Banking regulation in ensuring bank's efficiency: Looking through different forms of ownership

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Abstract. The study is aimed to investigate the impact of banking regulation intensity on the efficiency of banks with different forms of capital ownership. To test the hypothesis about the different level of influence of banking regulation instruments on state, private and foreign banks, the GLS-modeling tool was used. The study sample includes data on the banks from six countries (Ukraine, Poland, Kazakhstan, Georgia, Estonia and Belarus) within the research period of 2001–2014. Empirical calculations indicate that there is no need to introduce differentiated regulatory regimes depending on the form of ownership and the origin of bank's capital, since there are no significant differences in the impact of different components of the regulatory mechanism on the banks of different ownership forms and different origins of capital. Particularly noteworthy is the formulation of a strategy for regulating state-owned banks, with slight differences in the effectiveness in the use of indicative and administrative instruments, while at the same time the importance of

institutional environment indicates the need to reform the principles of state-owned banks operations.

Keywords: bank, regulation, efficiency, ownership, performance.

JEL Classification: G21, G28, C51

1. INTRODUCTION

Banking regulation strategy is always formed taking into account the priority goals for the banking system development, which determine the choice of specific banking regulation instruments and their application intensity. That is why in the course of optimal banking regulation system formation and for the sake of balancing stakeholders' interests, it is reasonable to define the impact of various instruments that can be used by the regulator in relation to banks' profitability. The main factors of commercial banks' performance are the scales and conditions of financial intermediation (Adewole et al., 2019; Hadi et al., 2018) as well as increase in payment cards and devices for client services (Kocisova et al., 2018; Djajanto at al., 2019). The growth of bank services volume is strongly related with credit and other financial risks management on both micro and macro levels (Belás et al., 2017). On the other hand, macroeconomic environments as well as banking regulation terms define the level of banks' profitability at different stages of economic cycle (Naser, 2019). Current trends of theory and practice of banking regulation demonstrate an important role of central bank transparency as the characteristic of monetary policy efficiency (Barhaq & Zakutniaia, 2017; Próchniak & Szyszko, 2019; Balcerzak et al., 2017). On the other hand, regulation authorities nowadays are facing such challenges as flexibility and customer orientation (Leskaj, 2017; Bojarko et al., 2012). In such context the research on different banking regulation measures' impact on commercial banks performance will allow determine the most effective levers of influence to stimulate or hinder the banking system development.

Research of commercial banks' functioning allows revealing specific features of foreign banks' activities as compared to domestic banks (Atahau et al., 2019). Xu et al. (2018) found that government ownership is an important factor of Chinese banks performance. At the same time, Qayyum et al. (2018) identified that the presence of foreign banks stimulate banking system efficiency due to the implementation of best managerial practices. Increasing foreign capital presence in a country is connected not only with increasing attention to the internal risk management in banks, but also with the development of banking regulation (Kaminskyi & Versal, 2018; Valaskova et al., 2018). Taking into account the strong impact of foreign capital in the banking sector on country's economy, as revealed by Fernandes (2018), the investigation of banking regulation features as applied to different ownership forms becomes crucial.

2. LITERATURE REVIEW

Last financial crises boosted attention to the monetary policy influence on financial market development. Issues of security are considered as core dimension of regulatory bodies' efforts intensification (Balas & Kaya, 2019), taking into account deepening of relationships between banks and enterprises through the credit channel (Rahman et al., 2018). At the level of real sector good governance is the most significant factor of enterprises performance ensuring (Grenčíková et al., 2019; Gavurova et al., 2017) as well as determinant of social and economic stability (Bilan et al., 2019b). Regulation factor is the main issue for the improvement of market efficiency in general, particularly through the reduction of

corruption level (Mujtaba et al., 2018). Changes in interest rates are considered as the main channel of regulatory authority impact on the financial and real economy (Jiang & Wang, 2017; Szyszko, 2017). Islam & Khan (2019) substantiate the prospects of banking regulation changes in European banking system in terms of financial stability ensuring. Kosicova et al. (2018) found, that banks' stability strongly depends on the country specific, which confirms banking regulation importance. On the other hand, development of international banking network creates a necessity to take into account structure of bank capital in bank regulation system (Gaigaliene et al., 2018). Characterizing the specificity of differences in banks' performance, it should be noted that commercial banks, which are part of financial conglomerates, reach higher profitability comparing to other banks (Palečková, 2018). In addition, specialized banks also have strong differences of their performance in comparison with universal banks (Kozmenko & Vasyl'yeva, 2008). According to Ruinan (2019) countries' differences lead to the variance in banks' efficiency as well as bank size. Wahyudi et al. (2018) revealed that bank size is one of the most significant factors of changes in banks' performance it terms of return on deposit investigation. According to Pavković et al. (2018) large and medium sized banks demonstrate higher level of efficiency measured by return on assets and return on equity indicators. Taking into account importance of systemic banks for long-term banking system development, confirmed by Buriak et al. (2015) and Vasylyeva et al. (2014) bank size should be considered as one of the main factors of its performance.

In terms of investigation the influence of banking regulation of banks' efficiency the main determinants of bank performance should be considered. It is broadly proved that corporate governance is an important factor of banks' efficiency (Agnihotri & Gupta, 2019; Firtescu et al., 2019) especially in terms of ensuring both their profitability and security (Rafinda et al., 2018) as well as human and intellectual capital (Sulphey & Naushad, 2019). Human factor has even a meaning in terms of country's influence of banks' corruption and performance (Dheera-aumpon, 2017). Another important factor of banks' efficiency is customer trust influenced by risk perception, information disclosure and other bank characteristic (Skvarciany & Jurevičienė, 2017), which might be considered as the main condition of bank competitiveness (Skvarciany et al., 2018). Interaction of social and institutional trust leads to the multiplication an impact on banks performance (Bilan et al., 2019a; Bhasin, 2016; Buriak et al., 2019; Bilan et al., 2019d). That determinates a necessity of taking it into account in the process of banks' corporate governance transformation (Brychko & Semenog, 2018). Moreover, trust-oriented management has a strong potential in regulation perspective (Çera et al., 2019). Djalilov et al. (2015), Vasylieva et al. (2014) proved that corporate social responsibility has a moderate positive effect on banks' performance. It is worth to pay attention to the existing short-term impact in banks' efficiency growth due to social responsible banks' activities (Vasileva & Lasukova, 2013; Zhu et al., 2017), while implementation of new system of internal management has rather long-term effect (Nasr et al., 2019). At the same time the intensity of corporate social responsibility are defined by informational development (Hammerström et al., 2019; Bilan et al., 2019c). Digitalization and financial innovations not only determine the changes in banks' business model, but also have to be taken into consideration in the context of banking regulation development (Druhov et al., 2019). Despite the fact that banks' profitability is determined mainly by internal factors of banks functioning there is the influence of macroeconomic indicators such as inflation and GDP growth (Nuhiu et al., 2017).

Meanwhile, the main determinants of banks' stability and profitability remain capital adequacy and increase (Fruet-Cardozo et al., 2019). Capital growth has a positive impact on the bank's net profit; however, the level of profitability varies significantly depending on the country of study (Nocoń & Pyka, 2019), even in countries with similar conditions of development (Černohorská et al., 2017). Besides, in view of the positive effect of asset diversification for banks' efficiency identified by Belas et al. (2018), the research of influence of capital structure in banks' profitability becomes interesting.

Current trends of global economy development show existence of common vector of European regulation system functioning (Bilan et al., 2019e; Kozmenko et al., 2011; Vasilyeva et al., 2019), that can create better conditions for financial system. So Basel III implementation led to banks' solvency enhancing (Bunea & Dinu, 2019; Vasilyeva et al., 2016), that might be precondition for their efficiency growth. Besides, it is interesting to investigate other instruments of banking regulation, such as capital requirements and interest rates, which demonstrated their efficiency in financial system regulation (Vasylyeva et al., 2014). That is why research into the impact of banking regulation on the performance of banks of different ownership should be conducted at the level of individual regulatory instruments.

3. METHODOLOGY

The study of the estimation of the relationship between the intensity of banking regulation and bank profitability is proposed to conduct on the example of banks from 6 European countries (Ukraine, Poland, Kazakhstan, Georgia, Estonia, Belarus), which allows to take into account both differences in the regulation of banking systems between countries, so and specific features of the functioning of individual banks. Besides the total array of 110 commercial banks from 6 countries, three samples of banks were formed by their ownership type: state banks, banks with foreign capital and private banks with the national capital. The study period is defined from 2001 to 2014.

Despite the wide range of commercial banks' performance assessment methods, there is a significant correlation between the results obtained with the use of different approaches (Gavurova et al., 2017). By the way, the most used indicators of bank performance are profitability parameters such as return on equity and return on capital (Skvarciany et al., 2019; Lyeonov & Liuta, 2016; Kliestik et at., 2018). Thus, dependent variable of the research is the return on assets indicator.

The goal of research is to determine the most effective specific instruments to regulate different ownership banks. It will not only differentiate the regulation methods by direction and power of their impact on the profitability of banking institutions but also identify tools to control the functioning of different ownership banks. So the set of independent variables was formed from the following indicators:

- The legal compliance indicator. It characterizes the degree of rule of law in the country, i.e, a stable and effective legal environment for the functioning of banking entities;

- The level of implementation of Basel banking supervision principles in the country. It is estimated as a dummy variable with the value 1 – if Basel requirements are implemented in the country, 0 – if not;

- The refinancing rate set by the country's central bank;

- The required reserve rate, established by the central bank;

- The creation of a fund or guarantee system for bank deposits in the country, measured by dummy variable with the value 1 – if it is present in the country, 0 – if not;

- The obligation of banks to participate in the Deposit Guarantee Fund, measured by dummy variable, where 1 means, that banks are obliged to participate, 0 – are not;

- The level of real interest rate;

- The number of staff employees of the central bank. An insufficient size of it may be caused by omission or ineffective implementation of some functions. At the same time, an excessive number of employees of the central bank is accompanied by duplication of tasks, processes bureaucracy banking regulation and supervision and increased administrative expenses of the central bank.

- Limitations on interest rates on loans;

- Financial freedom index, the values of which for a particular country vary on a 100-point scale to set a maximum for a country with a maximum level of market power and minimize government intervention in regulating the financial sector.

Taking into account the results of previous researches aimed to the investigation of the determinants of banking profitability, a set of control variables should be included in the regression equation, namely the size of the bank, expressed as a share of bank assets in the country's banking system; control of corruption as a parameter calculated by the World Bank to reflect the effectiveness of government; as well as the level of inflation in the form of an annual growth rate of the consumer price index.

The results the test for the heteroskedasticity of the selected statistical data proved its relevance for studied data. Therefore, we should use the generalized least squares method to determine the impact of banking regulation instruments on the profitability of bank assets.

4. EMPIRICAL RESULTS AND DISCUSSION

Analyzing the impact made by the different components of banking regulation, we will study the influence of the indicator of compliance with legal norms on the profitability of commercial banks' assets, the results of which are presented in Table 1.

Table 1

Results of the assessment of the impact made by the legal compliance in the country on the return on assets of different ownership banks, obtained by applying the generalized method of least squares

Factor variable	Impact on the return on assets of the bank			
	Banks of different ownership forms	State banks	Private banks	Foreign banks
Legal compliance indicator	-0,0135*** (0,0020)	0,0531 (0,0830)	-0,0232*** (0,0039)	-0,0107*** (0,0024)
Size of the bank	0,0049* (0,0029)	11,4350*** (2,8867)	0,0057* (0,0033)	-0,0043 (0,0069)
Control of corruption	0,0119*** (0,0022)	-0,1652*** (0,0611)	0,0229*** (0,0040)	0,0082*** (0,0029)
Level of inflation	-0,0002*** (0,0000)	-0,0007 (0,0004)	0,0001 (0,0001)	-0,0002*** (0,0000)
Constant	0,0133*** (0,0005)	-0,0353 (0,0959)	0,0120*** (0,0011)	0,0135*** (0,0007)
Number of observations	1045	24	407	614
Parameters of the model adequacy				
Wald chi$^2_{actual}$	66,5500	112,1700	67,2300	45,3600
Wald chi$^2_{crucial}$	9,4877	9,4877	9,4877	9,4877
Prob>chi^2	0,0000	0,0000	0,0000	0,0000

Source: Authors' results. ***, * indicate statistical significance at 99% and 90% respectively. The standard error is in parenthesizes.

According to the results of the calculations, it should be noted that the increase in the quality of the legal environment in the studied countries reduces the profitability of commercial banks' assets, which is confirmed both for the sample and for national and foreign banks formed by private capital. It certifies the fact that banks are inclined to make a profit by exploiting the imperfection of the legal framework in a country. It is quite natural since the sample included mainly transition economies, for which legislative transformation is typical, including in the financial sector. For state banks, the results of the calculations showed a positive, but statistically unconfirmed, effect of legal norms compliance on the profitability of

their assets. It indicates that the activity of state banks does not depend on the level of legal environment organization in the country.

Analyzing the impact of control variables on the return on assets of banks of different ownership, it should be noted that bank size is a more important factor for the profitability of state-owned and private banks, while for banks with foreign capital the impact is not statistically confirmed. Besides, the increase in the efficiency of the state power in the fight against corruption causes a decrease in the profitability of state banks, while for other groups of banks this influence is not confirmed. It should be noted that the increase in the level of inflation, in general, reduces the profitability of banks, observed on the example of banks with foreign capital. A direct correlation between the parameters is observed for private banks. It indicates that for private banks the inflation factor stimulates the growth of bank margin and, accordingly, the profitability of their activity.

The next parameter, the impact of which on banks' profitability should be evaluated, is the level of implementation of Basel banking supervision principles in the country. Table 2 demonstrates the calculation results, which show that the country's acceptance of Basel's requirements generally determines a 0.63% reduction in the level of bank assets. For foreign banks, the evaluation shows the more significant impact, which is probably caused by the foreign capital investment to countries with less stringent regulation of banking activities, the profitability of which is levelled while increasing the banking supervision intensity. At the same time, it should be noted that the profitability level of private banks is not characterized by significant changes in the country's implementation of the Basel principles - the obtained results were not statistically significant. Besides, the generated statistical array was not wide enough to obtain adequate results regarding the relationship between the parameters for state banks, and it does not let to conclude the presence or absence of such influence.

Table 2

Results of the assessment of the impact made by Basel Banking Supervision Principles implementation on the return on assets of different ownership banks in the country, obtained using the generalized least squares method

Factor variable	Impact on the return on assets of the bank			
	Banks of different ownership forms	State banks	Private banks	Foreign banks
Introduction of Basel banking supervision principles	-0,0063*** (0,0013)	X	0,0004 (0,0017)	-0,0122*** (0,0018)
Size of the bank	0,0075** (0,0031)	12,3298*** (2,3005)	0,0068** (0,0033)	0,0057 (0,0081)
Control of corruption	-0,0007 (0,0008)	-0,1785*** (0,0599)	0,0009 (0,0008)	-0,0010 (0,0012)
Level of inflation	-0,0001*** (0,0000)	-0,0007 (0,0005)	0,0004*** (0,0001)	-0,0002*** (0,0000)
Constant	0,0171*** (0,0012)	-0,0975* (0,0509)	0,0068*** (0,0018)	-0,0234*** (0,0016)
Number of observations	1045	24	407	614
Parameters of the model adequacy				
Wald chi2$_{actual}$	49,7900	109,8100	42,8200	107,2300
Wald chi2$_{crucial}$	9,4877	9,4877	9,4877	9,4877
Prob>chi2	0,0000	0,0000	0,0000	0,0000

Source: Authors' results. ***, **, * indicate statistical significance at 99%, 95% and 90% respectively. The standard error is in parenthesizes. X – the variable was excluded from the model because of the features collinearity.

One of the key tools to regulate banking is the refinancing rate set by the country's central bank. Aiming to define the regulatory intensity effect on banks' activity in the settlement process, the volatility of the refinancing rate was used that characterizes the level of central bank's activity in interfering with the functioning of the country's banking system. The assessment results of the impact made by the refinancing rate volatility on the profitability of commercial banks' assets are given in Table 3. They certify that, in general, for banks, the increase in the intensity regarding the central bank's manipulation of the refinancing rate stimulates the profitability of their assets, which is caused by the emergence of opportunities for banks to generate additional profits by attracting central bank funds and using interest rate differentials.

Table 3

The estimation results of the refinancing rate volatility effect on the return on different ownership bank assets obtained by applying the generalized method of least squares

Factor variable	Impact on the return on bank assets			
	Banks of different ownership forms	State banks	Private banks	Foreign banks
Refinancing rate volatility	0,0032*** (0,0007)	0,0506 (0,0666)	0,0021*** (0,0008)	0,0019 (0,0022)
The size of the bank	0,0040 (0,0033)	12,8446*** (2,3688)	0,0056 (0,0035)	-0,0019 (0,0086)
Control of corruption	-0,0026*** (0,0006)	-0,1944*** (0,0575)	-0,0005 (0,0009)	-0,0038*** (0,0012)
Inflation rate	-0,0002*** (0,0000)	-0,0008 (0,0006)	0,0003*** (0,0001)	-0,0002*** (0,0000)
Constant	0,0134*** (0,0007)	-0,0831 (0,0610)	0,0083*** (0,0010)	0,0139*** (0,0017)
Number of observations	1045	24	407	614
Parameters for the model adequacy				
Wald chi$^2_{actual}$	44,2300	111,9900	54,4800	32,5600
Wald chi$^2_{critical}$	9,4877	9,4877	9,4877	9,4877
Prob>chi^2	0,0000	0,0000	0,0000	0,0000

Source: Authors' results. *** indicates statistical significance at 99%. The standard error is in parenthesizes

It should be noted that, despite the statistically significant results obtained for the general sample of banks, in the context of different ownership banks, adequate conclusions can only be drawn for private banks, the impact of which on the refinancing rate volatility of the profitability of the assets is direct. It indicates that the manipulation of the universal refinancing rate cannot be used in the process of regulating the different ownership banks activity.

An important indicator of banking regulation intensity in the country is the required reserve rate, the level of which defines the stability and profitability parameters of the banking system. The results of the study regarding the impact of this indicator on the return on bank assets are aggregated in Table 4. According to the results of the calculations, the increase in the required reserve rate in the country causes an increase in the return on bank assets of private and foreign ownership, and the impact on the private banks' profitability is more intense. It may indicate that the increase in the level of bank reserves allows investing free funds into more risky assets or reflects the result of the banking system stability in the long run. For state banks, the effect of this parameter is not statistically confirmed.

An important factor characterizing the banking regulation intensity is the creation of a fund or guarantee system for bank deposits in the country, which protects the interests of bank customers, but at the same time requires the provision of the share of banking institutions' funds to ensure the deposits

compensation in case of bank insolvency – the participants in such a system. At the same time, this factor should potentially hold back the profitability of banks' activities by diverting some of their funds from their core business that confirms the results presented in Table 5.

Table 4

Results of the effect estimation of the minimum reserve rate on the return on different ownership bank assets obtained by applying the generalized method of least squares

Factor variable	Impact on the return on bank assets			
	Banks of different ownership forms	State banks	Private banks	Foreign banks
Required reserve rate	0,0007*** (0,0002)	-0,0003 (-0,0038)	0,0008*** (0,0003)	0,0006*** (0,0002)
The size of the bank	0,0077*** (0,0029)	12,4252*** (2,6809)	0,0074** (0,0033)	-0,0007 (0,0071)
Control of corruption	-0,0015** (0,0006)	-0,1806*** (0,0633)	0,0018** (0,0008)	-0,0037*** (0,0010)
Inflation rate	-0,0001*** (0,0000)	-0,0007 (0,0005)	0,0004*** (0,0001)	-0,0002*** (0,0000)
Constant	0,0088*** (0,0007)	-0,0987* (0,0517)	0,0043*** (0,0014)	0,0104*** (0,0009)
Number of observations	1045	24	407	614
Parameters for the model adequacy				
Wald chi$^2_{actual}$	38,4500	109,8200	38,0000	38,0300
Wald chi$^2_{critical}$	9,4877	9,4877	9,4877	9,4877
Prob>chi^2	0,0000	0,0000	0,0000	0,0000

Source: Authors' results. ***, **, * indicate statistical significance at 99%, 95% and 90% respectively. The standard error is in parenthesizes.

Table 5

The results of assessing the impact made by the deposit guarantee fund for bank customers on the return on different ownership bank assets obtained by applying the generalized method of least squares

Factor variable	Impact on the return on bank assets			
	Banks of different ownership forms	State banks	Private banks	Foreign banks
The presence of a deposit guarantee fund for bank customers	-0,0037*** (0,0013)	-0,0201 (0,0298)	-0,0084** (0,0038)	-0,0027* (0,0015)
The size of the bank	0,0063** (0,0006)	12,6334*** (2,3190)	0,0064* (0,0033)	-0,0028 (0,0072)
Control of corruption	-0,0017** (0,0006)	-0,1898*** (0,0611)	0,0010 (0,0007)	-0,0035*** (0,0010)
Inflation rate	-0,0001*** (0,0000)	-0,0006 (0,0005)	0,0004*** (0,0001)	-0,0002*** (0,0000)
Constant	0,0149*** (0,0013)	-0,0915* (0,0513)	0,0154*** (0,0038)	0,0149*** (0,0015)
Number of observations	1045	24	407	614
Parameters for the model adequacy				
Wald chi$^2_{actual}$	27,0800	112,7900	48,0200	31,6500
Wald chi$^2_{critical}$	9,4877	9,4877	9,4877	9,4877
Prob>chi^2	0,0000	0,0000	0,0000	0,0000

Source: Authors' results. ***, **, * indicate statistical significance at 99%, 95% and 90% respectively. The standard error is in parenthesizes.

The estimation showed that in countries where the deposit guarantee system of bank customer is in place, the bank assets' return is on average 0.37% lower than in countries where such a system is not implemented. Moreover, when analyzing the results obtained for different ownership banks, it should be noted that the decline in the return on assets due to the diversion of funds from their activities is the most significant factor for private banks, while the impact is less significant for foreign banks than the average for the sample. The lack of statistically significant relationship between the parameters for state banks is caused by the fact that in any case their obligations are guaranteed by the state.

It should be noted that the presence of a deposit guarantee system does not make it possible for all banks registered in the country to participate in it, that should be further regulated at the legislative level. Therefore, the study also requires to be influenced by the obligation of banks to participate in the Deposit Guarantee Fund, the results of which are summarized in Table 6.

The calculations show that the obligatory participation of banks in the Deposit Guarantee Fund, similar to the availability of such a fund in the country, statistically significantly affects the return on assets of private and foreign banks in the reducing direction, while the impact is not statistically significant for state banks. The coincidence of the quantitative levels of the estimated parameters proves the fact that the bank deposit guarantee fund in the studied countries implies a simultaneous legislative setting of banks' obligations to participate in the creation of such a fund.

Table 6

The results of the impact assessment of the banks' obligatory participation in the Deposit Guarantee Fund on the return on assets of different ownership banks obtained by applying the generalized method of least squares

Factor variable	Impact on the return on bank assets			
	Banks of different ownership forms	State banks	Private banks	Foreign banks
Obligatory participation of banks in the Deposit Guarantee Fund	-0,0037*** (0,0013)	-0,0201 (0,0298)	-0,0084** (0,0038)	-0,0027* (0,0015)
The size of the bank	0,0063** (0,0006)	12,6334*** (2,3190)	0,0064* (0,0033)	-0,0028 (0,0072)
Control of corruption	-0,0017** (0,0006)	-0,1898*** (0,0611)	0,0010 (0,0007)	-0,0035*** (0,0010)
Inflation rate	-0,0001*** (0,0000)	-0,0006 (0,0005)	0,0004*** (0,0001)	-0,0002*** (0,0000)
Constant	0,0149*** (0,0013)	-0,0915* (0,0513)	0,0154*** (0,0038)	0,0149*** (0,0015)
Number of observations	1045	24	407	614
Parameters for the model adequacy				
Wald chi$^2_{actual}$	27,0800	112,7900	48,0200	31,6500
Wald chi$^2_{critical}$	9,4877	9,4877	9,4877	9,4877
Prob>chi^2	0,0000	0,0000	0,0000	0,0000

Source: Authors' results. ***, **, * indicate statistical significance at 99%, 95% and 90% respectively. The standard error is in parenthesizes.

An important indicator of the monetary policy stability and the efficiency of banking services market regulation is the level of real interest rate, which is one of the criteria to define the countries' rating in terms of financial market development. The results of the study regarding the relationship of this parameter with the banks' profitability are shown in Table 7.

Analyzing the obtained results, it should be noted that the level of real interest rate cannot be a universal tool to regulate the banking institutions' activities since the effect of the parameter on the

profitability of the assets for the whole sample of commercial banks is not statistically confirmed, similarly as for state-owned banks.

Table 7

The results of the effect estimation of the real interest rate on the return on different ownership bank assets obtained by applying the generalized method of least squares

Factor variable	Impact on the return on bank assets			
	Banks of different ownership forms	State banks	Private banks	Foreign banks
Real interest rate	-0,0000 (0,0001)	-0,0002 (0,0014)	-0,0002** (0,0001)	0,0003*** (0,0001)
The size of the bank	0,0078*** (0,0030)	12,2296*** (2,4055)	0,0068** (0,0033)	-0,0016 (0,0073)
Control of corruption	-0,0023*** (0,0008)	-0,1835*** (0,0680)	-0,0008 (0,0011)	-0,0032*** (0,0011)
Inflation rate	-0,0001** (-0,0000)	-0,0007 (0,0009)	0,0002* (0,0001)	-0,0000 (0,0000)
Constant	0,0117*** (0,0008)	-0,0995* (0,0513)	0,0101*** (0,0013)	0,0102*** (0,0010)
Number of observations	1045	24	407	614
Parameters for the model adequacy				
Wald chi^2_{actual}	21,5000	109,8600	40,1300	45,3700
Wald chi^2_{critical}	9,4877	9,4877	9,4877	9,4877
Prob>chi^2	0,0000	0,0000	0,0000	0,0000

Source: Authors' results. ***, **, * indicate statistical significance at 99%, 95% and 90% respectively. The standard error is in parenthesizes.

The dependencies obtained for different ownership bank also attracted attention. Thus, the increase in the real interest rate by 1% determinate the quick profitability of the private banks' assets by 0.02% in the average.

For banks with foreign capital, there was an increase in the real interest rate by 1%, the profitability of their assets increased by 0,03%. It proves the fact that mechanism to introduce banking activity depends on the bank's form of ownership and, thus, this instrument is to regulate the ratio of national and foreign capital in the assets of the country's banking system.

The formation of an effective model for banking regulation in the country is related to the solution of the essential task to optimize the number of staff employees of the central bank. Therefore, in determining the intensity of banking regulation, one should take into account this component the most representative parameter of which is the ratio of workers at the central bank to the number of banks and their branches. It enables to compare sizes of the central bank staff to the banking system scale. The influence of the banking regulation intensity on the profitability of banks is mediated by such factors as the frequency of inspections of commercial banks, the number of reporting forms on the results of their activities, the level of control over the banking institutions' functioning, which determinates its study, the results of which are presented in Table 8.

The results of the evaluation showed that the increase in the number of central bank staff, which is not accompanied by an increase in the number of banking institutions, is characterized by a stable negative relationship with the profitability of the commercial banks' assets, and it should be noted that the most significant quantitative impact is recorded for foreign banks, whereas for private banks with national capital, the reduction in the return on assets is less than the average for the banking system. The parameters, obtained for state-owned banks, demonstrate the absence of a statistically significant relationship between the above indicators. It is quite logical, given the fact that corporate governance

models of state-owned banks are characterized by the presence of more general features with the operating mode of the central bank than private banks.

Table 8

Results of the evaluation of the impact on the size of the state central bank's return on assets of different ownership banks obtained by applying the generalized least squares method

Factor variable	The impact on the profitability of bank assets			
	Banks of different ownership	State banks	Private banks	Foreign banks
The ratio of the number of employees in the central bank to the number of banks and their branches	$-2,48 \cdot 10^{-6}$*** $(4,94 \cdot 10^{-7})$	$5,99 \cdot 10^{-6}$ $(8,14 \cdot 10^{-6})$	$-1,4 \cdot 10^{-6}$*** $(5,24 \cdot 10^{-7})$	$-3,43 \cdot 10^{-6}$*** $(8,69 \cdot 10^{-7})$
The size of the bank	0,0078*** (0,0030)	11,7024*** (2,5307)	0,0075** (0,0033)	-0,0031 (0,0076)
Control of corruption	-0,0052*** (0,0009)	-0,1403* (0,0728)	-0,0014 (0,0011)	-0,0072*** (0,0012)
Inflation rate	-0,0001*** (0,0000)	-0,0007 (0,0005)	0,0004*** (0,0001)	-0,0002*** (0,0000)
Constant	0,0129*** (0,0004)	-0,0748 (0,0549)	0,0090*** (0,0008)	0,0144*** (0,0007)
Number of observations	1045	24	407	614
Parameters for the model efficacy				
Wald chi$^2_{actual}$	44,7300	113,0400	46,9400	42,1300
Wald chi$^2_{crusial}$	9,4877	9,4877	9,4877	9,4877
Prob>chi^2	0,0000	0,0000	0,0000	0,0000

Source: Authors' results. ***, **, * indicate statistical significance at 99%, 95% and 90% respectively. The standard error is in parenthesizes

In terms of ensuring the banking system stability and prioritization of the banking services consumers' interests compared with those of the owners of commercial banks to the central bank, such instruments regulating supply and demand in the banking market as limiting the price parameters of basic types are used. The establishment of restrictions on interest rates on loans and deposits has become widespread in the world practice, which, on the one hand, is related to the necessity to shift the emphasis from speculative to investment purposes of granting bank loans, and on the other hand, with stimulation of attracting temporarily free households' funds to banks' deposit accounts. These banking regulation instruments are characterized by the possibility of the potential impact on the commercial banks' profitability, given the fact that the main source of their income is the difference between the value of deposit and credit resources, since the form of expression of such restrictions is often the establishment of minimum interest rates and maximum interest rates , while the commercial interests of bank owners are completely opposite in direction.

The banks from the sample belong to six countries, which has not set limits on deposit rates. It did not allow assessing the effect of this parameter on the profitability of bank assets, so determining the relationship between the availability of limits on the value of banking services and profitability of banks was conducted on the example of restrictions on interest rates on loans, the results of which show the data in Table 9.

Table 9

Results of impact assessment available in the country limits interest rates on loans to banks return on assets of different forms of property obtained by applying the generalized least squares method

Factor variable	Impact on the return on assets of the bank			
	Banks of different ownership	State banks	Private banks	Foreign banks
Limitations on interest rates on loans	-0,0001 (0,0007)	0,0053 (0,0264)	0,0013 (0,0009)	-0,0000 (0,0012)
The size of the bank	0,0076** (0,0031)	12,6507*** (2,8301)	0,0077** (0,0035)	0,0009 (0,0077)
Control of corruption	-0,0021*** (0,0007)	-0,1823*** (0,0614)	0,0009 (0,0007)	-0,0043*** (0,0011)
Inflation rate	-0,0001*** (0,0000)	-0,0007 (0,0005)	0,0005*** (0,0001)	-0,00019*** (0,0000)
Constant	0,0115*** (0,0007)	-0,1033* (0,0567)	0,0065*** (0,0010)	0,0127*** (0,0011)
Number of observations	1045	24	407	614
Parameters for the model efficacy				
Wald chi$^2_{actual}$	21,8200	109,9900	41,7300	32,1900
Wald chi$^2_{crucial}$	9,4877	9,4877	9,4877	9,4877
Prob>chi^2	0,0000	0,0000	0,0000	0,0000

Source: Authors' results. ***, **, * indicate statistical significance at 99%, 95% and 90% respectively. The standard error is in parenthesizes.

The expectation of a statistically significant effect of credit rate restrictions on the return on assets of banks has not been confirmed. At the same time, given the signs of the calculated coefficients, we can assume that the establishment of such restrictions stimulates the profitability of banks with national capital of both private and state ownership, reducing the return on assets of banks with foreign capital. However, this hypothesis needs further research to formulate empirically valid conclusions.

Effective regulation of banking activities requires maintaining the central bank's independence from the government, which creates the necessary conditions to maintain market relations in the banking sector.

The generally accepted indicator of the market relations level in the financial sector is the financial freedom index. The results of the study regarding the impact of this parameter on the banks' profitability at the microlevel are presented in Table 10.

Analyzing the results of empirical calculations, it should be noted that, despite the confirmation of the insignificant positive impact made by the financial freedom index on the banks' return on assets in their overall sample, which indicates an increase in interest of economic entities in banking in a context of market environment, no individual ownership groups have been identified, which creates the basis for concluding the weaker impact of the general financial organization conditions of the banking system as compared to the specific instruments used by the central bank in the process of banking regulation and supervision.

Table 10

Results of the evaluation of the impact of financial freedom in the country in return on assets of
different ownership banks obtained by applying the generalized least squares method

Factor variable	Impact on the return on assets of the bank			
	Banks of different ownership	State banks	Private banks	Foreign banks
The financial coverage	0,0000* (0,0000)	-0,0005 (0,0005)	0,0001 (0,0000)	0,0000 (0,0000)
The size of the bank	0,0068** (0,0031)	13,5704*** (2,5612)	0,0062* (0,0034)	0,0002 (0,0075)
Control of corruption	-0,0029*** (0,0008)	-0,1684*** (0,0596)	-0,0006 (0,0013)	-0,0050*** (0,0012)
Inflation rate	-0,0001*** (0,0000)	-0,0007 (0,0005)	0,0004*** (0,0001)	-0,0002*** (0,0000)
Constant	0,0087*** (0,0017)	-0,0764 (0,0549)	0,0034 (0,0024)	0,0112*** (0,0023)
Number of observations	1045	24	407	614
Parameters for the model efficacy				
Wald chi$^2_{actual}$	25,2200	115,4900	50,6900	34,7900
Wald chi$^2_{crucial}$	9,4877	9,4877	9,4877	9,4877
Prob>chi^2	0,0000	0,0000	0,0000	0,0000

Source: Authors' results. ***, **, * indicate statistical significance at 99%, 95% and 90% respectively. The standard
error is in parenthesizes.

5. CONCLUSION

Practical calculations indicate that there is no need to introduce differentiated regulatory regimes
depending on the ownership form and the origin of the bank's capital since there are no significant
differences in the impact made by different components of the regulatory mechanism on different
ownership banks and the origin of capital. Particularly noteworthy is the formation of a strategy to
regulate state-owned banks, with slight differences in the effectiveness of the indicative and administrative
instruments use, while at the same time the importance of institutional environment indicates the need to
reform the principles of state-owned banks' operation. Besides, the privatization and transfer of state-
owned banks to commercial bases or the regulation of priority socio-economic goals are important. In the
context of harmonizing the interests of government and business to ensure the banking activity
profitability, the most effective instruments of banking regulation are measures of an administrative nature
(in terms of banking containment, which is important in terms of economic growth and credit boom in
the country) and measures to create conditions of the high-quality legal environment of the banking
business.

6. LIMITATIONS

Calculations' results illustrate relationships of banking regulation and banks' profitability for the
sample of country with similar historical conditions of banking system development. Used methodology
might be expanded for the broader country sample. Research period is limited by 2001-2014 accordingly
to the availability of commercial banks' profitability statistics from the Bankscope database. However,
such period covers pre-crisis, crisis and post-crisis time intervals. Therefore, it is possible to predict the
persistence of identified relationships in further study periods.

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