Current Problems of Banking Supervision and Regulation: A New Evidence

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Abstract:

At present, in the era of globalization, the banking sector failure in one country can cause negative externalities for the financial institutions of other states. The fundamental problem of implementing standards based on Basel II is that these standards contribute to the development of pro-cyclicality of banking regulation.

The authors emphasize the need to design such a regulatory system, which should contribute to innovative development and at the same time restrain socially dubious novelties. Therefore, the article substantiates the need to increase the size of the capital "buffer", which is intended to address the problem of improving the financial situation and increasing the financial viability of the largest banks and banking systems.

This reduces risks and increases the capital "safety cushion", as well as optimizes the impact on the commercial banks behavior caused by the use of counter-cyclical capital regulation requirements.

The conducted research supported the hypothesis put forward by the authors that when forming a countercyclical capital buffer it is necessary to focus on indicators of: return on assets of the banking system (ROA) and return on equity (ROE), depending on GDP growth, but this dependence does not become evident immediately, but with a time lag of 1 year. The object of the research is the banking system of Russia.

Keywords: Banking sector regulation, banking supervision, counter-cyclical capital buffers, capital adequacy ratio, Granger test, cointegration.

JEL code: G21, G28.

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1. Introduction

The financial crisis of 2007-2009 revealed the imperfection of the banking regulatory system. Analyzing the lessons from the crises, J. Stiglitz stressed that the design of institutions for banking regulation and supervision had become an urgent problem even before the latest global shocks. There is a heated debate between supporters and opponents of the banking regulation. Some expressed fear that through these rules banks could circumvent the basic banking principles while others were concerned that regulators might lose their independence. Both approaches to regulation did not withstand the crisis. For this reason J. Stiglitz concluded that banks need both principles that define the goals and objectives of regulation, and rules that allow them to implement these principles in practice (Stiglitz, 2010).

The lessons from the financial crisis made it possible to put the question about the need for a fundamentally different mechanism of regulation and supervision in the financial sector at the top of the agenda, taking into account the specifics of the various segments of financial market and generic interrelationship among them, covering all financial institutions and instruments, and preventing regulatory arbitrage cases.

Moreover, the activities of regulators and financial institutions should be absolutely transparent. At present, in the integrated world, the banking sector failure in one country can generate negative externalities for the financial institutions of other states. Therefore, the regulation and supervision of financial institutions and financial markets should be carried out at the supranational level. At the same time, the main goal of such regulation should be financial stability (Lagarde, 2012; Thalassinos *et al.,* 2014; 2015).

However new risks may arise in the global economy, which can very quickly spread throughout the world. Small shocks, such as, for example, the mortgage default in the United States, the uncertain situation with sovereign bonds in Greece, the difficulties in the functioning of the Spanish banking system, have a chance to turn into global problems for the entire global banking system. Such factors contributing to vulnerability of regulatory policies in individual countries significantly increase the level of systemic volatility, thereby reducing the possibility of greater stability of the international banking system.

In this connection, it can be said that, despite the fact that modern finances are characterized by the global nature of their development, the structure of ensuring the banking system stability remains predominantly national.

2. Literature Review

The main regulatory efforts of the banking sector are aimed at increasing its rigorous compliance with banking standards. However, the costs of tight regulation are quite

high, so the question arises regarding their optimization. Innovative efforts in the banking sector in recent years have been mainly focused on circumventing reporting standards and tax avoidance, as well as increasing the cost of transactions carried out by banks. All of this caused an increase in regulatory costs and negative social effects. That is, tight regulation is aimed at deterring financial innovations, which is not efficient and does not contribute to the modernization of the banking sector (Greenspan, 2007). It is necessary to design a regulatory system that promotes innovative development and at the same time constrains socially dubious novelties (Clarke *et al.,* 2012; Allegret *et al.,* 2016; Ozen *et al.,* 2014).

It should be noted that the conditions for the global financial and economic crisis was formed before the start of the active phase of Basel II implementation. Western European banks have switched to Basel II more or less in full only since 2008. Nevertheless, the Basel Capital Agreement has a number of objective flaws.

First, it is the pro-cyclicality of banking regulation, triggered by an approach to the calculation of capital adequacy. According to the Basel documents, the equity capital of a commercial bank consist of the sum of tier 1 capital (Tier 1) and Tier 2 capital (Tier 2). The structure of the second tier may be significantly different in individual countries depending on the requirements of the national regulator.

The fundamental problem of implementing standards based on Basel II is that these standards contribute to the development of pro-cyclicality of banking regulation. When the economy is stable and the risks of shocks are minimal, the Basel Agreement allow a reduction in requirements for equity capital of banks. During the crisis, the requirements for the banks capitalization increase and the economy, which at that time needs additional financial resources, enters a recession phase at an accelerated rate. Therefore, it turns out that banks interested in making a profit raise the amplitude of business fluctuations in general (Akerlof, Schiller, 2010). Thus, the credit policy of banks exacerbates cyclicality, and the Basel I and Basel II Agreements II do not provide for the development of such a scenario (Boldeanu and Tache, 2016; Gorbunova, 2016; Grima and Caruana, 2017; Grima, 2012).

The weighted capital adequacy ratio recorded in the Basel agreement corresponds to the banking sector model with a significant level of financial leverage, which, in essence, is similar to the manifestation of the risk of bankruptcy due to a sharp change in market conditions (Haldane *et al.,* 2007). The low level of equity capital is provoked by both modern tax systems and the desire of bank managers to obtain high profits and, consequently, bonuses. Therefore, establishing a minimum amount of equity capital dictated by the Basel Agreements makes sense in principle. However, this measure resulted in an unexpected outcome - a fixed minimum of equity capital has become the norm.

Secondly, as many economists note today, the Basel Agreements encourage "intellectual laziness" (Semenko, 2009), since a profound analysis of the asset

portfolio risks becomes unnecessary, it is replaced with compliance with capital adequacy standards. The bank's compliance with the capital adequacy ratio is misleading for investors; they trust the weighted policy of the bank and at the same time trust the assessment of rating agencies, whose market is currently overly monopolized.

Nowadays, the key rating agencies are Moody's, Standard & Poor's (S&P) and Fitch Ratings. They are monopolists, since they control about 95% of the global ratings market, including: S & P controls 40% of the market, Moody's - 39% and Fitch - 16%. The independent assessment of a counterpart is too expensive. It is noteworthy that the Financial Stability Board has developed principles that, in the opinion of their authors, are intended to reduce the dependence of market players on rating agencies (CRA), namely:

- all legislations, standards and other regulatory documents should specify the definitions of creditworthiness, remove references to credit rating agencies and develop measures for elaborating a risk management system;
- all central banks in their assessments should rely on their own opinion concerning the risks associated with various financial instruments;
- credit institutions should rely on their own methods of assessing the borrowers' creditworthiness and publish information on the share of assets for which there is no such assessment for various reasons;
- activity of national regulatory and supervisory authorities should be aimed at developing the banking risk management system, as well as providing banking supervision;
- all investment companies and institutional investors should disclose information on methods of internal assessment of credit risks and their decisions should not be referenced to CRA ratings;
- a downgrade of the CRA on a counterparty or collateral should not be considered by market participants as a signal for a "margin call" situation for derivative transactions;
- securities issuers must comply with the requirements for transparency and public disclosure so that investors can independently assess credit risks.

In 2010, the Basel Committee developed a new set of documents containing requirements for capital adequacy and capital liquidity for commercial banks, called Basel III. "Basel III" can be viewed as a combination of new relevant ways to assess risks (credit, market and operational) and the formation of sufficient capital, functional supervision and principles of market discipline. Moreover, it is the whole set of these measures that relates to risk-based supervision, which ensures financial stability. In this connection, it is considered as a new paradigm for banking supervision, which should be extended to the entire financial system.

Starting from 2016, credit organizations are required to establish so-called capital buffer not less than 2.5% of net profit. The buffer should be formed from two equal parts of 0.625% each. Before January 1, 2015, banks had to increase the size of the equity (authorized) capital to 4.5%, while the amount of capital belonging to Tier 1 - to 6%. In 2018, tier 1 capital should lose deferred taxes and securitized assets, which give it a 15% "safety cushion". At the same time, the value of capital adequacy set as a norm by regulators related to the first and second tiers is determined by the ratio of each of these types of capital to assets weighted by the risks rate (market, credit and operational). The resulting value should have reached 8% by January 1, 2013, while with the inclusion of "buffer" capital as of January 1, 2019 it should be 10.5%.

"Basel III" contributes to strengthening large credit institutions because they have an extensive branch networks. To this end, the Basel Agreement provides for the possibility of classify as equity capital their own minority share (must be less than 10%) in the capital of other financial institutions.

The "Basel III Agreement", in addition to the characteristics of the quantitative plan, implies the implementation of new approaches to banking supervision, involving the monitoring and control of compliance by financial institutions with market discipline and capital adequacy standards. To achieve this goal, standards for disclosing information relating to the risks taken by banks are being introduced. Thus, it is assumed to implement the principle of transparency.

Analysts of the Basel Committee have made a forecast of how new principles of regulation and supervision in the banking sector will affect macroeconomic indicators. According to it, GDP growth rates can reduce in the 35th quarter from the moment new requirements for the equity capital of credit institutions are implemented, then, in the analysts' opinion, the GDP growth rate is expected to return to the previous level.

The impact of the implementation of the Basel III standards on macroeconomic parameters may vary depending on the capitalization of the national banking sector and on the decision made by the national regulator on the size of the buffer capital. The period during which credit organizations adjust the size and structure of their equity capital in accordance with the Basel rules will also affect the GDP. If the national regulator insists on the absolute adoption of Basel Agreement, then the parameters for reducing GDP growth will still depend on the characteristics of the national economy. Experts note that increased control over credit institutions can lead to transference of high-risk activity to companies that are not subject to strict regulation.This shows that capital flow between regulated and unregulated sectors is quite predictable, with consequent adverse effects on the state of the financial sector and global sustainability.

Today, the issue of forming a counter-cyclical buffer capital for large financial institutions above the minimum normal value remains a matter of discussion. At

present, it is generally recognized that the additional financial resources available to the bank, severe restrictions on high-risk operations, various structural constrains can significantly reduce the risks generated by large businesses and their top managers (Paech, 2010). In addition, for the increase of the commercial banks manageability in the post-crisis period the following fundamental aspects of banking regulation are the most promising:

  - the division of regulatory control into over systemically important banks and all other commercial banks. To this end, it is necessary to develop criteria for classifying a bank as a too-big-to-fail within the framework of national banking legislation, which will make it possible to work out a system of preventive safeguards to avert the bankruptcy of large banks or assist them in stressful situations. For which reason the activities of systemically important banks require special more thorough control in accordance with the requirements of antitrust laws.

  -in order to prevent the withdrawing of commercial banks operations out of national regulatory agencies control or to take advantage of differences in the modes of commercial banks operation in different countries, it is necessary to streamline international banking operations by bringing them into line with a single international standard. This will be possible through establishing an international regulatory body ensuring the development of uniform standards and control over their observance.

   - to reduce the level of super-risky, and, accordingly, super-profitable for banks operations, it is necessary to capture the conditions for paying remuneration to top managers of banks. Since at present there is a conflict of interests between top managers and shareholders of banks over the payment of remuneration regardless of the credit institution performance, more thought also needs to be given to defining parameters for the dependence of bonus payments to top managers on the banks' financial performance.

By virtue whereof the authors substantiate the need to increase the value of the capital "buffer", which should solve the problem of improving the financial situation and increasing the financial viability of the largest banks and banking systems. This reduces risks and increases the capital "safety cushion", as well as optimizes the impact on the commercial banks' behavior due to the use of counter-cyclical capital regulation requirements. At the same time, this may smooth the movements of the economic cyclical development.

In the event that banks had an additional countercyclical buffer reserve for standard and non-standard loans not exceeding the calculated value (percentage) of debt on standard and non-standard loans, this would ensure the stability of their financial performance during the crisis. If, at the beginning of the crisis, banks were allowed to restore this additional buffer reserve for standard and non-standard loans, the need to form an additional reserve of 100% of troubled and bad loans debt would not affect their financial performance.

3. Methodology

The value of this additional countercyclical buffer reserve can be calculated on the basis of the rate of GDP decline, due to the fact that this indicator has an impact on the main performance indicators of commercial banks - return on assets and return on equity capital. However, in the course of this research, we may encounter the need in addition to the indicator of slow-down in the rate of GDP growth to take into account time lags, since in most cases such changes do not affect the main indicators of the banking system immediately, but after a while, for example, in a year, two years, etc.

That is why in our paper we examine how GDP growth or decline affects the main indicators of the banking system profitability, as well as how the state of the banking system can change as a result of macroeconomic factors impacts. The object of the research is the banking system of developing countries as the most volatile one. Such research will make it possible to predict in the future a possible change in the banking system, including the probable reduction in its financial stability in unstable macroeconomic environment, which makes it necessary to regulate it. As a tool for determining causation, we will use the Granger cointegration model.

The economic growth of any country is measured by the rate of its real GDP growth. This variable is one of the main indicators of the World Bank WDI (World Development Indicators) database[4]. Variables characterizing bank profits are — ROA, (Return On Assets), rand — ROE (Return On Equity). These variables were selected as key indicators from the Bank Scope database. We will take them as the main indicators of the commercial banks efficiency.

Return On Assets (ROA) reflects the profitability of banks' assets and takes into account various bank balance-sheet-related financing transactions. Most of the researchers by calculating the ROA estimate mainly the ability of the bank's management to administer the bank's income and expenditures, while generating extra profit (Rashid, Dewan Arif *et al.,* 2011). ROA as an indicator of profitability is commonly used to characterize the profitability of commercial banks (Turgutlu, 2014) .

Return On Equity (ROE) is the profitability ratio of banks' equity capital; it allows to evaluate not only the profitability of commercial banks, but also the growth of equity capital and, as a consequence, the capacity of the banking system, enabling commercial banks to be financially viable. In recent years, commercial banks profitability has tended to increase.

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[4]*https://data.worldbank.org/indicator?tab=all*

In general, the profitability of the entire banking sector at the end of 2017 was about 1%, the return on capital was about 8.3% (in 2016, 1.2% and 10.3%); the return on assets of credit institutions in 2017 was 1.0%, return on equity - 8.3% (a year earlier - 1.2 and 10.3%, respectively). State-controlled banks were the most profitable in 2017, their return on their assets was 2.1%, and the return on equity - 16.1%. Good results were also demonstrated by banks controlled by non-residents (2.4 and 13.8%, respectively).

Table 1. *Profitability ratio for groups of banks in Russia[5]*

Groups of credit institution	Return on Assets, %		Return on Equity, %	
	2016	2017	2016	2017
Banks controlled by the state	1.9	2.1	15.8	16.1
Banks controlled by non-residents	1.8	2.4	11.4	13.8
Private banks with a capital of more than 1 billion rubles.	0.4	1.4	3.3	10.9
Private banks with a capital of less than 1 billion rubles.	0.1	-0.01	0.5	-0.1
For reference: systemically important credit organizations	*1.9*	*1.7*	*15.7*	*13.5*

The rate of real GDP growth reflects the macroeconomic environment of a country, in other words, economic activity in the country. A large number of empirical studies have shown that the rate of real GDP growth has a positive effect on the banking profitability (Ductor, Lorenzo, and Daryna Grechyna. 2015). Taking into account the rate of GDP growth allows having in mind the stage of the economic cycle, as well as its current shape. Some researchers speak about the positive effect of GDP growth rates on the profitability of commercial banks and the banking system as a whole (Bikker, Jacob A., and Haixia Hu. 2002), while the economic downturn leads to declined profitability and losses of commercial banks.

Table 2. *Macroeconomic data in Russia for the period from 2007 to 2017*

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Return on Assets of the banking system, %	3.0	1.8	0.7	1.9	2.4	2.3	1.9	0.9	0.3	1.2	1.0
Return on	22.7	13.3	4.9	12.5	17.6	18.2	15.2	7.9	2.3	10.3	8.3

Equity of the banking system, %										
GDP growth rate,%	108.7	105.2	92.2	104.5	104.3	103.5	101.3	100,7	97.2	99.8	101.7

In the course of analyzing macroeconomic indicators, we very often encounter the fact that in most cases time series are non-stationary, that is, their stochastic specifications change over time. To such time series we can attribute GDP growth, levels of price, consumption and many other things. To analyse such time series, it is common to use differences or carry out some kind of transformation (seasonally adjusted); in this case their stationarity is achieved and after that an analysis is carried out.

Nevertheless, present-day studies offer a fundamentally different approach to the analysis of non-stationary time series; one of this kind of research is cointegration. It allows not only eliminating the spurious regression, but also showing the cause / effect relationship of non-stationary indicators in the body of interest. If we want to obtain as much information as possible related to the object of analysis, in this case - the banking system, we must compare not only the linear values occurring in one period of time, but also explore the dynamics and evolution of variables, that is, take their past values into account given the time lag.

We can understand cointegration as a tool in the field of macroeconomic theory, bearing in mind the fact that most of the indicators are non-stationary. At the same time, there are a number of stable stationary relations in the economy, to which we can add non-stationary series as factor ones. In other words, cointegration reflects the mathematical formulation of observed stability; in addition, it is a tool for testing proposed macroeconomic hypotheses, and in the case of accepting such a hypothesis, it is possible to determine a quantitative assessment of the developed hypotheses.

The idea of cointegration was first presented in the works by Granger (Granger, 1981) and was further developed in the works by Engle, Granger and a number of other scholars (Engle, Granger, 1987). The Granger test assumes that information relating to the prediction of variables is contained only in the time series of these variables. In so doing, the Granger test consists in evaluating the following regression equation (1):

$$y_t = \sum_{k=1}^{n} \alpha_i \, x_{t-k} + \sum_{k=1}^{n} \beta_i \, y_{t-k} + \varepsilon_{t.i}, \qquad (1)$$

where α_i and β_i, k-time lag, и ε-error of the regression.

We can express the specification of our model in two equations:

The dependence of Return on Assets on GDP growth (equation 2).

$$ROA_{it} = \sum_{i=1}^{n} \alpha_i, kROAi_{t-k} +$$

$$\sum_{k=1}^{p} \beta_i, GDPi, t-k \qquad\qquad \mu_{ROA}{}^{+\varepsilon_{t.i}} \qquad\qquad (2)$$

The dependence of Return on Equity on GDP growth (equation 3).

$$ROE_{it} = \sum_{i=1}^{n} \alpha_i, kROEi_{t-k} +$$

$$\sum_{k=1}^{p} \beta_i, GDPi, t-k \qquad\qquad \mu_{ROE}{}^{+\varepsilon_{t.i}} \qquad\qquad (3)$$

At the very beginning of the cointegration regression test, we should check the time series for stationarity by means of the Dickey-Fuller test (DF-test, Dickey - Fuller test), which is one of the methods for unit root test.

Let us formulate the main and alternative hypotheses: hypothesis H0: - the process is non-stationary; hypothesis H1: - the process is stationary of the first order. To verify the cointegration of two time series of ROA (ROE) and GDP in this work we used the Granger method, according to which the study will be conducted according to the following scheme: 1) the order of the time series data integration is determined; 2) based on the least squares method the cointegration equation is estimated; 3) using the Dickey-Fuller test, the regression residuals of this equation are investigated for stationarity; the main hypothesis is that the ROA and ROE indices are not cointegrated with GDP; 4) if, according to the results of the Dickey-Fuller test, the residuals are stationary, then the main hypothesis is rejected, and the time series ROA and ROE with GDP are co-integrated.

In order to test the time series for integrability, we calculate the Student's t-statistic for a parameter and compare it with the upper and lower threshold values of the DF-statistic from the Dickey-Fuller test table (Table 3).

Table 3. *Dickey-Fuller augmented test results for ROA and ROE*

unit root testing for ROA	unit root testing for ROE
including one lag for (1-L) ROA Sample scope 9 null unit root hypothesis: a = 1	including one lag for (1-L) ROE Sample scope 9 null unit root hypothesis: a = 1

| test without constant
  model: (1-L)y = (a-1)*y(-1) + ... + e
  score for (a - 1): -0.152305
  test statistics: tau_nc(1) =-0,926097
  Asymptote of p-value 0.3155
  1st order autocorrelation coefficient for e: -0.033 | test without constant
  model: (1-L)y = (a-1)*y(-1) + ... + e
  score for (a - 1): -0.150801
  test statistics: tau_nc(1) =-0,899057
  Asymptote of p-value 0.3269
  1st order autocorrelation coefficient for e: -0.022 |

In our case, for n observations, the value of the t-statistic is larger than the lower critical value (0.05), therefore, in both cases, both for ROA and ROE, we accept the null hypothesis and can say that the process is non-stationary, that is, it either does not integrate at all, or integrates at a higher order (Table 4).

Table 4. *Dickey-Fuller augmented test results for GDP*

Unit root testing for ROA of GDP	Unit root testing for ROE of GDP

including one lag for (1-L) GDP
Sample scope 9
null unit root hypothesis: a = 1
  test without constant
  model: (1-L)y = (a-1)*y(-1) + ... + e
  score for (a - 1): -0.00885711
  test statistics: tau_nc(1) =-0,404445
  Asymptote of p-value 0.5383
  1st order autocorrelation coefficient for e: -0.234
	including one lag for (1-L) GDP
	Sample scope 9
	null unit root hypothesis: a = 1
	  test without constant
	  model: (1-L)y = (a-1)*y(-1) + ... + e
	  score for (a - 1): -0.00862405
	  test statistics: tau_nc(1) =-0,392881
	  Asymptote of p-value 0.5427
	  1st order autocorrelation coefficient for e: -0.235

Since the asymptomatic value of p is large enough, there is no reason to reject the null hypothesis concerning the presence of a unit root (the series can be considered as non-stationary). Next, we calculate the cointegration regression for ROA and ROE for the period 2007-2017 (Tables 5 and 6).

Table 5. *Cointegration regression for ROA-least square method, on the basis of observations 2007-2017 (T = 11)*

		Standard error of	t-statistics	for P-value	
GDP	0,0157924	0,00227619	6,938	4,00e-05	***
Mean dep. variable			1.581818		
St. dev. of dep. variable			0.825613		
Residual sum of squares			5.906764		
St. model error			0.768555		
Uncentered R-square			0.827992		
Centered R-square			0.133443		
Log-likelihood			-12.18844		
Akaike Information Criterion			26.37688		

Schwarz Criterion (SC)   26.77478
Hannan-Quinn information criterion (HQC) 26.12606
 Rho Parameter   0.380574
Durbin–Watson Statistic   0.945313

Table 6. *Cointegration regression for ROE-MNK, on the basis of observations 2007-2017 (T = 11)*

	standard error of	t-statistics	for P-value
GDP 0,120783	0,0168390	7,173	3,02e-05 ***
Mean dep. variable		12.10909	
St. dev. of dep. variable		6.117427	
Residual sum of squares		323.3839	
St. model error		5.686685	
Uncentered R-square		0.837263	
Centered R-square		0.135867	
Log-likelihood		-34.20352	
Akaike Criterion		70.40704	
Schwarz Criterion (SC) 7		0.80494	
Hannan-Quinn information criterion (SC)		70.15622	
Rho Parameter		0.320909	
Durbin–Watson Statistic		1.057343	

To support the cointegration, we will carry out an augmented Dickey-Fuller test for residuals of the model in terms of ROA and ROE. Let us make the main hypothesis: the time series of ROA (ROE) and GDP indicators are not cointegrated. To verify the main hypothesis, we calculate the regression residuals of the resulting equation, and examine them for stationarity using the Dickey-Fuller augmented test. According to the results of the ADF – test, the regression residuals are stationary, therefore, the null hypothesis of the absence of cointegration between time series of indicators is disproved. In other words, the time series of the examined ROA (ROE) and GDP coefficients are cointegrated (Table 7).

Table 7. *Augmented Dickey-Fuller test for GDP results*

Augmented Dickey-Fuller test for uhat including one lag for (1-L)uhatROA	Augmented Dickey-Fuller test for uhat including one lag for (1-L)uhat ROE
null unit root hypothesis: a = 1 model: (1-L)y = (a-1)*y(-1) + ... + e score for (a - 1): -0.719581 test statistics: tau_nc(2) =-2,14053 Asymptote of p-value 0.01864 1st order autocorrelation coefficient for e: 0.034	null unit root hypothesis: a = 1 model: (1-L)y = (a-1)*y(-1) + e score for (a - 1): -0.9373 test statistics: tau_nc(2) =-2,66827 P-value 0.02815 1st order autocorrelation coefficient for e: 0.050

Thus the conducted research supported the hypothesis that Return on Assets of the banking system (ROA) depends on GDP growth, and Return on Equity (ROE) also depends on GDP growth, but this dependence does not manifest itself immediately due to the time lag. In our case, the variables take the greatest degree of cointegration with the time lag, which equals 1 year, that is, the greatest impact of the GDP change rates on the profitability of the banking system is witnessed after this time. Our Granger test showed that all variables are cointegrated, which indicates their long-term equilibrium relationship and authenticity of correlation.

Taking into account the revealed dependence, maintaining the required level of profitability and sustainability of commercial banks in the context of the impact of global a macroeconomic risks require an adjustment of the system of banking activities regulation and supervision in developing countries.

4. Conclusions

The cyclical development of the economies of developing countries is becoming increasingly evident, which is manifested in a decrease in the GDP growth rates under the impact of the financial crisis. In this connection, the creation by megaregulators the system of pro-cyclical regulation of the banking system development should become an important instrument for controlling the banking system.

In our opinion, the main instrument for regulating banking capital should remain a counter-cyclical capital buffer, the main purpose of which is to contain extremely rapid credit growth during periods of economic boom. The most important problem in this case is the search for indicators by which it would be justified to activate the countercyclical capital buffer. To this end, the Basel Committee on Banking Supervision offered assessments based on calculating the deviation of the actual data from the long-term trend, formed with the use of the Hodrick-Prescott filter. If the deviation is much higher than the resulting value, this indicates the need to accept additional requirements for the adequacy of core capital.

However, in a crisis, these indicators are insufficient, since they do not reflect the state of the banks' credit policy. In this connection, the authors attempted to identify and substantiate more realistic indicators of countercyclical buffer assessment for developing countries. To this end, we estimated the most important macroeconomic indicators (the level of GDP and the volume of loans granted to non-financial organizations) for the period from 2009 to 2017 inclusive. The data were presented as quarterly figures for the above mentioned period.

Based on the econometric model of least squares, the authors identified interrelationships of the main banking indicators, which allowed us to prove the possibility of using an indicator for the assessment of a countercyclical buffer that reflects the ratio of loans to non-financial organizations (legal entities) to GDP,

which, according to the authors, allows the most realistic assessment of the situation in the country's credit system.

Acknowledgments:

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