland only one indicator has correlation with the indicator of GDP per capita characterizing growth of economy.

Table 5.

Indicators of development of the financial sector interacting with GDP per capita in countries with bank-based financial structures

Countries	Indicators of development of the financial sector	
Belgium	1. Life insurance penetration	*Insurance* ***activity*** *(R^2 = 0.970)*
	2. Overhead costs	Bank ***efficiency*** *(R^2 = 0.987)*
	3. Non - life insurance penetration	*Insurance* ***activity*** *(R^2 = 0.994)*
	4. Stock market capitalization/GDP	*Market* ***size*** *(R^2 = 0.998)*
Italy	1.Central bank assets/GD	*Bank* ***size*** *(R^2 = 0.936)*
Luxembourg	1. Net interest margin	Bank ***efficiency*** *(R^2 = 0.622)*
	2.Central bank assets/GDP	*Bank* ***size*** *(R^2 = 0.952)*
France	1. Public bond market capitalization/GDP	*Market* ***size*** *(R^2 = 0.856)*
	2.Stock market total value traded/GDP	*Market* ***activity*** *(R^2 = 0.959)*
Germany	1. Public bond market capitalization/GDP	*Bank* ***size*** *(R^2 = 0.983)*
	2. Stock market total value traded/GDP	*Market* ***activity*** *(R^2 = 0.995)*
Ireland	1.Private credit by deposit money banks/GDP	*Bank* ***activity*** *(R^2 = 0.954)*
	2. Deposit money bank assets/GDP	*Bank* ***size*** *(R^2 = 0.997)*
Denmark	1. Central bank assets/GDP;	*Bank* ***size*** *(R^2 = 0.950)*
	2. Liquid liabilities/GDP	*Bank* ***size*** *(R^2 = 0.981)*
Portugal	1. Central bank assets/GDP	*Bank* ***size*** *(R^2 = 0.968)*
Finland	1. Central bank assets/GDP	*Bank* ***size*** *(R^2 = 0. 962)*
Austria	1. Private bond market capitalization/GDP	*Market* ***size*** *(R^2 = 0.991)*
	2. Stock market total value traded/GDP	*Market* ***activity*** *(R^2 = 0.995)*

After carrying out the research of evaluation of the correlation of the indicators of the financial sector and GDP per capita it was also established that in France, Germany and Austria economic changes are determined by the indicators of the capital market, and in Finland, Portugal, Denmark, Ireland, Luxembourg and Italy by the indicators of the bank sector. In Belgium changes in both capital market and bank and insurance sectors are important for economic processes.

However it has to be noted that the results of research provided in Table 5 show that in the countries with bank-based structures of the financial system correlation with GDP per capita is strong, as the values of determination coefficients are higher than 0.93 in all countries belonging to this group, except Luxembourg (R^2 – 0.622) and France (R^2 – 0.856). In providing the influence of indicators of the financial sector on GDP per capita in greater detail it was established that in countries with bank-based financial structures out of 19 obtained indicators of development of the financial sector over half characterize development of the bank sector and a large number of them show that the size of the bank sector is one of the most important factors influencing changes of GDP per capita. However indicators of the capital market, where the indicator of size is in domination, are also important in these countries. So in countries with bank-based structures of the financial system development of the size of not only the bank sector but also of the size of the capital markets influencing GDP per capita is important. However the obtained results do not prove that countries with bank-based financial structures are dominated only by indicators characterizing the development of the financial sector and having the strongest correlation with GDP per capita are typical of this group of countries. It was also established that in countries with bank-based financial structures attraction of funds through capital markets is not less important than through the bank sector. Structurized results of the research provided in Table 6 show that in countries with market-based structures of the financial system out of 22 analyzed indicators characterizing development of the financial sector four have correlation with growth of economy in Greece, three in Netherlands, England and Spain, and two indicators in Sweden.

Table 6 presents structurized research results and shows that only in Sweden indicators of the bank sector are correlated to GDP per capita, while in other countries indicators of both the bank sector and capital markets interact with the macroeconomic indicator. Therefore there is no ground to state that countries with market-based financial structures are dominated solely by indicators characteristic of this structure. The determination coefficients established during the research show that the correlation with GDP per capita in the countries of this group is very strong, as the obtained lowest value of 0.927 in Sweden, and 0.999 value obtained in Spain, Greece, and 0.998 in England. This shows that change of the identified indicators of the financial sector would also significantly influence the indicator of GDP per capita characterizing the growth of economy. However it should be noted that countries with market-based structures of the financial system also manifest the influence of the changes of the assets of the Central bank on the economic processes of those countries. It was established that reduction of the assets of the Central bank has a strong correlation (R^2 ~ 0.990) with GDP per capita. It was also determined during the research that in the countries with market-based structures of the financial system correlation with the indicator of GDP per capita was manifested by an average of three indicators of the financial sector, the determination coefficients of which are higher than 0.990. Upon providing in greater detail characteristics of development of the financial sector, it was established that in the countries with formed market-based structures of the financial system indicators of the bank sector (10) are in domination – 5 of them characterize the size of the bank sector, 2 – activity and 3 efficiency, differently from countries with

Table 6.

Indicators of development of the financial sector interacting with GDP per capita in countries with bank-based financial structures

Countries	Indicators of development of the financial sector	
Netherlands	*1. Private bond market capitalization/GDP*	*Market **size** (R^2 = 0.973)*
	2. Central bank assets/ Total financial assets;	*Bank **size** (R^2 = 0.990)*
	3.Net interest margin	Bank ***efficiency*** *(R^2 = 0.995)*
United Kingdom	*1. Liquid liabilities/GDP;*	*Bank **size**(R^2 = 0.969)*
	2. Stock market turnover ratio	*Market **efficiency** (R^2 = 0.997)*
	3. Stock market total value traded/GDP	*Market **activity** (R^2 = 0.998)*
Greece	*1. Private credit by deposit money banks/GDP*	*Bank **activity** (R^2 = 0.989)*
	2. Central bank assets/GDP;	*Bank **size** (R^2 = 0.995)*
	3. Overhead costs	Bank ***efficiency*** *(R^2 = 0.998)*
	4. Stock market total value traded/GDP	*Market **activity** (R^2 = 0.999)*
Spain	*1. Private credit by deposit money banks/GDP*	*Bank **activity** (R^2 = 0.948)*
	2. Central bank assets/GDP;	*Bank **size** (R^2 = 0.998)*
	3. Liquid liabilities/GDP	*Bank **size** (R^2 = 0.999)*
Sweden	*1. Stock market turnover ratio*	*Market **efficiency** (R^2 = 0.927)*
	2. Central bank assets/ Total financial assets	*Bank **size** (R^2 = 0.990)*

bank-based structures of the financial system: out of 5 indicators of the capital market correlation with GDP per capita is showed by only 1 size indicator, and from among activity and efficiency indicators by 2. So this group of countries is also dominated by indicators of the bank sector, which show that by influencing the development of the size of the bank sector, as well as possibilities of lending and efficiency of activities of banks growth of economy expressed as GDP per capita can be influenced in countries, in which market-based structures of the financial system have formed. However in these countries activity and efficiency of capital markets remains important.

Correlation of indicators characterizing the development of the financial sector with GDP per capita of countries with forming structure of the financial system is provided in Table 8. The obtained results of the research show that in the three Baltic States, in which the structure of the financial system is still forming, different indicators of the financial sector that manifest the correlation with the indicator GDP per capita characterizing growth of economy are in domination. The obtained values of determination coefficient, which are not lower than 0.990, show that in these countries the identified indicators of the financial sector have a strong correlation with GDP per capita.

Table 7.

Indicators of development of the financial sector interacting with GDP per capita in countries with still forming financial structures

Countries	Indicators of development of the financial sector	
Lithuania	1. *Liquid liabilities/GDP*	*Bank **size** (R^2 = 0.924)*
	2. Deposit money bank/(Deposit money bank + Central bank) assets	*Bank **size** (R^2 = 0.990)*
	3. *Central bank assets/GDP*	*Bank **size** (R^2 = 0.995)*
	4. *Non - life insurance penetration*	*Insurance **activity** (R^2 = 0.999)*
	5. *Stock market turnover ratio*	*Market **efficiency** (R^2 =1.00)*
	6. *Bank deposits/GDP*	*Bank **size** (R^2 = 1.00)*
Latvia	1. *Stock market total value traded/GDP*	*Market **size** (R^2 = 0.949)*
	2. *Deposit money bank assets/GDP*	*Bank **size** (R^2 = 0.993)*
	3. *Overhead costs*	Bank ***efficiency*** *(R^2 = 0.998)*
Estonia	1. *Bank deposits/GDP*	*Bank **size** (R^2 = 0.952)*
	2. *Life insurance penetration*	*Insurance **activity** (R^2 = 0.994)*

It was established that in Lithuania six indicators of the financial sector characterizing both the development of bank and insurance sectors and capital markets interact with economic processes and only in Lithuania importance of the assets controlled by the Central bank on the economy of the country is distinguished. In Latvia growth of economy is less sensitive to changes in the financial sector, as three indicators of the financial sector correlated to the indicators of GDP per capita, the values of determination coefficient of which are less than one, were established. In Estonia two indicators of the financial sector showing the importance of bank (R^2 – 0.952) and insurance sectors (R^2 – 0.994) to economic change are important. Providing in greater detail the characteristics of the indicators of development of the financial sector in the countries with still forming structures of the financial system, it was established that a large part of the obtained 11 indicators of development of the financial sector characterize development of the bank sector and nearly all the size of the bank sector. This shows that the influence of development of the bank sector on the change of the indicator of GDP per capita is significant. Development of the insurance sector is also important to economic changes in the countries, where the structure of the financial system is forming, as a strong correlation between insurance indicators and the indicators of GDP per capita was

established during the research. Indicators of the development of the financial sector identified thanks to the complex model and correlated to GDP per capita show that in the countries, where the structure of the financial system is just forming, a dominating bank sector determines the formation of a bank-based financial system.

The research showed that the influence of the development of the financial sector on GDP per capita is very strong and significant, as upon analyzing the correlation of 22 indicators of the development of the financial sector with this macroeconomic indicator, a correlation of the indicators of the financial sector was established in all analyzed countries. It was also established that the growth of economy expressed by the indicator of GDP per capita is influenced by the tendencies of change of the indicators of both the bank sector and the size of the capital market, as the correlation of these indicators with economic processes is obvious. Analyzing the influence on GDP per capita it was established that the abundance of indicators of the bank sector show the importance of the development of the size of this sector. On the basis of identified indicators characterizing development of the financial sector it cannot be stated that just the indicators of development of the bank sector or just the capital market influence the economic processes in the country. However in the countries with bank-based and market-based financial structures one of the indicators influencing the change of GDP per capita is the established indicator of Central bank assets/GDP. As the influence and effect of the Central bank in regulating the offer of money and possibilities of lending of commercial banks for the growth of economy is significant, it means that the Central bank was and is one of the factors, determining the development of the whole financial system and influencing economic changes from historic times till these days. Be stated for the Baltic States upon analyzing the nature and strength of influence of indicators of development of the financial sector on change of GDP per capita that in order to sustain long-term growth of GDP per capita attention has to be paid in Lithuania and Estonia not only to the growth of the bank sector but also to sustaining the development of the insurance market. Meanwhile in Latvia the development of both the bank sector and share market is important in order to influence long-term growth of GDP per capita. The obtained results of the research show that in the three Baltic States, in which the structure of the financial system is still forming, in case of domination of a strong bank sector even rapid growth of economy does not create conditions for formation of the structure of a market-based financial system.

Conclusions

1. The obtained results of the research do not prove that the countries with bank-based financial structures are dominated only by indicators characterizing the development of the financial sector peculiar only to this group of countries that have the strongest correlation with GDP per capita. This shows that in the global environment indicators of the development of capital are also significant in the structure of a bank-based financial system.
2. The obtained results do not confirm the researches of other authors, who analyzed the dependency of the financial sector and the growth of economy of the "old" European Union countries, as it is stated that the growth of economy determines the formation of the structure of a market-based financial system, and with the domination of a strong bank sector in the Baltic States even in rapidly growing economy, dominant strong banking sector and law average GDP per capita, does not create conditions for the formation of a market-based financial structure.
3. Significant indicators characterizing the development of the financial sector were established, which have the strongest correlation with the gross domestic product per capita in "old" European Union countries with formed **market-based** financial system:
   - banking sector size development indicators – *Central bank assets/GDP, Liquid liabilities/GDP*, activity indicators – *Private credit by deposit money banks/GDP*, efficiency indicators – *Net interest margin, Overhead costs;*
   - capital market size development indicators – *Private bond market capitalization/GDP*, activity indicators – *Sock market total value traded/GDP*, efficiency indicators – *Sock market turnover ratio*.
4. Significant indicators characterizing the development of the financial sector were established, which have the strongest correlation with the gross domestic product per capita in the countries with formed **bank-based** financial system:
   - banking sector size development indicators – *Central bank assets/GDP, Deposit money bank assets/GDP, Liquid liabilities /GDP*, activity indicators – *Private credit by deposit money banks /GDP*, efficiency indicators – *Net interest margin, Overhead costs;*
   - capital market size development indicators – *Stock market capitalization/GDP, Private bond market capitalization/GDP, Public bond market capitalization /GDP*, activity indicators – *Sock market total value traded/GDP*, efficiency indicators – *Sock market turnover ratio;*
   - insurance sector activity development indicators – *Life insurance premium volume /GDP, Non life insurance premium volume /GDP*.
5. Significant indicators characterizing the development of the financial sector were established. Which have the strongest correlation with the gross domestic product per capita in Baltic States countries **with forming financial** structures:
   - banking sector size development indicators - *Central bank assets/GDP, Deposit money bank assets/GDP, Liquid liabilities/GDP, Bank deposits/ GDP*, activity indicators - *Private credit by deposit money banks/GDP*, efficiency indicators - *Overhead costs;*
   - capital market size development indicators - *Stock market capitalization/GD;*.
   - insurance sector development indicators - *Life insurance premium volume /GDP.*

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Finansų sistemos rodiklių ir bendrojo vidaus produkto ryšio vertinimas Europos Sąjungos šalyse

Santrauka

Sėkmingai funkcionuojantis finansų sektorius kiekvienoje šalyje yra svarbi ekonomikos augimo sąlyga. Tačiau kaip, per kokius finansų sistemos segmentus veikiami ekonominiai procesai bei jų rezultatai, nuo kokių kitų aplinkos veiksnių tas poveikis priklauso, vis dar yra atviri klausimai, kadangi kiekvienos šalies ekonomikos, kaip ir finansų sistemos vystymasis taip pat turi savo specifinių bruožų. Gausiuose moksliniuose tyrimuose ir jų rezultatus atspindinčiose mokslinėse publikacijose jau seniai bandoma analizuoti ir įvertinti tiek finansų sistemų struktūrų pranašumus, tiek finansų sektoriaus išsivystymo lygio įtaką šalies ekonomikai. Dinamiškai keičiantis pačiai ekonominei aplinkai, intensyvėjant šalių integraciniams procesams, ryškėjant globalizacijos poveikiui, finansų sistemos neišvengiamai keičiasi, todėl jų įtakos įvertinimas atskiros šalies ekonomikos vystymuisi tampa itin aktuali ir vis sudėtingesnė problema. Ekonomistai jau senai stengiasi nustatyti bankinės ir rinkos finansinės struktūros pranašumą viena kitos atžvilgiu bei įvertinti poveikį ekonomikos vystymuisi tiek išsivysčiusiose, tiek besivystančiose bei spartaus ekonomikos vystymosi šalyse, kuriose finansų struktūros tik formuojasi. Vienas iš svarbiausių moksliniuose tyrimuose akcentuojamų faktorių yra susiformavusios bankų ir rinkos tipo finansų struktūros, kurių sąveika su ekonomikos augimu gali būti skirtinga. Moksliniuose tyrimuose stengiamasi išryškinti į bankus ir į rinkas orientuotos finansų struktūros poveikio ekonomikos vystymosi ypatumams svarbą. Daugelis tyrimų buvo atlikti šalyse, kuriose finansų sistemos struktūra nepasižymėjo ryškiais pasikeitimais, t.y. visą tyrimo laikotarpį išliko bankų ar rinkos tipo. Šalyse, kuriose finansų sektoriaus plėtra itin sparti ir paveikta globalizacijos, tokių tyrimų nebuvo atlikta. Kadangi Europos Sąjunga, kaip savanoriškas šalių su istoriškai susiformavusiais skirtingais ekonomikos ir finansų sistemos modeliais bei išsivystymo lygiu vienijimosi modelis, šiandien geriausiai atspindi pasaulyje vykstančius integracijos ir globalizacijos procesus, tai būtent šių šalių tyrimas nagrinėjamos problemos kontekste yra svarbus. Europos Sąjungos erdvėje greitai vyko ir vyksta integraciniai procesai finansų sektoriuje ir dėl aktyvaus bankų jungimosi ir įsigijimų proceso, dominančio potencialius investuotojus įsitraukti į vieningą ES erdvę, vystymosi strategijos perkeliamos į kitus regionus. Tikėtina, kad daugelis vystymosi ypatumų gali chronologiškai pasikartoti naują vystymosi etapą pasiekusiose šalyse, t. y. Lietuvoje, Latvijoje ir Estijoje. Todėl šio **straipsnio tikslas** – atlikti finansų sistemos vystymosi rodiklių ir ekonomikos augimą charakterizuojančio rodiklio – bendrojo vidaus produkto ryšio vertinimo tyrimą Europos Sąjungos šalyse ir išskirti tuos finansų sektoriaus rodiklius, kurie turi stipriausią ryšį su bendruoju vidaus produktu, tenkančiu vienam gyventojui.

Mokslininkų A. Demirgüç-Kunt, R. Levine bei T. Beck atlikti svarbūs tyrimai, nagrinėjantys finansų sektoriaus ir ekonomikos vystymosi

tendencijas akcentuojant finansų sistemos struktūros poveikį ekonomikos augimui, 1999 metais sukėlė aštrias diskusijas, kurios tęsiasi iki šių dienų. Mokslininkai pirmieji, atlikdami daugelio pasaulio šalių finansų sistemoje susiformavusios struktūros tipo analizę, atkreipė dėmesį į finansų rinkos struktūros pokyčius, veikiančius šalies ekonomikos augimą. T. Beck, A. Demirgüç-Kunt ir R. Levine (1999), remdamiesi R. King ir R. Levine (1993a, b), R. Levine ir S. Zervos (1998), R. Levine, N. Loayza ir T. Beck (1999), P. Rousseau ir P. Wachtel (1998), A. Demirgüç-Kunt ir V. Maksimovic (1998) bei G. Rajan ir L. Zingales (1998) atliktais tyrimais, pirmą kartą tarp finansų sektoriaus tyrėjų atliko visapusišką ir išsamų (kaip teigė patys mokslininkai) finansų sektoriaus vystymosi ir susiformavusių finansų struktūrų poveikio ekonomikos augimui vertinimą, suskirstant šalis į keturias grupes pagal vidutinį bendrą vidaus produktą, tenkantį vienam šalies gyventojui. Šis tyrimas labai svarbus tuo, kad buvo išskirti finansų institucijų ir kapitalo rinkų *dydį, aktyvumą* ir *efektyvumą* apibūdinantys finansiniai rodikliai, darantys ilgalaikį poveikį ekonomikos augimui. Nors daugelis autorių, analizuodami finansų struktūras, yra linkę Europos Sąjungos šalių finansų sistemą laikyti orientuotą į bankinį sektorių, A. Demirgüç-Kunt ir R. Levine (1999), A. Demirgüç-Kunt ir H. Huizinga (2000), R. Levine (2002), C. Girardone, J. C. Nankervis ir E. F. Velentza (2006) tolesniuose savo darbuose, taikydami finansų struktūros indekso skaičiavimo metodiką, išskyrė kiekvienos Europos Sąjungos šalies finansų struktūrą, Lietuvos, Latvijos ir Estijos struktūros indeksas nebuvo apskaičiuotas.

Tam, kad aiškiau išsiskirtų finansinių rodiklių ir šio makroekonominio rodiklio kitimo tendencijų priklausomybė, tyrimas atliekamas šalis klasifikuojant pagal mokslininkų T. Beck, A. Demirguc-Kunt, R. Levine (1999), A. Demirguc-Kunt, R. Levine (1999), R. Levine (2002), G. Girardone, J. C. Nankervis, E. F. Velentza (2006) apskaičiuotą finansų struktūros indeksą: visos šalys suskirstomos į turinčias bankų tipo ir rinkos tipo finansų sistemos struktūrą bei Baltijos šalis su besiformuojančia finansų sistemos struktūra. Siekiama nustatyti finansų sektoriaus vystymosi rodiklių ryšio su ekonomikos augimu, išreikštu BVP pokyčiu, ypatumus. Šiame tyrime akcentuojamos labai svarbios dvi tyrimo dalys, galinčios nustatyti rodiklių, nusakančių bankų sektoriaus ir kapitalo rinkų *dydžio, aktyvumo ir efektyvumo* poveikį kiekvienoje šalyje vykstantiems ekonominiams procesams, išreikštiems BVP pokyčiu, ryšį.

Finansų sektoriaus rodiklių ir bendrojo vidaus produkto, tenkančio vienam gyventojui, ryšiui nustatyti, atliekamas tyrimas, pritaikant daugialypės koreliacijos metodą. Tačiau prieš tai būtina atlikti tyrimą, pateikiantį duomenų sklaidos charakteristikas, ir patikrinti, ar tyrimui parinktų priklausomų kintamųjų populiacija pasiskirsčiusi pagal normalųjį skirstinį. Normalusis BVP vienam gyventojui imties reikšmių pasiskirstymas analizuojamas remiantis tiesinės regresijos prielaida, kurioje numatoma, jog kiekvienai fiksuotai nepriklausomo kintamojo reikšmei x_i priklausomo kintamojo Y_i reikšmės turi būti pasiskirsčiusios pagal normalųjį dėsnį. Pateikiant rezultatus nurodomas statistinis patikimumas. Naudoti šie patikimumo lygiai: $p > 0,05$ – statistiškai nepatikima; $p < 0,05$ – statistiškai patikima. Kadangi tiesinės dviejų kintamųjų priklausomybės mato – koreliacijos koeficiento r metodika priklauso nuo kintamųjų skalės, tai pasiskirsčiusiems pagal normalųjį dėsnį intervaliniams kintamiesiems yra skaičiuojamas Pirsono (*Pearson - R*) koreliacijos koeficientas, o matuojamų pagal rangų skalę kintamųjų yra skaičiuojamas Spirmeno *(Spearmen)* koreliacijos koeficientas. Kadangi tyrimui atlikti kintamieji yra intervaliniai, tai ryšio stiprumui išmatuoti skaičiuojamas Pirsono koreliacijos koeficientas. Gauti atliktos koreliacinės analizės rezultatai parodė kiekvieno finansų sektoriaus vystymosi rodiklio ir BVP vienam gyventojui priklausomybės ryšį, kurį nusako Pirsono koeficientas.

Apibendrinus tiesinės koreliacijos rezultatus, galima teigti, kad visose analizuotose šalyse tarp BVP vienam gyventojui ir finansų sektoriaus vystymosi rodiklių nustatyta stipri tiesinė priklausomybė ir koreliacija statistikai reikšminga.

Įvertinus ryšio tarp kintamųjų stiprumą, būtina nustatyti šio ryšio priežastinį pobūdį bei finansų sektoriaus vystymosi rodiklius, darančius įtaką BVP pokyčiams. Tam tikslui yra naudojama tiesinė regresinė analizė, o kadangi nepriklausomų kintamųjų, t. y. finansinių rodiklių, yra daugiau negu vienas, naudojama daugelio faktorių (daugialypė) regresija.

Daugialypės regresijos modelis yra taikomas, kai nepriklausomų kintamųjų yra daugiau nei vienas. Tiesinės regresijos prielaidos yra šios: kiekvienai fiksuotai nepriklausomo kintamojo reikšmei x_i *(tyrime x_i priskiriami visi šalies finansų sektoriaus rodikliai)* priklausomo kintamojo Y_i (*tyrime Y_i priskiriamas šalies BVP, tenkantis vienam gyventojui)* reikšmės turi būti pasiskirsčiusios pagal normalųjį dėsnį, priklausomo kintamojo Y_i dispersija turi būti lygi esant visoms nepriklausomo kintamojo reikšmėms (homoskedastiškumo reikalavimas), ryšys tarp priklausomo kintamojo ir nepriklausomo kintamojo turi būti tiesinis. Nepriklausomų kintamųjų įtakai Y įgytoms reikšmėms vertinti pateikiamas daugialypės koreliacijos koeficientas R (kvadratinė šaknis iš determinacijos koeficiento). Nulinė hipotezė H_0 atmetama (koeficientai statistiškai reikšmingai skiriasi nuo 0), jeigu p – reikšmė $p < a$, čia a - pasirinktasis reikšmingumo lygmuo ($a=0.05$). Visi nepriklausomi kintamieji įtraukiami į skaičiavimą blokais, pasirinkus plačiausiai taikomą *Stepwise* (po žingsnį) metodą, kur kiekviename žingsnyje nepriklausomi kintamieji yra apdorojami kartu.

Atlikus ekonometrinį tyrimą, t. y. įvertinus, ar kiekvienos šalies BVP vienam gyventojui imties reikšmės pasiskirsčiusios pagal normalinį dėsnį, nustatyta, kad visose tiriamose šalyse BVP vienam gyventojui reikšmės pasiskirsčiusios pagal normalųjį skirstinį, nes normališkumo kriterijaus $p > a$, t. y. reikšmės didesnės už 0.05, vadinasi, tolesniems tyrimams tiesinę daugialypę regresiją taikyti galima.

Remiantis daugialypės regresijos rezultatais, galima teigti, kad BVP vienam gyventojui reikšmingi tik kapitalo rinkos rodikliai yra Prancūzijoje, Vokietijoje ir Austrijoje, o Suomijoje, Portugalijoje, Airijoje, Liuksemburge ir Italijoje pokyčius gali lemti tik bankinio sektoriaus vystymosi rodikliai, kur ypač svarbų vaidmenį vaidina Centrinio banko turto ir BVP santykis (išskyrus Airiją, kur yra svarbūs komercinių bankų suteikti kreditai privačiam sektoriui ir jų santykis su BVP). Išanalizavus šalių, turinčių į rinką orientuotą finansų struktūrą, gautus tyrimo rezultatus, nustatyta, kad BVP vienam gyventojui poveikį gali turėti tiek kapitalo rinkos, tiek ir bankų sektoriaus rodikliai, kur ir šioje šalių grupėje išsiskiria Centrinio banko turto santykio su BVP arba visu finansiniu turtu svarba. Baltijos šalyse BVP vienam gyventojui pokyčius gali lemti tiek bankų sektoriaus, tiek ir rinkos rodikliai. Tačiau Estijoje tik gyvybės draudimo įmokų apimčių ir bankų depozitų santykis su BVP gali daryti poveikį BVP vienam gyventojui, kuris nusako ekonomikos augimą šalyje.

Apibendrinus gautus tyrimo rezultatus, galima išskirti finansų sektoriaus rodiklius, kuriems keičiantis bus juntamas poveikis ir vykstantiems ekonominiams procesams, išreikštiems per BVP vienam gyventojui kitimo tendencijas. Taip galima identifikuoti tuos finansų sektoriaus vystymosi rodiklius, kurie turi stipriausią ryšį su BVP, tenkančiu vienam gyventojui. Gauti tyrimo rezultatai neįrodo, kad šalyse, kuriose yra į bankus orientuota finansų struktūra, dominuoja tik šiai šalių grupei būdingi finansų sektoriaus vystymąsi charakterizuojantys rodikliai, turintys stipriausią ryšį su BVP vienam gyventojui. Tai rodo, kad globalioje aplinkoje bankų tipo finansų sistemos struktūroje reikšmingi ir kapitalo vystymosi rodikliai. Baltijos šalių, kurioms būdingas spartus ekonomikos augimas ir per trumpą laiką susiformavęs finansų sektorius, gauti rezultatai nepatvirtina kitų autorių, nagrinėjusių „senųjų“ Europos Sąjungos šalių finansų sektoriaus ir ekonomikos augimo priklausomybes, tyrimų, kad ekonomikos augimas sąlygoja rinkos tipo finansų sistemos struktūros formavimąsi. Nes Baltijos šalyse, net ir sparčiai augant ekonomikai, dominuojantis stiprus bankų sektorius ir mažas vidutinis BVP, tenkantis vienam gyventojui, nesudaro sąlygų formuotis į rinkas orientuotai finansų sistemos struktūrai.

Raktažodžiai*: finansų sistema, finansų sistemos struktūra, bankų sektoriaus rodikliai, rinkos struktūros rodikliai, draudimo sektoriaus rodikliai.*

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