Commercial Banking Sector's Performance Results 'Impact on EU Countries' Government Expenditures and Net Export

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Abstract. The aim of this research to prepare an econometric model suitable to evaluate commercial banking sector performance impact on government expenditures as well as net export and also investigate the impact changes in terms of banking sector concentration degree and business cycle phase.

Keywords: commercial banking sector, government expenditures, net export, econometric model.

1. Introduction

Commercial banking sector activities and economic growth connection poses a sharp scientific debate and great scientific interest. Individual commercial banks form a network of commercial banks, which systematically operates the country's economic growth, and this effect is further enhanced by the processes of globalization and integration in parallel. The rapid development of this sector and additional foreign banks' investments allowed to activate the newly joined EU countries economic entities' relationships and created conditions for faster economic growth of those countries. However, the turmoil of the twenty-first century's first decade in the global financial market, reorganization and restructuring processes showed that the commercial banking sector has shortcomings, and failing to identify these deficiencies in time could have significant consequences for the national economy.

The object of the research - the commercial banking sector's impact on the national economy, which is traditionally analyzed through loan and deposit volumes, capital growth, sector liberalization and international integration, the banking system transformation impact on economic growth (measured GDP per capita or the growth of total cost) and inflation. The study of the authors is also based on indicators which reflect commercial banks' activity results, but this investigation differs from all the others in such problematic aspects: (i) the study tests the hypothesis that the same banking sector's performance results may have different effect on different economic sectors (households, businesses, government, foreign sector) and while analyzing the impact on the total output, specific effects may not be noticeable, so in this study the impact is evaluated on government expenditure and net exports separately; (ii) it is likely that commercial banks' performance results depend on the sector's characteristics, such as liberalization, international integration, etc. These characteristics can be regarded not only as the influencing factors, but also as channels through which this impact is revealed. Therefore, the study is testing the hypothesis that the commercial banking sector's concentration is one of those characteristics, which through the competition is changing the sector's impact on government expenditure and net exports; (iii) it is likely that the commercial banking sector performance results' impact will depend on economic entities' expectations and moods, so the study tests the hypothesis that the commercial banking sector performance results' impact on government expenditure and net exports will differ in economic cycle phases.

Summing up the above stated hypotheses the aim of this study is to create a model that would allow to quantify the impact that the commercial banking sector performance results make on government expenditure and net exports, and to identify how this effect is determined by the commercial banking sector's degree of concentration and the economic cycle phase. This model will be tested empirically in EU countries. In order to achieve the aim of this study, the targets were set which together define structure of the paper: (i) to provide a theoretical relationship between commercial banking sector performance results and economic growth through government expenditure and net exports; (ii) to create a model suitable for the quantitative evaluation between commercial banking sector performance results' impact on government expenditures and net export, while this impact could be potentially determined by commercial banking sector's degree of concentration and the economic cycle phase; (iii) to present data of an empirical study overviewing dynamics of EU countries banking sector performance results, government expenditures and net export; (iv) to adapt a

model for the EU countries group, empirically test the hypothesis and discuss analysis results. For the theoretical study's reasoning and empirical research conclusion formulation the scientific literature analysis, generalization and interpretation methods has been applied. The research model uses econometric methods. Empirical calculations have been made using open source Gretl program.

2. Commercial banking sector's performance results' impact on government expenditures and net exports theoretical premises

In this part of the study, commercial banking sector performance results' impact on government expenditures and net exports is investigated theoretically, starting with the discussion question "whether commercial banking sector's performance has an impact on the national economy, or the economy effects the commercial banking sector".

The first empirical study which have analyzed the commercial banking industry and its importance to the economy, have been performed by Schumpeter (1911). In conclusions the author states that the commercial banking sector seeking to improve its managed capital, performs capital reallocation functions, thus promoting economic growth. Premises about the financial property growth impact on economic development have not been adopted explicitly - discussions aroused about the strength of the impact and direction of the impact, it remained unclear whether economic growth effects commercial banking sector's performance or commercial banking sector promotes economic growth.

For the relatively long time it was widely accepted that a well-functioning commercial banking sector is only a consequence of the economic growth. The main purpose of the commercial banking sector was regarded as mediation between business entities, personal savings and investment issues and the distribution of funds among the economic activities' spheres. Robinson (1952) argued that the economy leads and the commercial banking sector follows a growing economy since the banking markets and institutions arise only when the economy creates the need for them and their development is a consequence of economic growth, but not the result. As the economy is growing the number of commercial banking sector's provided services is growing too, and with it the whole sector is expanding. This idea gave a starting point to Miller and Modigliani (1958) theory, which is based on the capital structure indifference point of view – for a perfect financial markets capital structure does not matter,

and to form an optimal capital structure there is no possibility. Theory's adherents claimed that neither the value of the company, nor the performance results of the company do not depend on corporate funding sources: loans, shares and / or bonds, therefore, commercial banks while providing loans and intermediating financial transactions do not create the added value, their activity is unclear and uncertain, and financial investment-intensive companies are able to attract funds from financial markets themselves.

For a long time, this theoretical axis representing empirical studies (e.g.: Friedman, Schwartz, 1963; Hicks, 1969), it was considered that the commercial banking sector does not have a significant impact on economic growth, the commercial banking sector follows a growing economy, and not the opposite. The twentieth century's second half this opinion started to change in the opposite - strong and stable commercial banking sector may be the cause of economic growth. Robinson (1952) and Miller and Modigliani (1958) findings have been contradicted by neoclassics (Patrick, 1966; Goldsmith, 1969), who stated that productivity, capital, population growth and technological progress factors explain the long-term economic growth. Stressing the importance of savings and capital investment in promoting economic growth, they assumed that the economic capacity can be expanded if the public retains a part of its resources and use them for economic development, and this redistribution of financial flows could be carried out by the commercial banking sector.

Patrick (1966) deepened the debate about the relationship between economic growth and the commercial banking sector by splitting this connection into two components - the supply-guided and demand-tracked. The supply-guided component states that commercial banks as financial intermediaries and related services development promotes investment and economic growth. Based on the demand-tracked component, commercial banking sector during economic growth reacts to an increase in demand for financial services and at the same time tracks the economic growth. The study concludes that the link between the commercial banking sector and economic growth is changing while the economy is developing: in the initial economy's growth stage the commercial banking system can accelerate the economic growth redistributing funds from the traditional to the modern sectors of the economy. As the economy is growing, the supply-guided force gradually decreases, and the commercial banking sector is beginning to follow the demand which is formed by economic growth.

The view that the commercial banking sector affects economic growth, but not vice versa, is stated in Goldsmith (1969) study. The author argued that commercial banks converting the short-term financial instruments to a long-term

financing instruments form the basis for economic growth. At the same time, he argued that in such cases it is essential to maintain liquidity during the time of economic growth. In economic system liquidity can be achieved if one player has a surplus of funds (saving more than investing), while others feel the lack of funds (investing more than saving), and commercial banking sector plays an intermediary role.

Patrick (1966), Goldsmith (1969) and McKinnon (1973) and Shaw (1973) asserted a position that the role of economic growth also belongs to financial intermediation, not only to fiscal and monetary policy, changes in politics and legislation, population and labor force growth, research formed the basis of the direction, stating that the commercial banking sector's performance result are not just a consequence of economic growth, but one of the main factors stimulating economic growth. Barro, Becker (1989) empirical study, comprising 87 countries and socio-demographic factors, led to the conclusion that the commercial banking sector development promotes fertility rates decrease, increases the availability of modern services sector and thereby contributes to economic growth. Acemoglu, Ziliboti (1997) findings show that certain high-yield investment projects cannot be divided up and therefore require high levels of capital concentration and changes in the commercial banking sector, which in the long time period promotes economic growth. The researchers stated that the commercial banking sector should accumulate necessary stocks of capital in order to finance large-scale projects. In case of restricted legal entities financing possibilities commercial banking sector would have a negligible or even negative impact on economic growth. Zsolt Ping (1997) study said that commercial banks in their financial intermediary role promote economic growth, creating favorable conditions for households' development activities, which they could not achieve on their The economic growth rate depends on how effectively commercial banks perform this function. King, Levine (1999), Levine et al. (2000) studies revealed a strong correlation between economic growth and the commercial banking sector performance results. The scientists concluded that the commercial banking sector creates conditions for economic growth.

Commercial banking sector reaches especially high interest of investigators when the economy is slowing. Stiglitz (2001), Hogarth et al. (2002); Boyd et al (2005), Serwa (2007), Kroszner et al. (2007), DELL'ARICCIA et al. (2008) studied the economic and commercial banking sector connection while countries are moving into recession. The authors presented the conclusions - the commercial banking crisis usually coincide or even is revealed before the economic slowdown, but strict conclusion that the commercial banking sector

leads to economic slowdown has not been stated. This view is followed by other authors (Kaminsky, Reinhart, 1999; Demirgüç-Kunt, Detragiache, 2005; Hilbers et al. 2005). The study authors found that the crisis in the commercial banking sector and the recession periods coincide, but whether the economic depression is caused by commercial banking performance it is not completely clear, because it is very difficult to distinguish the cause from the outcome.

The above overviewed empirical studies once again have led to a debate question "whether commercial banking sector's performance results' have an impact on the national economy, or the economy operates the commercial banking sector" (Benink, Benston, 2005; Gupta, 2005; Goodhart et al. 2006), however, the link between the economic growth and the commercial banking sector even today raise a lot of discussions. Law et al. (2013) performed a study and concluded that the commercial banking sector stimulates the economy to grow only when a certain level of institutional development is reached. Monnin, Jokipii (2014) conducted commercial banking sector indicators and economic indicators correlation study concludes that the link is close, which means that change of one group indicators, respectively, will have an impact on the other group of indicators change. Scientists did not state an obvious impact direction, but remained in the provisions that the commercial banking sector's stable performance is one of the factors that promote economic growth.

Summarizing the overviewed research, a framework can be provided which represents the economic and commercial banking performance relationship (see: Fig.1).

ECONOMIC GROWTH

Schumpeter (1911); Harrod-Domar (1946); Solow, (1956); Patrick (1966); Kennedy (1966); Goldsmith (1969); McKinnon (1973); Shaw (1973); Barro, Becker (1989); Greenwood, Jovanovic (1990); Fabozzi, Modigliani (1992); Wright and Valentine (1992); Kidwell, Peterson, Blackwell (1993); Fry, (1995); Acemoglu and Zilibotti (1997); Zsolt, Ping (1997); Kropas, Katkus (1997); Levine, Zervos (1998); King, Levine (1999); Gilles (1999); Rajan, Zingales (2000); Khan (2000); Gaytan, Ranciere, (2001);

Acemoglu, Zilibotti (1997); Greenwood, Smith (1997); Demirgüç-Kunt, Maksimovic (1998); Stiglitz (2001), Hogart, Reis, Saporta (2002); Demirgüç-Kunt, Detragiache (2005); Hilbers, Otker-Robe, Pazarbasioglu, Johnson (2005).

Adams (1819); Robinson (1952); Miller-Modigliani (1958); Friedman, Schwartz (1963), Hicks (1969); Demetriades, Hussein (1996).
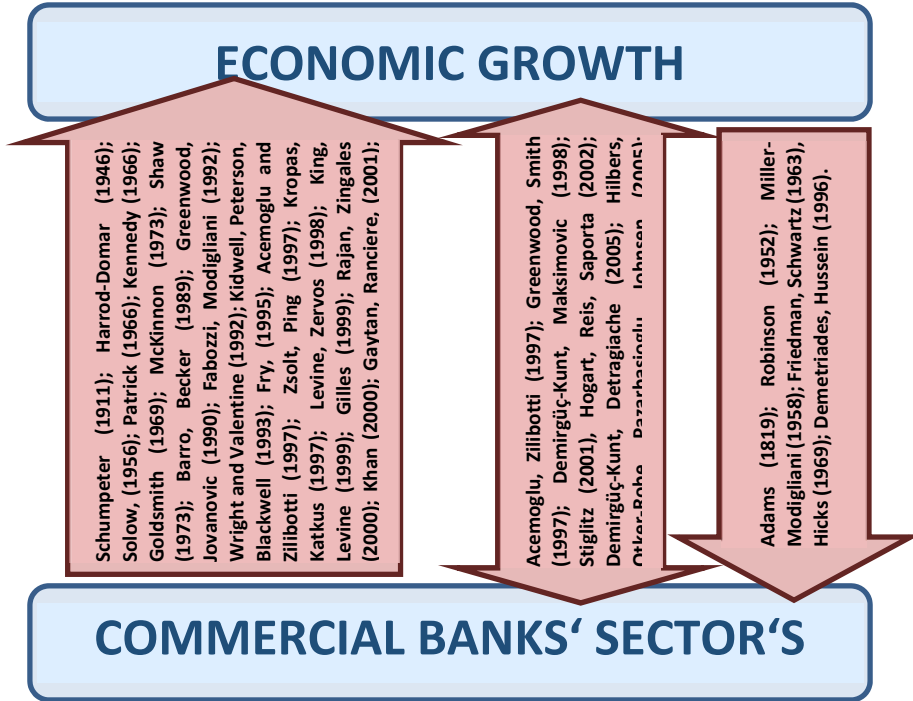
COMMERCIAL BANKS' SECTOR'S

Fig.1. Interaction of commercial banks' sector's changes and economic growth

Source: compiled on the basis of Odekun, 1996; Gregorio, Guidotti, 1995; Arestis, Demetriades, 1997 et al.

Figure 1 it is assumed that there is two-way communication between country's economic and commercial banking sector performance results, but using Granger causality principle (Granger, 1969) it is separated when the connection occurs over time and how it can be empirically verified. Since analyzing the economic and commercial banks' performance results at the same time the economy can operate the commercial banking sector, as the latter may affect the economy, the reason – consequence link assessment becomes complicated. Granger causality concept is based on the idea that previously occurred events may be the cause of events that will take place later on, but not the consequence, it allows to stop a possible two-way communication if the analysis includes economic phenomena under investigation and time dimension. In this study, to determine the commercial banking sector's performance impact on government expenditures and net exports, analyzed factors will be added to the delay in the model, and the

investigating consequence – in the current time, as shown in Figure 1.

Before the presentation of the research methodology, theoretical substantiation of the study is completed discussing commercial banks' performance results which may have an impact on government expenditures and net exports.

Before analyzing and evaluating the commercial banking sector's performance results' impact of government expenditures and net exports, it is necessary to emphasize that it is expressed through the commercial banking operations. Greenwood, Jovanovic (1990), Kidwell et al. (1993), Fry (1995), Gayton, Ranciere (2001), Gross (2002), evaluating different aspects of commercial banking activities releases their various routes of exposure, the main are - financial resources and risk management.

Empirical studies (King, Levine, 1999; Rajan, Zingales, 2000) show that a properly functioning commercial banking sector can effectively organize the allocation of financial resources. Accumulating large volume of funds through the incoming deposits and converting those loans, commercial banks impact the economy. Through the money supply and demand mechanism in the financial market capital is distributed more expediently and rational borrowed and investment funds structure is formed, credit, investment portfolio and liquidity risk is reduced. It would be complicated to carry out investment projects for government institutions and businesses companies without commercial banks interference, it is often difficult and risky. Commercial banks have accumulated more experience in investment sphere, has at its disposal abundant financial resources and accurate financial information. With highly skilled professionals and market experts, performing financial market research and financial resource allocation control, commercial banks help government institutions and business companies make more informed and less risky investment decisions.

Summarizing Fabozzi, Modigliani (1992), King, Levine (1999), Rajan, Zingales (2000), Gaytan, Ranciere (2001), Bain, Howells (2004) insights due to the commercial banking sector's role in the country's economy, the following key aspects of their activity having the impact of government expenditures and net exports are distinguished: (i) the investment efficiency enlargement; (ii) long-term loans liquidity assurance; (iii) the financial resources reallocation efficiency and accuracy; (iv) cost reduction of the allocation of financial resources in the market; (v) financial resources attraction and money supply enlargement in the economy.

Investment efficiency enlargement is related to the flow of information about investment opportunities disposal and management and investment risk distribution. Commercial banks disposing information about individual

enterprises, export markets and countries - trade partners - economic trends may evaluate investment projects and adequately allocate financial resources ensuring their profitability.

Commercial banking sector supports liquidity, creating opportunities for lenders to lend for short periods, and for borrowers to borrow for a long time. Often borrowers wish to borrow for a longer period than lenders want to lend. Although long-term loans use depositors' funds, under normal conditions, the credit institutions can ensure the return of the deposit at any time.

Commercial banks attracting financial resources perform iterative deposit creation and thus increase the money supply in the economy. Acting money multiplier, money supply growth is determined by each additional monetary unit access to the banking system. Under competition conditions, through the financial market mechanism, financial funds go for productive users and social priorities, thereby efficiently and safely carrying out financial - credit operations nationwide.

Wright, Valentine (1992) argues that if assessing the commercial banking sector's effect, it is necessary to take into account not only the role of commercial banks as a whole, but also identify the services, through which the latter impact is expressed. These services are necessary for a modern economy to function. Systematizing (Kropas, Katkus, 1997; Gilles, 1999; Schardax, Reininger 2001; Cecchetti, 2003) views, it is possible to distinguish core commercial banking services, with an impact on government expenditures and net exports: (i) access to payment system (for saving and borrowing the authority is necessary which carries out the transfer of funds between the entities, individuals, etc.); (ii) maintaining liquidity (liquid funds are necessary for legal entities and assurance of economic development); (iii) the functions, associated with traditional banking, execution - to identify, assess and manage the risk; (iv) the provision of information (financial advisory services, information on products and services); (v) the state guarantees preservation (financial intermediaries insure deposits, mediates offering state subsidies, etc.).

Summarizing analyzed research results it could be stated that the commercial banking sector's impact on government expenditures and net exports occur within the investment efficiency enlargement, long-term loans liquidity provision, the attraction of financial resources, redistribution, lending cost reduction and money supply enlargement in the economy.

3. Commercial banking sector's performance results' impact on government expenditures and net exports evaluation econometric model

Before starting to construct a model that could evaluate the commercial banking sector's performance results' impact on government expenditures and net exports and could establish whether this impact is determined by the commercial banking sector's degree of concentration and the economic cycle phase, it is necessary to state that this model will be adapted to investigate panel-type data. In the context of the investigation, this type of data is superior to time-series or cross-sectional data. As macro-level data is often available for a relatively short period of time, a combination of cross-sectional data and time series, i.e. analyzing panel data avoids the problems associated with small test samples. Panel data is more informative, because of more observations (more volatility, more degrees of freedom), so estimates are more effective as an opportunity to investigate the variation in time and between groups appears. Panel type data also has disadvantages: (i) it is assumed that the determined factors' impact in time and among tested objects do not differ. This shortcoming will be eliminated by modeling due to commercial banking sector's degree of concentration (intergroup differences) and due to the phase of the business cycle (periods differences) arising impact differences of the analyzed factors; (ii) the calculated estimates describing investigating factors influence may be misaligned if the unobservable random effects correlate with the other independent variables. The problem, described as endogeneity, will be decided by transforming the data and removing unobservable objects heterogeneity.

Commercial banking sector's performance results' impact on government expenditures and net exports evaluation and determination whether this effect is determined by the commercial banking sector's degree of concentration and the economic cycle phase will be divided into two phases. Consequently, the following two models will be presented: the first (1) model consists of the following in order to determine which factors are analyzed and when affected by the interference (involves the first research phase); the second (2) model consists of a way to be able to evaluate whether the factors, that have been identified as important in the first stage, have impact on government expenditures and net exports due to the commercial banking sector's degree of concentration and the economic cycle phase. Table 1 gives the variables to be used for the forming models.

Table 1. Model dependent, independent and controlled variables

Dependent model variables	Independent model variables	
	Indicators reflecting CBS performance results	Controlled variables
Government expenditure (G)	**Loans (L) Deposits (D) Asset (A) Margin (m)**	Government income (GI); Government debt (GD); Unemployment rate (UR); Population (P); Political elections (PE).
Net exports (NXR)		Effective wage (EW); International trade index (PI); Nominal effective exchange rate (NEER); Research and development expenditures (RDE).

Source: compiled by investigation authors

Proper model formation for the study begins by submitting unobservable random effects' (UE) models of the commercial banking sector's performance results' impact on government expenditures (1_G_UE) and net exports (1_NXR_UE) assessment:

$$G_{i,t}=\alpha+AR(1)+\delta_{2+q}td2+q_t+\ldots+\delta_T tdT_t+\beta_{1,1}\cdot L_{i,t-1}+\ldots+\beta_{1,q}\cdot L_{i,t-q}+\beta_{2,1}\cdot D_{i,t-1}+\ldots+\beta_{2,q}\cdot D_{i,t-q}+\beta_{3,1}\cdot A_{i,t-1}+\ldots+\beta_{3,q}\cdot A_{i,t-q}+$$
$$\beta_{4,1}\cdot m_{i,t-1}+\ldots+\beta_{4,q}\cdot m_{i,t-q}+c_{1,1}\cdot GI_{i,t-1}+\ldots+c_{1,q}\cdot GI_{i,t-q}+c_{2,1}\cdot GD_{i,t-1}+\ldots+c_{2,q}\cdot GD_{i,t-q}+c_{3,1}\cdot UR_{i,t-1}+\ldots+c_{3,q}\cdot UR_{i,t-q}+ c_{4,1}\cdot P_{i,t-1}+\ldots+c_{4,q}\cdot P_{i,t-q}+ c_{5,1}\cdot PE_{i,t-1}+\ldots+c_{5,q}\cdot PE_{i,t-q} + a_i+u_{i,t} \text{ (1\_G\_UE)}$$

$$NXR_{i,t}=\alpha+AR(1)+\delta_{2+q}td2+q_t+\ldots+\delta_T tdT_t+\beta_{1,1}\cdot L_{i,t-1}+\ldots+\beta_{1,q}\cdot L_{i,t-q}+\beta_{2,1}\cdot D_{i,t-1}+\ldots+\beta_{2,q}\cdot D_{i,t-q}+\beta_{3,1}\cdot A_{i,t-1}+\ldots+\beta_{3,q}\cdot A_{i,t-q}+$$
$$\beta_{4,1}\cdot m_{i,t-1}+\ldots+\beta_{4,q}\cdot m_{i,t-q}+c_{1,1}\cdot EW_{i,t-1}+\ldots+c_{1,q}\cdot EW_{i,t-q}+c_{2,1}\cdot PI_{i,t-1}+\ldots+c_{2,q}\cdot PI_{i,t-q}+c_{3,1}\cdot NEER_{i,t-1}+\ldots+c_{3,q}\cdot NEER_{i,t-q}+$$
$$c_{4,1}\cdot RDE_{i,t-1}+\ldots+c_{4,q}\cdot RDE_{i,t-q}+a_i+u_{i,t} \text{ (1\_NXR\_UE)}$$

here:

AR(1) – reflects an autoregressive dependent variable behavior. The original Granger causality test (Granger, 1969) includes delayed dependent variable as one of the model factors, which is identified as a research object Granger cause, and the factor is identified as Granger cause if its late inclusion of values let better explain the evolution of the phenomenon.

α – model constant, δ – time (from 2+q to T) pseudo variable estimate, β – indicators reflecting commercial banking sector's performance results' (from 1 to 4) impact estimate, c – controlled variable (from 1 to 5 (in 1 model) and 4 (in 2

model)) tested dependent variable impact estimate, q – maximum delay of tested factors impact.

i – research object (country) number to N, t – research period number to T.

ai –includes a research object unobserved random effects (the heterogeneity of the countries);

ui,t – idiosyncratic (time-shifting) model error.

If ai includes untracked effects (e.g. country's banking system's specificity which occurred historically) which are difficult to assess empirically and they will not be controlled, calculated models estimates OLS (least squares) method's ai appears in the error. Models (1_G_UE) and (1_NXR_UE) can be rewritten in the form, which does not include ai, but the model has a composite error vi,t, which is equal to ui,t+ai. If ai correlates with the independent variables, the model will demonstrate endogeneity and model's estimates will be in disarray. If we assume that this not observed heterogeneity of the countries is constant (unchanging over time or changing very slowly - on the following assumptions ai does not have time index because it is constant over time), several transformation techniques allowing to remove from the model ai can be adapted. Usually first-order difference (FD) or fixed effects (FE) method is applied for these transformations. FE method is more suitable when high N is high and T is low, because when N is low, especially when T is high, FE transformation is very sensitive for the classical regression model assumptions infringement. In the study using macroeconomic indicators in time series with common trend (when the time series is characterized by non-stationarity due to trend, causing to misleading regression analysis results), FD transformation is acceptable. Together with FD transformation, which brings together a time series into a fixed shape and eliminates time-unchanging, unobservable investigated objects heterogeneity, will be applied and the log transformation (with the exception of the variables m UR and NXR, because they are expressed as a percentage, and PE, because it is pseudo variables), which will allow to interpret the obtained coefficients' estimates as elasticity coefficients and potentially nonlinear relationship between the dependent and independent variables enter into linear. After the above-described transformation, the empirical research first phase adapted models has such a form:

$$\Delta\ln(G_{i,t})=\alpha+AR(1)+\delta_{3+q}td3+q_t+\ldots+\delta_T tdT_t+\beta_{1,1}\cdot\Delta\ln(L_{i,t-1})+\ldots+\beta_{1,q}\cdot\Delta\ln(L_{i,t-q})+\beta_{2,1}\cdot\Delta\ln(D_{i,t-1})+\ldots+\beta_{2,q}\cdot\Delta\ln(D_{i,t-q})+\beta_{3,1}\cdot\Delta\ln(A_{i,t-1})+\ldots+\beta_{3,q}\cdot\Delta\ln(A_{i,t-q})+\beta_{4,1}\cdot\Delta(m_{i,t-1})+\ldots+\beta_{4,q}\cdot\Delta(m_{i,t-q})+c_{1,1}\cdot\Delta\ln(GI_{i,t-1})+\ldots+c_{1,q}\cdot\Delta\ln(GI_{i,t-q})+c_{2,1}\cdot\Delta\ln(GD_{i,t-1})+\ldots+c_{2,q}\cdot\Delta\ln(GD_{i,t-q})+c_{3,1}\cdot\Delta UR_{i,t-1}+\ldots+c_{3,q}\cdot\Delta UR_{i,t-q}+c_{4,1}\cdot\Delta\ln(P_{i,t-1})+\ldots+c_{4,q}\cdot\Delta\ln(P_{i,t-q})+$$
$$+c_{5,1}\cdot\Delta PE_{i,t-1}+\ldots+c_{5,q}\cdot\Delta PE_{i,t-q}+\Delta u_{i,t} \quad (1\_G\_FD)$$

$$\Delta(NXR_{i,t})=\alpha+AR(1)+\delta_{3+q}td3+q_t+\ldots+\delta_T tdT_t+\beta_{1,1}\cdot\Delta\ln(L_{i,t-1})+\ldots+\beta_{1,q}\cdot\Delta\ln(L_{i,t-q})+\beta_{2,1}\cdot\Delta\ln(D_{i,t-1})+\ldots+\beta_{2,q}\cdot\Delta\ln(D_{i,t-q})+\beta_{3,1}\cdot\Delta\ln(A_{i,t-1})+\ldots+\beta_{3,q}\cdot\Delta\ln(A_{i,t-q})+\beta_{4,1}\cdot\Delta(m_{i,t-1})+\ldots+\beta_{4,q}\cdot\Delta(m_{i,t-q})+c_{1,1}\cdot\Delta\ln(EW_{i,t-1})+\ldots+c_{1,q}\cdot\Delta\ln(EW_{i,t-q})+c_{2,1}\cdot\Delta\ln(PI_{i,t-1})+\ldots+c_{2,q}\cdot\Delta\ln(PI_{i,t-q})+c_{3,1}\cdot\Delta\ln(NEER_{i,t-1})+\ldots+c_{3,q}\cdot\Delta\ln(NEER_{i,t-q})+c_{4,1}\cdot\Delta\ln(RDE_{i,t-1})+\ldots+c_{4,q}\cdot\Delta\ln(RDE_{i,t-q})+\Delta u_{i,t} \quad (1\_NXR\_FD)$$

Calculating the model's estimates by OLS method, we have to assume that errors ($\Delta u_{i,t}$) do not correlate in time, i.e. $\rho(\Delta u_{i,t};\Delta u_{i,t-1})=0$. This assumption can be tested in this way: if the model's error estimate is characterized by an AR (1) process, an error has autocorrelation, and if the random walk (errors dissemination in time is random) - errors in time do not correlate. If the model is not characterized by autocorrelation, conventional errors' heteroskedastic identification (White test, proposed by White (1980)) and correction (PCSE proposed by Beck, Katz (1995)) methods can be applied. As the panel data has time and object dimensions, in very general case, it could be expected that in order to receive stabilized model estimates, it would be necessary to adjust heteroscedasticity and autocorrelation (use HAC estimates covariance matrix). Cameron Trivedi (2005) provides evidence that the routine usage of PCSE can lead to wrong small standard coefficients estimates errors, using panel data with autocorrelation. In such cases it is advisable to apply Arellano (2003) proposed HAC (heteroscedasticity and autocorrelation corrected) estimates of the covariance matrix.

In the second stage of the investigation, the model will be used, which will allow to assess whether the investigation factors, which are identified as important in the first stage, impact on government expenditures and net exports depend on the commercial banking sector's the degree of concentration and the economic cycle phases. To model differences of commercial banking sector's concentration degree's influence on the analyzed factors, interaction variables can be used. Interaction is created among the factor, which in the first stage of the analysis has been identified as a statistically significant and pseudo variable, which reflects certain countries' group of commercial banking sector's concentration. If countries are divided into several groups, one of the groups' interaction is not included into a model and this group becomes comparable, and coefficients' estimates with interaction variables show the difference of analyzed factor's impact compared with the comparable group in commercial banking sector's concentration in countries group.

According to a similar logic, the economic cycle phase's influence on the commercial banking sector performance results' impact on government expenditures and net exports differences is modeled. The investigatory period is

divided into the economic cycle phases, therefore, pseudo variables are created, which reflect them. Using these pseudo variables and in the first stage of the analysis a statistically significant factors are identified, synergies are created that, except for one, are included into the model. The phase of the cycle, which is not included into the model through interaction, will become comparable, and estimates of the coefficients with the interaction variables will be reflected in the relevant phase of the economic cycle testing commercial banking sector's performance results' impact on difference of government expenditures and net exports comparing to the comparative phase of the economic cycle.

Models that include interaction variables will be presented in empirical part, when after the first stage of the investigation it will be determined which commercial banking sector's performance results and when make a statistically significant effect on government expenditures and net exports.

4. Empirical research extent presentation: EU countries' commercial banking sector's performance results, government expenditures and net exports dynamics

The model, presented in the previous part of the study, will be applied in the group of EU (28) countries, analyzing the quarterly data of 1999-2014 years, therefore, the tested data is recalculated in the current prices by eliminating the effect of seasonality. This section summarizes the data dynamics: (i) for each tested period for the entire EU (28) countries' group - government expenditures and net exports dynamics; (ii) changes during the entire study period for each analyzed EU (28) countries' group - the commercial banking sector's performance results' dynamics.

Figure 2 shows that during the whole analyzed period EU government expenditures during the calendar quarter grew from 418.63 billion EUR to 733.10 billion EUR and exceeded the 75% growth (75.12%). The total growth of EU government expenditures during the whole period took place in a consistent manner. Despite the global economic changes in 2008-2010, the EU countries' groups general government expenditures did not change significantly, and unlike the net export rate, fluctuations were non-clear.
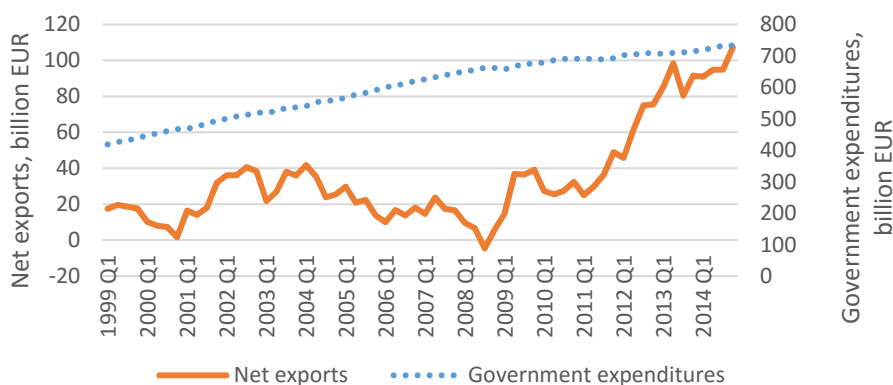
Fig.2. EU (28) government expenditures and net exports

Source: compiled by investigation authors on the basis of
http://appsso.eurostat.ec.europa.eu/nui/show.do

When comparing government expenditures and net exports noticeable changes are observed: government expenditures during the whole investigatory period grew consistently and, despite the economic slowdown during the crisis, has changed slightly, while net exports extent varied unevenly and reacted sensitively to any changes in the EU economic area.

By 2008, the short-term net export growth has been accompanied by sharp declines in net exports (2000 Q4, 2003 Q1, 2004 Q3, 2005 Q2, 2006 Q1, 2008 Q3), and only at the end of the 2008-2009 financial crisis, the EU's net exports' volumes began to grow rapidly. The period from 2011 first quarter to 2014 fourth quarter is marked with particularly rapid growth. During that period, the net export volumes increased 4 times (from 25.02 billion EUR to 107.17 billion EUR) and the net exports' increase amounted to 328.39%. These changes were determined by active EU central bank's actions in reducing the interbank rate, the EU economy's development and the fluctuations of euro exchange rate.

Considering all the above mentioned facts, the conclusion is formed that the EU government expenditures increased steadily while net exports' extent, focused on creation of new working places and product development, has been very volatile and difficult to predict.

Dynamic analysis of indicators reflecting commercial banks' performance results is started with evaluation of the commercial banking sector's loans provided to customers. In commercial banking performance, loans are one of the major banks' revenue and profit sources, and in the country's economic activity loans are one of the key economic stimulus impulses.

Throughout the analyzed period, commercial banks provided loans' extent in the EU countries increased almost 3 times: from 6.95 trillion EUR to 19.22 trillion EUR. In 1999-2014 total provided loans growth rate was 176.57%, but the growth trend of the entire analyzed period was not consistent. In the year of 2008 economic crisis directly affected the EU financial market and commercial banking activities. Commercial banks during the economic crisis period experienced serious financial losses and therefore, tightened lending process and limited the volume of the granted loans. Enhanced surveillance policy also has been applied by a number of EU countries' central banks, and due to this reason till the end of 2007 commercial loan market has been growing, but in 2008 went into recession, and the loans market recovery signs have been noticed only at the end of 2011, when the banking system started to ease lending restrictions and penalties.

Loan changes were not equivalent in individual EU members inside policy: some countries quarterly loan growth was very significant, the other - minimum, yet others - negative (see Fig.3).
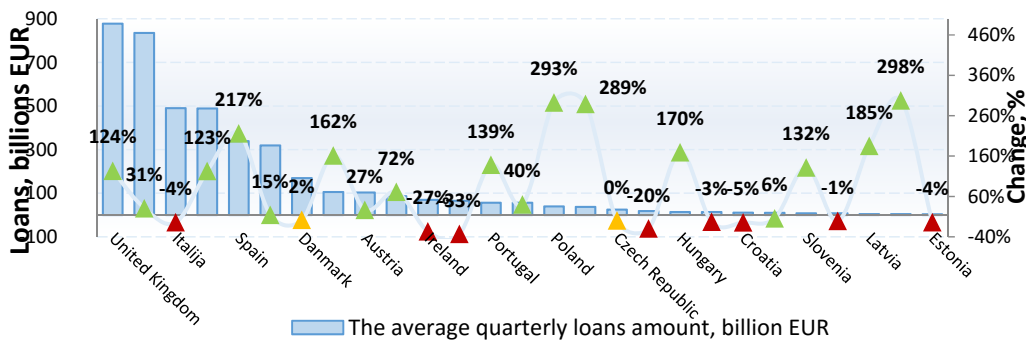

Fig. 3. EU countries commercial banks' provided loans quarterly averages and changes

Source: compiled by investigation authors on the basis of
http://appsso.eurostat.ec.europa.eu/nui/submitViewTableAction.do

Note: Bulgaria's data is not presented.

The highest growth is noticed in Spain, France, Latvia, Lithuania, Hungary, Poland, Portugal, Slovenia, Finland, Sweden and the United Kingdom: their quarterly loans growth exceeded the 120% limit. Such rapid growth in demand for borrowed money has been affected by the EU support programs and new EU members joining in 2004 and 2007. The largest decrease of extent of commercial banks provided loans is recorded in Greece, Ireland and Cyprus, but an objective assessment of the reason for the decrease is hampered by the relatively limited

statistical data that the responsible authorities in these countries provide.

Another significant indicator reflecting commercial banking sector's performance results is deposits. They allow to evaluate not only commercial banks' available financial resources reserves, but also symbolizes a society's income changes trends and savings level.

During the whole investigation period, the extent of deposits in commercial banks of the EU increased by 172.38%: 1999 the first quarter the EU's commercial banks were considered to have 11.45 trillion EUR different kinds of deposits, while 2014 the fourth quarter EU deposits in commercial banks amounted to 31.25 trillion EUR. Similarly, to the loans situation, deposit changes were not consistent: till 2007 the fourth quarter consistently rising, but in 2008 the volume of deposits began to fluctuate chaotically. Turmoil in the global financial market has changed the EU legal and physical entities habits: some of them spent money being afraid of devaluation - purchased goods and services, covered credits and spent savings; others, due to rising deposit interest rates – saved money even more rigorously and restricted the consumption and not necessary costs. Such volatile trend resulted in four years (2008 I quarter - 2012 I quarter) period of uncertainty in EU commercial banks deposits' market. Fully EU commercial banks deposits market has been stabilized only at the beginning of the year of 2013.

General tendency in the EU does not reflect the situation in each of the country and different each country's impact on the overall EU deposits market. Figure 4 shows that 6 countries are distinguished as the greatest deposits' contribution to the total EU deposits market: Germany, the United Kingdom, France, Spain, Italy and the Netherlands. Deposits in commercial banks of these countries compose 80% of the total EU deposit resources.
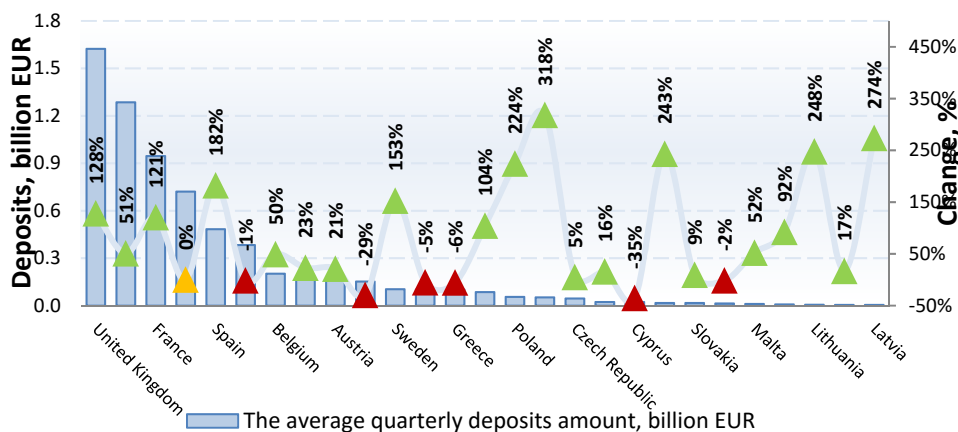

The average quarterly deposits amount, billion EUR

Fig. 4. EU countries commercial banks' deposits quarterly averages and changes

Source: compiled by investigation authors on the basis of
http://appsso.eurostat.ec.europa.eu/nui/submitViewTableAction.do

Note: Bulgaria data is not presented.

The highest growth rate (as well as the loans market) is observed in Spain, France, Latvia, Lithuania, Hungary, Poland, Portugal, Finland, Sweden and the United Kingdom state: the growth of deposits exceeded the limit of 100%. Mostly commercial banks deposit volumes decreased in Greece, Ireland and Cyprus, but due to previously mentioned statistics data objectivity reasons, in these countries the situation is not analyzed in more detail.

The third indicator reflecting banking sector's performance results is commercial banking assets. This indicator allows to assess individual and all domestic commercial banks size and available financial potential.

Calculations lead to the conclusion that of all investigated commercial banking performance indicators, banks' assets during the entire period of study grew mostly, i.e. 210.44%. From the beginning of the study till general economic stagnation (2008), the value of the index rose more than 2 times and despite the mid-term fluctuations, at the end of 2012 the value of the index peaked the highest point, i.e. 55.22 trillion. This trend shows intensified the concentration of financial capital in the commercial banking sector and growing the EU's economic dependence on the commercial banking system. Study's results of Individual EU countries did not distinguish any the new trends (see Fig. 5).
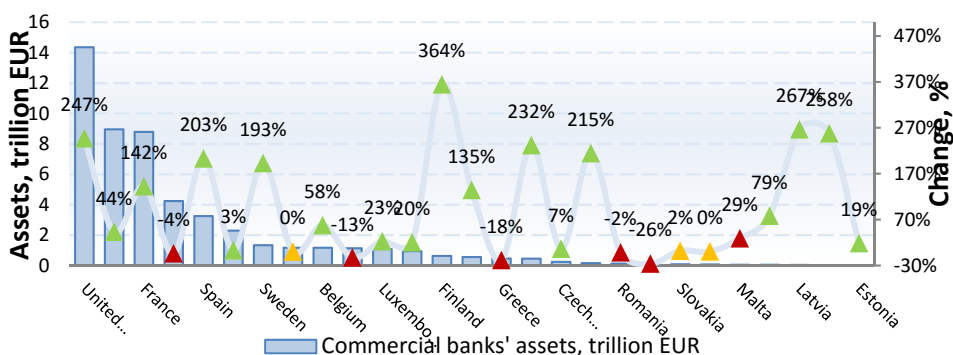

Fig.5. EU countries commercial banks' assets at the end of the investigatory period and changes

Source: compiled by investigation authors on the basis of

http://appsso.eurostat.ec.europa.eu/nui/submitViewTableAction.do

Note: Bulgaria data is not presented.

The largest commercial banks' assets are accumulated in the biggest EU countries: Germany, Spain, France, Italy, the Netherlands and the United Kingdom. The most worrying fact is that three of these countries (Spain, France and the United Kingdom) fall into top 10 list as having the fastest growth of commercial bank assets in their countries (Spain, France, Latvia, Lithuania, Hungary, Poland, Portugal, Finland, Sweden and the United Kingdom state) as the growth of commercial banks' assets under management during total period growth exceeded 100%. Bulgaria, Denmark and Croatia's banking accumulated assets during the entire study period remained unchanged, while Italia's and Romania's commercial banks' asset values decreased to a minor extent. The most rapid decrease of banking accumulated assets is observed in Greece, Ireland and Cyprus, but due to the relatively limited amount of statistical data, this trend is not accurate and has not been analyzed in more detail.

Commercial banks' lending margin is the value indicating the cost of borrowed money and the bank profits from loans. Commercial banks' loan margins size impacts the individual and legal entities lending possibilities. During the whole period of the study, the loan margin developed differently. Growing EU countries' economies, increasing competition of commercial banks and borrowed money supply, made commercial banks reduce lending margins and mitigate lending conditions. In the following consequence: between 1999 and 2008 first quarter lending margins decreased almost 5 times. However, too many liberal borrowing conditions and weak commercial banks control have brought a lot of damage for commercial banks in the year of 2008. Customers' inability to repay the borrowed money and the global economic recession has forced commercial banks to raise the cost of borrowed money and tighten control of credit risk management mechanisms. In 2008, lending margins started to rise, and peak has been reached in 2009 third quarter - 4.57%. Despite that, in 2010 second quarter tensions in the financial market began to decline. Until the end of the study, the average loans' margin in commercial banks did not fall below the 2.8% threshold. Each EU country's margins averages are presented in Figure 6.

During the investigation period the highest average margin has been recorded in Hungary (5.704%), Romania (5.20%), Bulgaria (4.82%), Poland (4.74%), Lithuania (4.54%), Latvia (4.26%) and Cyprus (4.46%), while the lowest lending margins were in Denmark (1.55%), Luxembourg (1.51%), Austria (1.64%), Finland (1.36%), Sweden (1.62%) and the UK (1.72%).

The average margin of EU commercial banks issued loans was 2.86%. Half of EU countries, exceeded the average limit, the other half were below this threshold. The maximum total term loans margin increases have been noticed in Germany, Ireland, France, Croatia, Italy, the Netherlands and Portugal - during the investigation period margin increased by more than 100%. The largest decline has been observed in Bulgaria, the Czech Republic, Latvia, Lithuania, Hungary, Poland and Slovakia - in these countries lending margin felt down more than 60%.
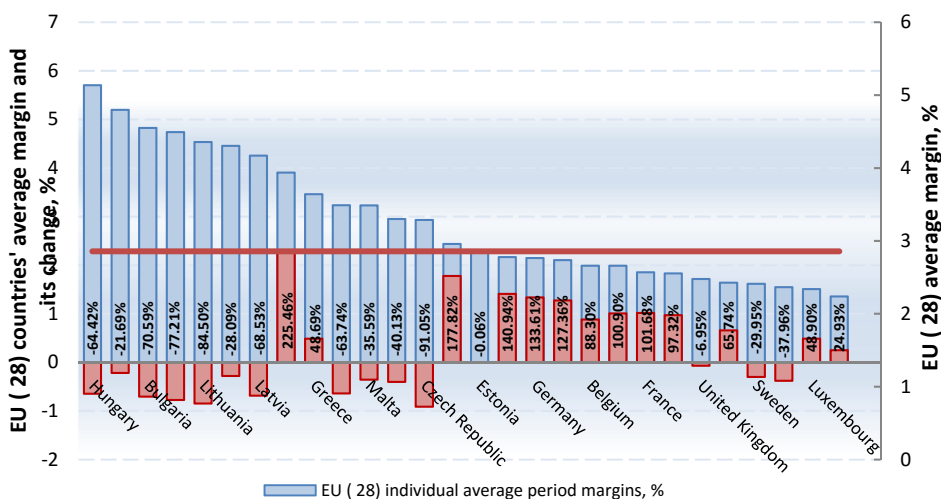

Fig. 6. EU countries commercial banks' provided loans average margins and changes

Source: compiled by investigation authors on the basis of
http://appsso.eurostat.ec.europa.eu/nui/submitViewTableAction.do

Summing up the results it can be concluded that all changes of indicators reflecting analyzed commercial banking sector's performance were not consistent. In 2008, the turmoil in the global financial market has changed and the EU commercial banks behavior. Decrease in loan and deposit volumes also decreased the EU commercial banks assets, and growing tensions in financial markets caused the growth of lending margins.

Despite the changes and fluctuations, the credit market increased 176.57% over the period, the deposit market increased by 172.38%, while the banks' asset growth has exceeded 210% mark and reached 55.22 trillion EUR. Commercial banks' lending margins felt down, and despite intense fluctuations throughout the study period decreased by 38.75%, or 1.88 percentage points (from 4.74% to 2.86%).

5. Commercial banking sector's impact assessment of EU government expenditure and net exports.

Empirical research carried out in the EU (28) countries' group with 1999Q1 – 2014Q4-term data (Panel structure 28X64). In the study the impact of analyzed factors will be considered with a possible delay up to one year (q=4), therefore, the impact assessment is limited to a very short and a short term. Models (1_G_FD) and (1_NXR_FD) adapted to the investigated data and maximum delay of the impact up to one year will have the following form:

$$\Delta\ln(G_{i,t})=\alpha+AR(1)+\delta_7 td2000K3+\ldots+\delta_{64} td2014K4+\beta_{1,1}\cdot\Delta\ln(L_{i,t-1})+\ldots+\beta_{1,4}\cdot\Delta\ln(L_{i,t-4})+\beta_{2,1}\cdot\Delta\ln(D_{i,t-1})+\ldots+$$
$$\beta_{2,4}\cdot\Delta\ln(D_{i,t-4})+\beta_{3,1}\cdot\Delta\ln(A_{i,t-1})+\ldots+\beta_{3,4}\cdot\Delta\ln(A_{i,t-4})+\beta_{4,1}\cdot\Delta(m_{i,t-1})+\ldots+\beta_{4,4}\cdot\Delta(m_{i,t-4})+c_{1,1}\cdot\Delta\ln(GI_{i,t-1})+\ldots+$$
$$c_{1,4}\cdot\Delta\ln(GI_{i,t-4})+c_{2,1}\cdot\Delta\ln(GD_{i,t-1})+\ldots+c_{2,4}\cdot\Delta\ln(GD_{i,t-4})+c_{3,1}\cdot\Delta UR_{i,t-1}+\ldots+c_{3,4}\cdot\Delta UR_{i,t-4}+$$
$$c_{4,1}\cdot\Delta\ln(P_{i,t-1})+\ldots+c_{4,4}\cdot\Delta\ln(P_{i,t-4})+c_{5,1}\cdot\Delta PE_{i,t-1}+\ldots+c_{5,4}\cdot\Delta PE_{i,t-4}+\Delta u_{i,t}\ (1\_G\_FD^{(1)})$$

$$\Delta(NXR_{i,t})=\alpha+AR(1)+\delta_7 td2000K3+\ldots+\delta_{64} td2014K4+\beta_{1,1}\cdot\Delta\ln(L_{i,t-1})+\ldots+\beta_{1,4}\cdot\Delta\ln(L_{i,t-4})+\beta_{2,1}\cdot\Delta\ln(D_{i,t-1})+\ldots+$$
$$\beta_{2,4}\cdot\Delta\ln(D_{i,t-4})+\beta_{3,1}\cdot\Delta\ln(A_{i,t-1})+\ldots+\beta_{3,4}\cdot\Delta\ln(A_{i,t-4})+\beta_{4,1}\cdot\Delta(m_{i,t-1})+\ldots+\beta_{4,4}\cdot\Delta(m_{i,t-4})+c_{1,1}\cdot\Delta\ln(EW_{i,t-1})+\ldots+c_{1,4}\cdot\Delta\ln(EW_{i,t-4})+c_{2,1}\cdot\Delta\ln(PI_{i,t-1})+\ldots+c_{2,4}\cdot\Delta\ln(PI_{i,t-4})+c_{3,1}\cdot\Delta\ln(NEER_{i,t-1})+\ldots+c_{3,4}\cdot\Delta\ln(NEER_{i,t-4})+c_{4,1}\cdot\Delta\ln(RDE_{i,t-1})+\ldots+c_{4,4}\cdot\Delta\ln(RDE_{i,t-4})+\Delta u_{i,t}\ (1\_NXR\_FD^{(1)})$$

After model parameters' estimates calculation using OSL method with standard estimates of the covariance matrix, it has been stated that errors of both models are characterized by heteroscedasticity, Table 2 shows the results obtained using HAC estimates of the covariance matrix.

Table 2. Determination of commercial banking sector's performance results' indicators impact on government expenditures and net exports and its occurrence time set

Coefficients' estimates			
	1_G_FD[(1)]		1_NXR_FD[(1)]
α	−0.001	α	0.001
AR(1)	−0.111*	AR(1)	−0.285***
td2000K3	0.008	td2000K3	0.008
…		…	
td2014K4	0.012	td2014K4	0.011
$\Delta\ln(L_{i,t-1})$	0.121	$\Delta\ln(L_{i,t-1})$	0.010
t-2	0.011	t-2	0.027
t-3	0.062	t-3	-0.050
t-4	0.035	t-4	-0.032
$\Delta\ln(D_{i,t-1})$	0.111*	$\Delta\ln(D_{i,t-1})$	-0.068
t-2	-0.008	t-2	-0.002

t-3	0.022	t-3	-0.085*
t-4	0.080**	t-4	0.023
$\Delta\ln(A_{i,t-1})$	0.036	$\Delta\ln(A_{i,t-1})$	0.017
t-2	-0.001	t-2	-0.044
t-3	-0.109***	t-3	0.123***
t-4	-0.091**	t-4	0.011
$\Delta(m_{i,t-1})$	-0.002	$\Delta(m_{i,t-1})$	0.004**
t-2	-0.001	t-2	0.002
t-3	0.008***	t-3	0.003***
t-4	0.008*	t-4	-0.002
$\Delta\ln(GI_{i,t-1})$	0.046*	$\Delta\ln(EW_{i,t-1})$	-0.029
t-2	0.308**	t-2	0.230
t-3	0.011	t-3	-0.081
t-4	0.021	t-4	-0.107
$\Delta\ln(GD_{i,t-1})$	0.035	$\Delta\ln(PI_{i,t-1})$	0.037
t-2	-0.009	t-2	-0.665
t-3	-0.031	t-3	0.008
t-4	-0.056***	t-4	0.181
$\Delta(UR_{i,t-1})$	0.012***	$\Delta\ln(NEER_{i,t-1})$	0.107
t-2	-0.004	t-2	-0.113**
t-3	0.002	t-3	0.011
t-4	0.001	t-4	0.013
$\Delta\ln(P_{i,t-1})$	0.091	$\Delta\ln(RDE_{i,t-1})$	0.035***
t-2	0.042	t-2	0.021***
t-3	0.169*	t-3	-0.037
t-4	0.110	t-4	-0.007
$\Delta(PE_{i,t-1})$	0.003		
t-2	0.001		
t-3	0.002		
t-4	0.005*		
	743		768
	0.226		0.186
	0.9070		0.2096
	<0.0001		<0.0001

Variable significant with the 99% reliability (***), 95% (**), 90% (*)

Source: compiled by investigation authors

The study volume (with them model calculations are performed) are different, due to the fact that in the analysis unbalanced panel data is used (for the study each country's data during the period is not available).

The analytical results show that during the short-term government expenditures are affected by unplanned budget revenue increase (in case of increase of one percent, government expenditures is growing at an average of 0.31%), the public debt growth (in case of one percent public debt increase, prompted the government to reduce the cost in 0.06%) does not change the level (in case of one percentage point increase in the unemployment rate, increases public

expenditures in 1.2%). It is estimated that the population and political elections in the short period does not impact government expenditures.

In the short term, effective changes of wage and the international trade conditions impact on net exports has not been indicated. Of all the variables used in the model only nominal effective exchange rate and the costs for research activities has an effect on net exports in the short term. Exchange rate appreciation reduces competitiveness of production, while export volume (in case of one percent increase in the exchange rate, reduces net exports ratio up to 0,001 points), expenditures on research activities increases the positive trade balance, but the scale of the impact is very small (the increase in one percent is related to the net exports ratio increase less than 0,001 points).

Commercial banking sector's performance indicators' reflecting only the volume of loans in the short period has no impact on government expenditures and net exports. Deposit volume growth in one percent in the short period is associated with 0.08% higher government expenditures and banks' asset growth in one percentage point respectively decreases in 0.2% government expenditures and 0.001 point increase in net exports ratio in the short period. Loan margins increase in one percentage point increases government expenditures in 0.8%, while the ratio of net exports in 0,007 points.

On the basis of results, patterns are formed for the second phase of empirical research, the purpose of which is to evaluate whether the factors identified as important in the first stage of the investigation make the impact on government expenditures and net exports due to the commercial banking sector's concentration degree and the economic cycle.

Firstly, countries are divided into three groups according to the commercial banking sector's concentration degree.

Table 3.EU-28 countries' members commercial banking sector's concentration degree levels

High concentration (> 90%)	Medium concentration (70% > 90%)		Low concentration (< 70%)	
Estonia; Malta; Finland; Sweden.	Cyprus; Portugal; Belgium; Denmark; Netherlands; Ireland;	Lithuania; Spain; Germany; Slovakia; Hungary; Greece.	Romania; Czech Republic; Austria; France; Slovėnia; Italy; Bulgaria;	Poland; Croatia; Latvia; United Kingdom; Luxembourg.

Source: compiled by investigation authors on the basis of

http://databank.worldbank.org/data/.....TABLE#

Three pseudo variables were created on the basis this distribution: high, which acquires value equal to one if the country's commercial banking sector is characterized by a high degree of concentration and gains value equal to zero, in all other cases; med, which acquires value equal to one if the country's commercial banking sector has a moderate degree of concentration and gain value equal to zero, in all other cases; low, which acquires value equal to one if the country's commercial banking sector is characterized by a low concentration degree and gain value equal to zero, in all other cases. Created pseudo variables and in the previous empirical part of the research set significant influencing factors and periods when this occurs, formed the basis of models which help test the hypothesis whether commercial banking sector's performance results' impact on government expenditures and net exports is determined by to the commercial banking sector's concentration degree:

$$\Delta\ln(G_{i,t})=\alpha+AR(1)+\delta_7 td2000K3+\ldots+\delta_{64}td2014K4+\beta_{2,4}\cdot\Delta\ln(D_{i,t-4})+\beta_{2,4}\cdot\Delta\ln(D_{i,t-4})\cdot med+$$
$$\beta_{2,4}\cdot\Delta\ln(D_{i,t-4})\cdot low+$$
$$\beta_{3,3}\cdot\Delta\ln(A_{i,t-3})+\beta_{3,3}\cdot\Delta\ln(A_{i,t-3})\cdot med+\beta_{3,3}\cdot\Delta\ln(A_{i,t-3})\cdot low+\beta_{3,4}\cdot\Delta\ln(A_{i,t-4})+\beta_{3,4}\cdot\Delta\ln(A_{i,t-4})\cdot med+\beta_{3,4}\cdot\Delta\ln(A_{i,t-4})\cdot low+$$
$$\beta_{4,3}\cdot\Delta(m_{i,t-3})+\beta_{4,3}\cdot\Delta(m_{i,t-3})\cdot med+\beta_{4,3}\cdot\Delta(m_{i,t-3})\cdot low+$$
$$c_{1,2}\cdot\Delta\ln(GI_{i,t-2})+c_{2,4}\cdot\Delta\ln(GD_{i,t-2})+c_{3,1}\cdot\Delta(UR_{i,t-1})+\Delta u_{i,t}\ (2\_G\_FD^{(1)})$$

$$\Delta(NXR_{i,t})=\alpha+AR(1)+\delta_6 td2000K2+\ldots+\delta_{64}td2014K4+\beta_{3,3}\cdot\Delta\ln(A_{i,t-3})+\beta_{3,3}\cdot\Delta\ln(A_{i,t-3})\cdot med+\beta_{3,3}\cdot\Delta\ln(A_{i,t-3})\cdot low+\beta_{4,1}\cdot\Delta(m_{i,t-1})+\beta_{4,1}\cdot\Delta(m_{i,t-1})\cdot med+\beta_{4,1}\cdot\Delta(m_{i,t-1})\cdot low+\beta_{4,3}\cdot\Delta(m_{i,t-3})+\beta_{4,3}\cdot\Delta(m_{i,t-3})\cdot med+\beta_{4,3}\cdot\Delta(m_{i,t-3})\cdot low+$$
$$c_{3,2}\cdot\Delta\ln(NEER_{i,t-2})+c_{4,1}\cdot\Delta\ln(RDE_{i,t-1})+c_{4,2}\cdot\Delta\ln(RDE_{i,t-2})+\Delta u_{i,t}\ (2\_NXR\_FD^{(1)})$$

High level concentration of commercial banking sector's countries' group variable is not included into the model, therefore, analyzed factors' impact in this group will be base, and coefficients' estimates of the interaction variables will reflect differences of factors' impact between the adequate and base periods.

In order to answer the next question, whether the commercial banking sector's performance results' impact on government expenditures and net exports is influenced by the economic cycle phase, the study period is divide into pre-crisis (1999Q1 – 2008Q1), an economic downturn (2008Q2 – 2010Q1) and post-crisis (2010Q2 – 2014Q4) periods. On the basis of this distribution, three pseudo variables were created: beforecris, which acquires value equal to one during a period of from 1999Q1 till 2008Q1, and acquires a value equal to zero during all other periods; cris, which acquires value equal to one during the period of up to 2008Q2 till 2010Q1, and acquires a value equal to zero during all other periods;

aftercris, which acquires value equal to one during a period from 2010Q2 till 2014Q4, and acquires a value equal to zero during all other periods.

In the previous empirical research pseudo variables having significant influencing factors were created and during the periods, when this occurs, models are created in order to help test the hypothesis, whether commercial banking sector's performance results' impact on government expenditures and net exports is influenced by the economic cycle phase:

$$\Delta\ln(G_{i,t})=\alpha+AR(1)+\delta_7td2000K3+\ldots+\delta_{64}td2014K4+\beta_{2,4}\cdot\Delta\ln(D_{i,t-4})+\beta_{2,4}\cdot\Delta\ln(D_{i,t-4})\cdot cris+$$
$$\beta_{2,4}\cdot\Delta\ln(D_{i,t-4})\cdot aftercris+$$
$$\beta_{3,3}\cdot\Delta\ln(A_{i,t-3})+\beta_{3,3}\cdot\Delta\ln(A_{i,t-3})\cdot cris+\beta_{3,3}\cdot\Delta\ln(A_{i,t-3})\cdot aftercris+\beta_{3,4}\cdot\Delta\ln(A_{i,t-4})+\beta_{3,4}\cdot\Delta\ln(A_{i,t-4})\cdot cris+$$
$$\beta_{3,4}\cdot\Delta\ln(A_{i,t-4})\cdot aftercris+\beta_{4,3}\cdot\Delta(m_{i,t-3})+\beta_{4,3}\cdot\Delta(m_{i,t-3})\cdot cris+\beta_{4,3}\cdot\Delta(m_{i,t-3})\cdot aftercris+$$
$$c_{1,2}\cdot\Delta\ln(GI_{i,t-2})+c_{2,4}\cdot\Delta\ln(GD_{i,t-2})+c_{3,1}\cdot\Delta(UR_{i,t-1})+\Delta u_{i,t}\ (2\_G\_FD^{(2)})$$

$$\Delta(NXR_{i,t})=\alpha+AR(1)+\delta_6td2000K2+\ldots+\delta_{64}td2014K4+\beta_{3,3}\cdot\Delta\ln(A_{i,t-3})+\beta_{3,3}\cdot\Delta\ln(A_{i,t-3})\cdot cris+\beta_{3,3}\cdot\Delta\ln(A_{i,t-3})\cdot aftercris+\beta_{4,1}\cdot\Delta(m_{i,t-1})+\beta_{4,1}\cdot\Delta(m_{i,t-1})\cdot cris+\beta_{4,1}\cdot\Delta(m_{i,t-1})\cdot aftercris+\beta_{4,3}\cdot\Delta(m_{i,t-3})+\beta_{4,3}\cdot\Delta(m_{i,t-3})\cdot cris+\beta_{4,3}\cdot\Delta(m_{i,t-3})\cdot aftercris+$$
$$c_{3,2}\cdot\Delta\ln(NEER_{i,t-2})+c_{4,1}\cdot\Delta\ln(RDE_{i,t-1})+c_{4,2}\cdot\Delta\ln(RDE_{i,t-2})+\Delta u_{i,t}\ (2\_NXR\_FD^{(2)})$$

Pre-crisis period interaction variable is not included into the model, therefore, analyzed factors impact in this period is base, and the coefficients' estimates of the interaction variables reflect differences of factors' impact between the adequate and base periods.

As in the previous analysis after calculation of model parameter estimates OSL method with standard estimates of the covariance matrix, it is stated that model errors are characterized by autocorrelation and heteroscedasticity, therefore, results obtained in Table 4 are received using HAC estimates of covariance matrix.

Table 4. ommercial banking sector's performance results' impact on government expenditures and net exports differences in economic cycle phases

Coefficients' estimates					
2_G_FD (1)		2_G_FD(2)	2_NXR_FD(1)		2_NXR_FD (2)
0.014**	α	0.015**	−0.014**	α	−0.014**
−0.006	AR(1)	−0.017	−0.306***	AR(1)	−0.313***
−0.002	td2000K3	−0.001	0.008	td2000K3	−0.001
	…			…	
−0.010	td2014K4	−0.010	0.020**	td2014K3	0.020**
0.077**	Δln(D_{i,t-4})	0.085**	0.121***	Δln(A_{i,t-3})	0.124***
0.035	med cris	0.004	-0.001	med cris	-0.013*

-0.093	low aftercris	-0.008	0.001	low aftercris	-0.012
-0.116***	$\Delta\ln(A_{i,t-3})$	-0.119**	0.005***	$\Delta(m_{i,t-1})$	0.006***
-0.004	med cris	0.021***	-0.003	med cris	-0.002***
0.001	low aftercris	0.023***	-0.015	low aftercris	-0.003**
-0.075**	$\Delta\ln(A_{i,t-4})$	-0.094**	0.004**	$\Delta(m_{i,t-3})$	0.008***
-0.034	med cris	0.031***	-0.001	med cris	-0.006**
0.091	low aftercris	0.021***	-0.006	low aftercris	-0.003**
0.007***	$\Delta(m_{i,t-3})$	-0.011***			
0.012	med cris	0.016**			
0.013	low aftercris	0.018**			
0.307**	$\Delta\ln(GI_{i,t-2})$	0.228**	-0.175**	$\Delta\ln(NEER_{i,t-2})$	-0.183**
-0.045***	$\Delta\ln(GD_{i,t-4})$	-0.037**	0.042***	$\Delta\ln(RDE_{i,t-1})$	0.042***
0.014***	$\Delta(UR_{i,t-1})$	0.013***	0.030**	$\Delta\ln(RDE_{i,t-1})$	0.031**
n	797		797	823	823
Adj. R^2	0.120		0.137	0.189	0.188
p-value verified H0: no errors autocorrelation	0.9897		0.2966	0.0617	0.1624
p-value verified H0: no errors heteroscedasticity	<0.001		<0.001	<0.001	<0.001

Variable significant with the 99% reliability (***), 95% (**), 90% (*)

Source: compiled by investigation authors

The analysis suggests that in the short-term deposit volume impact on government expenditures does not differ neither in countries of different level of commercial banks' concentration, nor in different phases of the economic cycle. Negative banks managed assets volume growth impact on government expenditures was lower both during crisis and after-crisis period (compared to the base - the pre-crisis period), and the impact of differences in accordance with the commercial banking sector's concentration degree was not observed. Also in this respect, loan margin impact differences have not been set. The latter had a positive impact on government expenditures during crisis and post-crisis periods, while during the pre-crisis period - negative. Concluding, the commercial banking

sector's impact on government expenditures is more varied not in countries with a different level of concentration of the banking sector, but according to the relevant business cycle phase.

A similar situation is observed in analyzed the commercial banking sector's performance results' impact on net exports – neither deposits volume, nor loans margin impact differences has not been set in countries of different level of commercial banks' concentration. Both commercial banks managed assets and loan margins positive impact on net exports remains positive in all phases of the business cycle, but it is smaller during the crisis and the post-crisis periods compared with the base - the pre-crisis period.

Summarizing the results of empirical research, it can be stated that during the short-term commercial banks performance results has an impact on government expenditures and net exports, though, the level of the impact is very low. Model-based evaluations have shown that the volume of loans does not have impact on neither the government expenditures, nor the net exports, the latter does not have impact on the volume of deposits. Banks' assets growth negatively affects government expenditures and positively - net exports. Banks' loan margins growth has a positive effect on government expenditures and net exports. Commercial banking sector concentration degree is not the factor that changes the analyzed commercial banking sector's performance results' impact on government expenditures and net exports, while the differences of the impact are rather obvious in different economic cycle phases: the banks' managed assets impact during the crisis and the post-crisis period is smaller for government expenditures and net exports (although the direction of the impact does not change), while bank loans margin impact on government expenditures changes the direction (impact for net exports is reduced) during the crisis and the post-crisis period compared with the pre-crisis period.

The composed evaluation model of commercial banks performance results' impact on economics can be applied to the assessment of the impact in long-term analysis of the annual data. Such a study will not grope the short-term effects, which were determined in the limits of this study, however, it will allow to perceive the impact which the commercial banking sector has on government expenditures and net exports in the long term.

6. Conclusions

Commercial banking sector's performance results' impact on government expenditures and net exports theoretical investigation has been started with the examination of a debatable question "whether commercial banking sector's

performance results' have impact on the national economy, or the economy operates the commercial banking sector". Research results lead to the general conclusion that the commercial banking sector's impact on government expenditures and net exports occur within their functions: growth of investment efficiency, long-term loans liquidity provision, attraction and reallocation of funds, lending cost reduction and increase of money supply in the economics.

Taking into consideration the results of theoretical research, the authors take the position that mutual relationship is possible between the government expenditures and net exports and the commercial banking sector performance results. Using Granger causality principle, the authors offer to separate the two-way relations and, forming panel data model, the authors says that using this model it can be quantified what impact on government expenditures and net exports is made by the commercial banking sector's performance results.

The study inspected the hypothesis that the same banking sector's performance results may have different effects on different economic sectors (governmental organizations, businesses); that the commercial banking sector's concentration degree is one of those characteristics, which through the competition changes this sector's impact on government expenditures and net exports; that commercial banking sector's performance results' impact on government expenditures and net exports will be different in phases of the economic cycle.

Summarizing the results of empirical research, it can be stated that during the short-term commercial banks performance results has an impact on government expenditures and net exports, though, the level of the impact is very low. Model-based evaluations have shown that the volume of loans does not have impact on neither the government expenditures, nor the net exports, the latter does not have impact on the volume of deposits. Banks' assets growth negatively affects government expenditures and positively - net exports. Banks' loan margins growth has a positive effect on government expenditures and net exports. Commercial banking sector concentration degree is not the factor that changes the analyzed commercial banking sector's performance results' impact on government expenditures and net exports, while the differences of the impact are rather obvious in different economic cycle phases: the banks' managed assets impact during the crisis and the post-crisis period is smaller for government expenditures and net exports (although the direction of the impact does not change), while bank loans margin impact on government expenditures changes the direction (impact for net exports is reduced) during the crisis and the post-crisis period compared with the pre-crisis period.

The composed evaluation model can be applied to the assessment of the impact

in long-term analysis. Such a study will not grope the short-term effects, which were determined in the limits of this study, however, it will allow to perceive the impact which the commercial banking sector has on government expenditures and net exports in the long term. The logics of composed model can be used while investigating commercial banking sector impact on other GDP structural elements.

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Summary

The question, whether commercial banking sector's performance has an impact on the national economy, or the economy affects commercial banking sector is still particularly debatable today. In this discussion, authors of this research take the position that the country's economy and commercial banking sector's performance has bi-directional relationships. Acting in a single economic space commercial banks are forming sector, which by using lending, financial intermediation and other activities through expenditures of different economic sectors affects country's economy. Especially high interest of economists commercial banking sector attracted when world economy started slowing down. Though commercial banking crises typically overlap or occur before the economic slowdown, however, strict conclusion that the commercial banking sector leads to economic slowdowns cannot be made.

Research authors suggest using Granger causality principle to separate this bi-directional link and construct a panel data model, which allows to evaluate quantitatively the impact of the commercial banking sector's performance results on government expenditures and net exports.

During the research we test several hypothesis: (i) the same performance results may have different effect on various economic sectors (households, businesses, government, foreign sector); (ii) commercial banking sector's concentration is one of those characteristics, which, through competition, changes this sector's impact on government expenditures and net exports; (iii) the impact of commercial banking sector's performance results on government expenditures and net exports vary in the economic cycle phases.

Taking everything into consideration, results of empirical research have shown that during the short-term commercial banks performance results has an impact on government expenditures and net exports, though, the level of the impact is very low. The growth of loans' does not have impact on neither the government expenditures, nor the net exports, the latter does not have impact on the volume of deposits. Banks' assets positive change negatively affects government expenditures and positively - net exports, while loans' margin growth has a positive effect on government expenditures and net exports. Commercial banking sector concentration degree is not the factor that changes the analyzed commercial banking sector's performance results' impact on government expenditures and net exports, while the differences of the impact are rather

obvious in different economic cycle phases.

The composed evaluation model can be applied to the assessment of the impact in long-term analysis. Such a study will not grope the short-term effects, which were determined in the limits of this study, however, it will allow to perceive the impact which the commercial banking sector has on government expenditures and net exports in the long term. The logics of composed model can be used while investigating commercial banking sector impact on other GDP structural elements.