Reserve Capital Buffer as an Instrument of Macroprudential Policy

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ABSTRACT

The analysis of Basel III main provisions shows that within the macroprudential policy, increasing the financial stability of the banking sector is achieved by growing the capital of banks and creating new tools to solve short-term liquidity problems. The proposed measures seem well developed, except one fact — the quantitative values of the regulatory requirements for growing the bank capital are insufficient to achieve the macroprudential policy objectives. This study aims to develop analytical tools allowing to form quantitative objectives of the macroprudential policy and to deliver them by streamlining the capital requirements of banks. The methods of comparative and GAP analyses were used in the study. The empirical analysis was performed with the data on the Russian stock index IMOEX dynamics, the data from the reports by the Bank of Russia and financial reports of systemically important Russian banks. According to the study results, a quantitative strategic objective of the macroprudential policy in the Russian Federation was determined, a gradual increase in the capital adequacy ratio of Russian banks to 40% was proposed, a calendar plan was developed to achieve the strategic objective stagewise in 10 years, and banks are realistic in achieving this objective. As a regulatory instrument to grow the capital adequacy of banks according to the target level, it is proposed to use an additional regulatory capital requirement in the form of a reserve buffer of a dynamic and adaptive nature. The empirical analysis of the possibilities and consequences of a new regulatory instrument application proved the expediency of its introduction to improve the effectiveness of the macroprudential policy in the Russian Federation.
Keywords: macroprudential policy; capital adequacy; capital buffer; banking sector sustainability

INTRODUCTION

The 2008 global financial crisis showed that the requirements for financial resilience of banks were insufficient. This led to a new concept of a global regulatory framework, known as Basel III.[1] A stricter definition of bank capital was introduced as part of this concept which increased their loss-absorbing capacity. New requirements for capital adequacy were established. They included the formation of a conservation capital buffer at 2.5% and a countercyclical capital buffer[2] in the amount of 0.0%–2.5% of total risk-weighted assets (RWA). Along with the Basel agreement, it was envisaged to introduce a leverage indicator of at least 3% of the ratio of bank capital to total assets and off-balance sheet liabilities not risk weighted.[3]

The most important aspect of Basel III was the more stringent capital requirements for global systemically important banks (G-SIBs), which have a significant impact on the global financial system. Additional requirements for Tier I capital adequacy were set to G-SIBs. The markup to risk-weighted assets[4] ranged from 1% to 3.5%. At the same time, the Basel Committee on Banking Supervision noticed banks that are not identified as systemically important globally, but their bankruptcy may have a negative impact on the economy of a particular country. Special regulatory measures[5] were recommended to be applied to them. This led to an additional systemic importance buffer of banks at the level of national jurisdictions ranging from 0.0% to 2.0%.

In November 2015, the Financial Stability Board raised the requirements for financial sustainability of global systemically important banks by approving the standards for total loss-absorbing capacity (TLAC). The standard established minimum requirements for loss-absorbing and recapitalisation capacity for G-SIBs.[6] At the same time, the loss-absorbing capacity was understood as the capacity of additional resources in the form of Tier I capital and certain debt instruments that can be used to cover losses when resolving the insolvency of financial institutions. The requirements for the capacity of financial institutions to absorb losses were determined considering the funds actually required to settle obligations in case of failure of large credit organizations. The minimum TLAC requirements are set at 16% of the RWA and 6% of the leverage ratio denominator. The requirements come into force on January 1, 2019 in countries with developed markets, and from January 1, 2025 in countries with emerging markets. In the future (from 2022 for developed countries and from 2028 for developing countries), these requirements will be increased to 18% and 6.75% respectively. It is understood that due to TLAC, large banks will be able to go bankrupt and will not cause financial crises similar to that of 2008.

The analysis of the Basel III basic provisions allows to state that increasing the sustainability of some banks and the banking sector as a whole is ensured by increasing their capital buffer and creating new tools to absorb liquidity shocks. However, from the point of view of their impact on achieving macroprudential policy goals, the effectiveness of these innovations remains outside the legal framework. According

[1] Basel Committee on Banking Supervision. Basel III: A global regulatory framework for more resilient banks and banking systems, 2010. URL: https://www.bis.org/publ/bcbs189.pdf (accessed on 23.05.2019).

[2] Basel Committee on Banking Supervision. Guidance for national authorities operating the countercyclical capital buffer. Bank for International settlements, 2010. URL: https://www.bis.org/publ/bcbs187.pdf (accessed on 23.05.2019).

[3] Basel Committee on Banking Supervision. Basel III leverage ratio framework and disclosure requirements, 2014. URL: https://www.bis.org/publ/bcbs270.pdf (accessed on 23.05.2019).

[4] Basel Committee on Banking Supervision. Global systemically important banks: updated assessment methodology and the higher loss absorbency requirement, 2013. URL: https://www.bis.org/publ/bcbs255.pdf (accessed on 23.05.2019).

[5] Basel Committee on Banking Supervision. A framework for dealing with domestic systemically important banks, 2012. URL: https://www.bis.org/publ/bcbs233.pdf (accessed on 23.05.2019); Basel Commitee on Banking Supervision. Regulatory consistency assessment programme (RCAP) — assessment of Basel III G-SIB framework and review of D SIB frame-

works — European Union, 2016. URL: https://www.bis.org/bcbs/publ/d372.pdf (accessed on 23.05.2019).

[6] Financial Stability Board. Principles on loss-absorbing and recapitalisation capacity of G-SIBs in resolution total loss-absorbing capacity (TLAC) term sheet, 2015. URL: https://www.fsb.org/wp-content/uploads/TLAC-Principles-and-Term-Sheet-for-publication-final.pdf (accessed on 23.05.2019).

to the Russian scientists [1], the new paradigm of financial regulation still retains some shortcomings reducing its effectiveness. Among these shortcomings, the authors focus on the delayed nature of the regulatory response to new risks. Besides, it should be noted that the upper limit of the increase in the general requirements for bank capital has not been yet determined. The issue of the combined effect of regulatory tools on the effectiveness of macroprudential policies, including the achievement of its strategic and current goals, has not been resolved. An analytical toolkit to determine quantitative goals of macroprudential policy and the mechanism to achieve them has not been developed. The study was motivated by the desire to resolve the question.

LITERATURE REVIEW

The research results in the works by Galati & Moessner [2], Zulkhibri [3] show that the literature on the effectiveness of macroprudential policy tools is still in its infancy and has so far provided only limited guidance for policy decisions. Theoretical studies of macroprudential policies show mixed results, and empirical studies on this issue are not conclusive.

In recent years, however, increasing efforts have been made to fill this gap. There is an increasing empirical work on the effect of some macroprudential tools on a range of target variables, such as quantities and prices of credit, asset prices, and amplitude of the financial cycle and financial stability. Criteria for assessing the quality of macroprudential policies are proposed. The research analyses the effects of introducing individual regulatory tools and proposes measures to optimize the portfolio of these tools.

Most works on this topic are devoted to assessing the impact of macroprudential instruments on banks' lending activity, financial stability and banking sector stability. So, Mankart, Michaelides, Pagratis [4] analyzed the impact of regulatory requirements for capital adequacy and leverage on bank lending. The authors concluded that the tightening of capital requirements for banks leads to a decrease in lending,

reserves and an increase in bankruptcy, and the tightening of requirements for leverage leads to an increase in lending and a decrease in failure rates.

Olszak, Roszkowska & Kowalska [5] support the view that macroprudential policy has the potential to curb the procyclical impact of bank capital on lending and therefore, the introduction of more restrictive international capital standards included in Basel III and of macroprudential policies in general are fully justified.

Aysan, Disli & Ozturk [6] also conclued that the implementation of macroprudential tools has a positive impact on financial stability.

Gornall & Strebulaev [7] found that capital regulation lowers bank leverage but can lead to compensating increases in the leverage of borrowers. Despite this, doubling current capital requirements would reduce the default risk of banks by up to 90%, with only a small increase in bank interest rates.

Noreen, Alamdar & Tariq [8] assessed the relationship of capital buffer and risk over the business cycle in developing countries and proved the relevancy of bank's capital buffer and bank risk to the soundness and stability of financial position in banking sector.

Maurin & Toivanen [9] concluded that the adjustment of euro area banks to higher capital adequacy requirements reduces not only loan growth, but also the volume of transactions with securities, and the volume of securities decreases more significantly. At the same time, the volume of attracted resources is decreasing.

Belem and Gartner [10] conducted similar studies for the Brazilian banks. They investigated the relationship between bankruptcy cost and a large number of factors. The bankruptcy cost is a quantitative expression of the "too big to fail" and a bank "significance". As a result, it was found that bankruptcy cost is weakly related to all common factors. Consequently, introducing increased regulatory requirements for systemically important banks has no reason. The introduction may be forced; and then according to regulatory authorities, the soundness of systemically important banks should grow. The lack

of reasoning will not harm. It only means that with the expansion of regulatory requirements, the competitiveness of large banks will fall, and this will negatively affect their soundness.

Danarsari, Viverita & Rokhim [11] investigated the relationships between capital buffer and bank stability among commercial banks in Indonesia after the financial crisis of 2007–2008. Using dynamic regression, the authors proved that improvement of the capital buffer enhances bank stability.

Oduor, Ngoka & Odongo [12] analyzed the impact of enhanced banking capital adequacy requirements on financial stability in Africa. The authors found increased regulatory capital improves competitive pricing for foreign banks while it makes domestic banks less competitive mainly attributed to the high cost of sourcing and holding extra capital for domestic banks compared to foreign banks who can source cheaper capital from parent companies. Thus, the authors questioned the effectiveness of enhanced regulatory capital on stability and competitiveness of the African financial system.

Another important area of research is the assessment of the quality of macroprudential policies. Analyzing the approaches to capital regulation in Basel III, A.R. Admati [13] points out flaws in the rules, which include dangerously low equity levels; complex and problematic system of risk weights that exacerbates systemic risk and adds distortions, and unnecessary reliance on poor equity substitutes. According to him, the underlying problem in macroeconomic policy is a breakdown of governance and lack of accountability to the public throughout the system, including policymakers and economists. To proceed with this topic, A. Matysek-Jedrych [14] suggests assessing the quality of institutional mechanisms of macroeconomic policy based on constructing ratings of macroprudential authority accountability and transparency across the EU countries.

M. Dumicic [15] investigated the effectiveness of macroprudential policy in terms of its mitigating financial stability risks. The author concluded that macroprudential policies are more effective in slowing credit to households than credit to the non-financial corporate sector, mainly because the latter had access to nonbank and cross-border credit in addition to domestic bank credit.

Pfeifer, Holub, Pikhart & Hodula [16] examined the relationship between capital and leverage ratios. They found that the capital and leverage ratios complement each other and that the introduction of a macroprudential leverage ratio could, under certain circumstances, enhance the effectiveness of a macroprudential policy.

I. Larionova, E. Meshkova [17] analyzed the effectiveness of using financial leverage in order to increase the financial stability of Russian banks. Based on the analysis, the authors concluded that due to a significant excess of the planned level of financial leverage, banks compiled a high-risk portfolio of assets, not captured by the new standard. According to the authors, in order to increase the effectiveness of this regulatory instrument, the regulatory levels of leverage ratio should be differentiated for banks with different business models.

Zakaria & Fatine [18] propose that these instruments should be used only in specific economic and financial situations. According to the authors, the output gap, describing the economic cycle, and the Z-score are the intermediate variables for the activation of capital instruments. Moreover, the liquidity ratio and changes in bank profitability are the two early warning indicators for activation of liquidity instruments.

Bui, Scheule & Wu [19] draw attention to the controversy concerning the appropriate size of banks' capital requirements, and the trade-off between the costs and benefits of implementing higher capital requirements. The authors suggest that a moderate increase in bank capital buffers is sufficient to maintain financial system resilience, since credit supply may be hampered if bank capital levels are too high.

P.H. Kupiec [20] assessed the efficacy of the requirement for minimum "total loss absorbing capacity" (TLAC) at global systemically important banks. The author notes that to meet the stated goals, TLAC requirements must impose

minimum TLAC at all subsidiaries and restrict how TLAC funds can be invested. According to the author, an equivalent, but much simpler solution is to significantly increase regulatory capital requirements on systemically important bank subsidiaries.

R. J. Herring [21] also notes the regulatory complexity of financial stability. Using the example of capital regulation, he showed how complexity has grown geometrically from the introduction of the Basel Accord on Capital Adequacy in 1988 to the introduction of Basel III and the total loss-absorbing capacity (TLAC) proposal in 2015. Having analyzed the current welter of required capital ratios, the author proposed to eliminate 75% of them without jeopardizing the safety and soundness of the system. The author pointed out the evident advantages of a simpler, more transparent regulatory system.

To summarise the research results, it should be noted that despite obvious progress, they do not contain specific recommendations on setting quantitative goals of macroprudential policy and the mechanism to achieve them, including determining the maximum bank capital burden, correlating capital adequacy with macroprudential policy objectives and tools to achieve these goals.

In this regard, the aim of this study will be to develop an analytical toolkit to set quantitative goals of macroprudential policy and to deliver them by streamlining requirements for bank capital.

RESEARCH METHODOLOGY

Our hypothesis is that the long-term goals of macroprudential policy should be aimed at achieving stability in the national banking system. The main tool to achieve this goal should be an additional capital buffer that is dynamic and adaptive and formed as the difference between the target and actually achieved level of financial stability in the banking sector.

Implementing this idea implies using comparative and GAP-analysis methods and following the steps:

• to assess the general level of capital adequacy to secure stability in the banking sector;
• to shape strategic and current goals of macroprudential policy in order to secure stability in the banking sector by the end of a given period;
• to develop a new regulatory instrument that ensures delivering macroeconomic policy goals by filling the capital adequacy gap;
• to empirically analyse the opportunities and consequences of applying a new regulatory tool — an additional capital buffer.

RESEARCH

Assessment of general level of capital adequacy to secure stability in banking sector

By financial stability of national banking systems we mean their ability to absorb losses, that is, the capital that can be used to cover unexpected losses.

When choosing the level of capital requirements, we will rely on the financial crises research results performed by Allen & Gu [22], Cheng & Mevis [23].

Allen & Gu analyzed the causes of the 2007–2009 crisis and concluded that this crisis was triggered by three types of risk: panic, asset price falls and contagion.

Cheng & Mevis studied the Global Financial Crisis and the European crisis. The authors found that the banks in the euro area were hit by two shocks of different nature. The Global Financial Crisis hit mainly large banks through their losses on investment in securities. The subsequent crisis in the euro area hit more traditional banks specializing in lending activities, mainly due to the increased banks' credit impairment expenses. The first shock seemed to have a "one-off" effect on banks' profits while the effects of the second shock were more long-lasting and reduced banks' profits in peripheral Europe.

Based on the research data, we believe that the level of capital requirements for banks should be determined by the value of impairment of assets during the crisis. Using this criterion requires an answer to two key questions:

what assets should impairment be tracked by? what time interval should be used?

We believe that it is necessary to analyze a wide range of assets, mainly non-financial ones. Risk banking assets consist primarily of loans to non-financial corporations and investments in corporate securities. The profitability of securities depends on the financial condition of corporations in the same way as the repayment of their loans. As for loans to individuals, the solvency of these borrowers depends on the general state of the economy and on the state of the markets, i.e. almost on the same factors as the profitability of non-financial corporations. Considering that during a crisis, prices of all assets tend to change (fall) along similar lines, we believe that it is most convenient to use any broad stock market index calculated on stocks as an indicator. Shares are not purely financial instruments, since their fundamental price is formed from the value of the company's property and its business profitability. Moreover, the property of non-financial companies is formed by a wide range of non-financial assets. Along with fundamental factors, the share price also depends on the speculative component. However, a change in liquidity, i.e. the cash flow of "hot money" affects the value of shares only in the short term.

We propose to limit the time interval to a one year period. In shorter periods, the impact of liquidity shortages on asset prices is significant. Short-term liquidity problems in the acute phase of the crisis can be solved by providing short-term loans to banks by the Central Bank. In this regard, the solution of liquidity problems in the acute phase of the crisis at the expense of bank capital seems inappropriate.

The stock index needs to be adjusted for inflation, since today the inflation rate approximately corresponds to the value of the risk-free interest rate for real borrowers, and not to the rate of short-term loans for financial companies. Thus, the inflation rate characterizes an alternative investment option.

On the example of the Russian banking sector, we studied the practical aspects of the proposed

approach to determining the general level of capital adequacy of banks considering covering unexpected losses. We used the IMOEX index as the stock index. This index is a price free-float composite index of the Russian stock market which includes the most liquid stocks of the largest Russian issuers, whose economic activities belong to the main sectors of the economy.

Here is what we did to adjust the IMOEX index for inflation. We converted the annual inflation values (Consumer Price Index= CPI) from official sources[7] into a CPI with a basis of 1.00 as of January 1, 1998. Then, we obtained weekly price index values by interpolation from annual values. Next, we divided the weekly IMOEX index values into the weekly price index values, and thus we got the IMOEX index values cleared of inflation.

Fig. 1 shows the IMOEX index dynamics adjusted for inflation in the period of 1998–2019.

Fig. 1 shows three periods of impairment of assets in the Russian economy. These periods correspond to the crises of 1998, 2008 and 2014. The 2008 global crisis was followed by a sharp impairment of assets in the Russian economy. The 2014 crisis was less pronounced than the 2008 crisis. During the 2014 crisis, the impairment of assets lasted a longer period, and the fall in asset prices was less significant than in 2008.

Fig. 1 shows the value of asset prices fall during the crises. We analyzed the 2008 crisis and considered the averaging period of one year (justified above). Here are the results. Right before the asset prices fall, the IMOEX index was at approximately the same level of 250 for more than a year. After a sharp asset prices fall at the end of 2008 and their subsequent rebound, the IMOEX index averaged 150. The maximum fall in the index corresponded to its value at the level of 66, but this drop was short-term and therefore should not be considered. Thus, in the 2008 crisis, assets impaired to 0.6 from the pre-crisis level, and

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[7] Consumer Price Indexes in the Russian Federation in 1991–2019. URL: http://www.gks.ru/wps/wcm/connect/rosstat_main/rosstat/ru/statistics/tariffs/# (accessed on 02.07.2019).
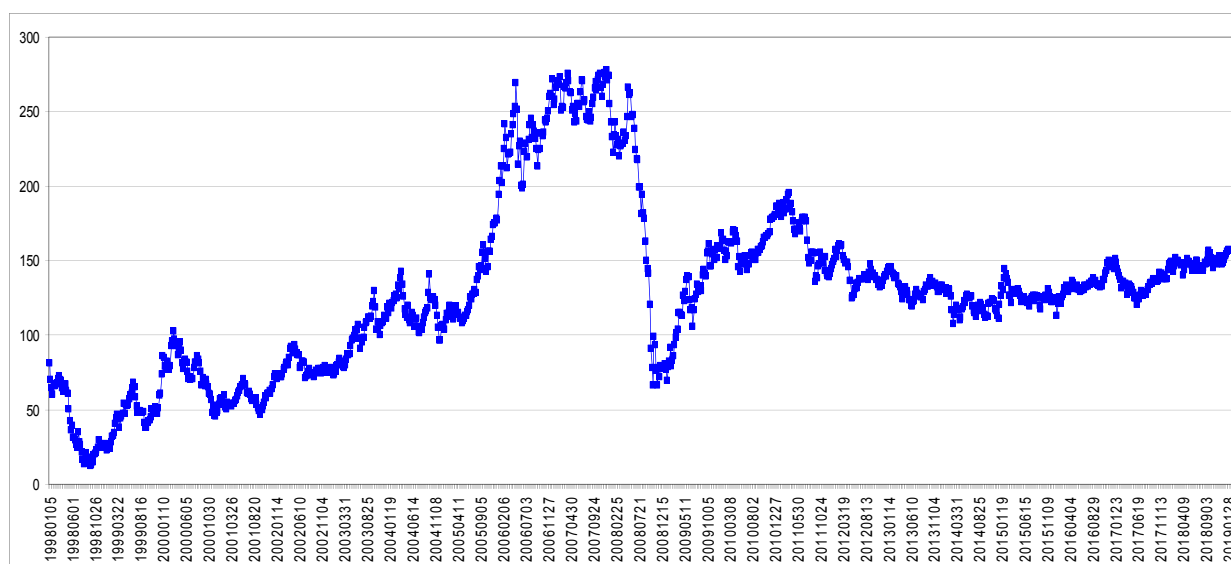
Fig. 1. **IMOEX index dynamics in the period from 1998 to 2019**

Source: historical IMOEX values from www.finam.ru. URL: https://www.finam.ru/profile/mirovye-indeksy/micex/export/?market=6&em =13851&code=MICEX) (accessed on 05.07.2019).

the asset prices fall was 40%. For this fall were not an issue for banks, their capital should be at least 40% of the value of risk assets.

We suggest considering this value as the maximum value of capital adequacy necessary to completely cover possible losses in the Russian banking sector arising in a crisis. This is a rather large amount compared to current capital adequacy ratio N 1. However, the experience of 2008 shows that banks' capital is clearly not enough to cover losses incurred during crises. For example, in the 2008 crisis, the US Federal Reserve had to use mechanisms for long-term refinancing of banks. Refinancing was carried out by repurchasing distressed securities from banks. The repurchase conditions were that the money received by banks possessed the qualities of equity. Similar things were happening in the euro area. A program of short-term bank refinancing was activated there. The idea of the program was in repurchasing securities and it lasted for 1.5 years. After this period, the repurchased securities from the ECB balance sheet disappeared and were not returned to the banks.

The Bank of Russia had to introduce additional measures to maintain the stability of the banking sector during the 2008 crisis. This

is evidenced by the adoption of Federal Law No. 173-FZ of October 13, 2008 "On Additional Measures to Support the Financial System of the Russian Federation". This Law provided for deposit opening by the Central Bank of the Russian Federation in VEB.RF, for a total amount of up to $ 50 billion for one year allowing for the term prolongation, as well as employment of the funds of the National Welfare Fund for a total of up to 410 billion rubles. Deposits were opened so that VEB.RF were able to provide subordinated loans to Russian banks in the future. The law also provided for the Central Bank of the Russian Federation to submit unsecured subordinated loans (deposits, loans, bonded loans) to Sberbank of Russia for a total amount of 500 billion rubles for the period up to and including December 31, 2019. At the same time, the Central Bank of the Russian Federation obtained the right to compensate part of the losses (expenses) to credit organizations for transactions with other credit organizations with the revoked banking licenses. It is important that the funds allocated to support the banking sector were intended mainly for the largest banks and related organizations, for example, OAO "Agency for Housing Mortgage Lending".

Shaping macroprudential policy goals to achieve stability in the banking sector

When shaping macroprudential policy goals, we assume that the strategic goal of this policy is to achieve the maximum stability in the banking system by the end of a given time period, and the current goals are the stepwise achievement of the strategic goal. When determining the time period to achieve the strategic goal, it is necessary to abide by the gap between the strategic goal and the achieved capital adequacy of banks. The larger this gap is the longer the time period should be. Abidance by these terms will allow banks to increase their own funds in accordance with the tactical (established for the year) goals without undue effort.

Currently, the general capital requirements to banks include regulatory requirements in the form of ratios: ratio of own funds (capital) — N 1.0., common equity Tier I capital ratio — N 1.1., capital adequacy ratio — N 1.2., leverage ratio — N 1.4., as well as capital premiums. Capital premiums include conservation and countercyclical capital buffers, as well as a premium for the systemic importance of banks. At the same time, compliance with the minimum allowable numerical value of premiums is ensured by Tier I capital sources exceeding the amount required to comply with bank capital adequacy requirements. The nature of capital premiums sources and the quality of Tier I capital sources determine applicability of N 1.1. ratio for shaping strategic goals on the financial stability in the banking sector.

The strategic goal for the Russian banking sector will be to increase Common Equity Tier 1 Capital of banks to 40% of risk-weighted assets. Considering the level of capital adequacy reached by this sector as of December 1, 2018 in the amount of 8.5%[8], we can calculate Tier 1 Capital gain necessary to achieve the strategic goal. It will be 31.5%. Based on this, a ten-year period will be the real time for the Russian

banking sector to reach stability. This will require a year-on-year increase in Tier 1 Capital of banks by approximately 3.0 percentage points. Knowing that the target values of Common Equity Tier 1 Capital of Russian banks will be introduced from January 1, 2020, the real time for the Russian banking sector to reach stability will be the end of 2030.

Given the current regulatory requirements, it's most likely that the strategic and current goals of macroprudential policy will not coincide with the level of capital adequacy formed by banks. In this regard, there is a need for an additional regulatory requirement to achieve the targets on time. This means that along with target indicator N 1.1. and the targets for existing capital premiums, targets for an additional regulatory requirement must be set as an additional capital buffer.

While setting target values, it is important to provide for a transitional period when banks can prepare for the new regulatory requirement. A lower level of the target values should be established for the additional capital buffer during this transition period. In particular, for the Russian banking sector, the target level of the general capital buffer as of 01.01.2020 should be set at the level of minimum values — 3.5%. This level will include achieving the targets for the value of: the conservation capital buffer — 2.5%, the buffer for the systemic importance of banks — 1.0%, the countercyclical buffer — 0.0% and the additional buffer — 0.0%.

Development of a new regulatory instrument that ensures delivering macroeconomic policy goals

Achieving macroprudential policy goals will largely depend on the introduction of a new regulatory instrument, an additional capital buffer. Let us call it a reserve capital buffer.

Essentially, the reserve capital buffer will be similar to the conservation capital buffer, since it aims at absorbing losses. However, this capital buffer will differ from the conservation capital buffer in a dynamic and adaptive manner as its size will be determined by the differential between the target and the achieved capital

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[8] Overview of the banking sector of the Russian Federation, January 2019 URL: http://cbr.ru/Collection/Collection/File/19986/razv_bs_19_05.pdf (accessed on: 15.07.2019).

adequacy levels, both at the level of individual banks and the entire banking sector.

Considering the maximum capital adequacy required to completely cover potential losses caused by systemic risks, financial stability achieved by banks stepwise and the capital buffers already formed by banks, we offer the following algorithm to calculate the total and the reserve capital buffers for banks and the banking sector as a whole:

$$Xoi = Xzi - Xni, \quad (1)$$

where: Xoi — target total capital buffer of the bank(s) in the i-th year;

Xzi — target level of capital adequacy of the bank(s) in the i-th year;

Xni — regulatory level of capital adequacy of the bank(s) in the i-th year.

In this case, Xoi will consist of the following elements:

$$Xoi = Zi + Ki + Si + Ri, \quad (2)$$

where: Zi — target conservation capital buffer of the bank(s) capital in the i-th year;

Ki — target countercyclical capital buffer of the bank(s) in the i-th year;

Si — target premium to capital for the systemic importance of the bank(s) in the i-th year;

Ri — target reserve capital buffer of the bank(s) in the i-th year.

From equation (2) we can find Ri:

$$Ri = Xoi - (Zi + Ki + Si). \quad (3)$$

Given that in the reporting period banks can form capital buffers above standard values on a voluntary basis, the target reserve capital buffer of the bank(s) will include the following elements:

$$Ri = Rsi + Rdi, \quad (4)$$

where: Rsi — generated reserve capital buffer of the bank(s) at the beginning of the i-year;

Rdi — additional reserve capital buffer to be generated in the i-year.

Equation (4) can be used to find Rdi:

$$Rdi = Ri - Rsi. \quad (5)$$

Rdi definition is important in the strategic management of banks, since it forms the minimum margin of the return on their risk-weighted assets.

The calculation algorithm shows that the reserve capital buffer is not only an instrument for regulating the stability of banks and the banking sector, but also an instrument for strategic management of financial stability. In this regard, we believe that the reserve capital buffer should not only be regulatory, but should also be used to assess the quality of risk management and affect the remuneration to the owners and heads of banks.

Empirical analysis of the opportunities and consequences of applying a new regulatory tool

We examined the possibilities and consequences of applying the reserve capital buffer on the example of the Russian banking sector. We calculated the target level of the total and reserve capital buffers of banks in the i-th year based on the following assumptions:

• introducing requirements for the total capital buffer from January 1, 2020;

• establishing minimum requirements for the total capital buffer as of January 1, 2020 at a minimum level of 3.5% of risk-weighted assets;

• using of a three year transition period;

• achieving stability in the banking sector by the end of 2030.

Table 1 and *Fig. 2* present the calculation results of the target values of Tier I capital adequacy in the Russian banking sector.

As shown in *Table 1,* at the beginning of 2019, the Russian banking sector managed to form N 1.1. capital adequacy level in the amount of 8.5%. This was facilitated by introducing requirements for the conservation capital buffer in the amount of 1.875% and capital allowances for the systemic importance of banks in the amount of 0.625%, as well as the expected increase in these capital

Target capital adequacy of Russian banks (2020–2030)

Date	Capital adequacy (*Xzi*)	Total capital buffer (*Xoi*)						
		Including						
		Total	Protective (*Zi*)	Counter-cyclical (*Ki*)	For systemic importance (*Si*)	Reserve (*Ri*)		
						Total	ncluding	
							Formed (*Rsi*)	Additional (*Rdi*)
01.01.2019*	8.5**	–	1.875	0	0.625	6.0	6.0	–
01.01.2020	8.0	3.5	2.5	0	1.0	0.0	5.0	0.0
01.01.2021	10.0	5.5	2.5	0	1.0	2.0	5.0	0.0
01.01.2022	13.0	8.5	2.5	0	1.0	5.0	5.0	0.0
01.01.2023	16.0	11.5	2.5	0	1.0	8.0	5.0	3.0
01.01.2024	19.0	14.5	2.5	0	1.0	11.0	8.0	3.0
01.01.2025	22.0	17.5	2.5	0	1.0	14.0	11.0	3.0
01.01.2026	25.0	20.5	2.5	0	1.0	17.0	14.0	3.0
01.01.2027	28.0	23.5	2.5	0	1.0	20.0	17.0	3.0
01.01.2028	31.0	26.5	2.5	0	1.0	23.0	20.0	3.0
01.01.2029	34.0	29.5	2.5	0	1.0	26.0	23.0	3.0
01.01.2030	37.0	32.5	2.5	0	1.0	29.0	26.0	3.0
01.01.2031	40.0	35.5	2.5	0	1.0	32.0	29.0	3.0

Source: compiled by the author.

Note: * – the achieved level is shown on 01.01.2019, the planned values are for the subsequent dates;
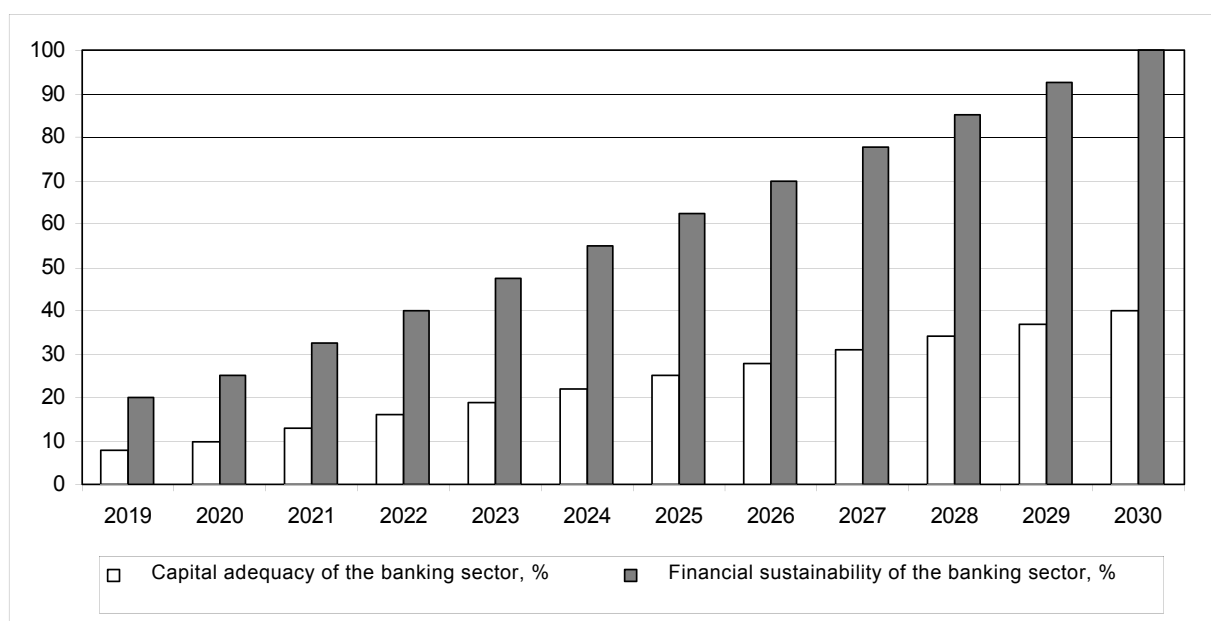
** – on 01.12.2018.

Fig. 2. **Capital adequacy and sustainability of the Russian banking sector**

Source: compiled by the author.

allowances as of January 1, 2020 to 2.5% and 1.0% respectively. *Table 1* also shows that the increase in the target values of the total capital buffer by 3.0 percentage points will start in 2022. This will lead to increasing requirements for the reserve capital buffer by a similar amount starting from January 1, 2023.

The maximum value of the year-on-year increase in the reserve capital buffer at the end of the transition period will be 3.0 percentage points. Achieving this indicator will require banks to maintain a return on risk-weighted assets not less than 3.0%. At the end of 2018, the return on risk-weighted assets in the banking sector amounted to 2.5%; and systemically important banks to 2.8%.[9] Therefore, we can expect that achieving a 3.0% return level by banks is possible.

We investigated the opportunities and consequences of applying the new regulatory instrument in relation to some banks on the example of Russian systemically important banks (*Table 2*). The analysis was carried out in the transition period, the most difficult time in introducing additional regulatory requirements.

Table 2 shows that during the transition period, a total capital buffer as an additional reserve capital buffer as of 01.01.2020 will only be required by VTB (0.2%), and as of 01.01.2021 by VTB (2.0%), Russian Agricultural Bank (0, 5%), Gazprombank (1.8%), Credit Bank of Moscow (1.8%), Raiffeisenbank (0.2%) and Rosbank (1.2%). Considering the return level of these banks in 2018, we expect that only Russian Agricultural Bank, Gazprombank and Credit Bank of Moscow may have some difficulties in meeting the requirement to create the reserve capital buffer. These banks will have to improve the efficiency of their activities to increase the return on of risk-weighted assets.

CONCLUSIONS

The idea of this work was to develop analytical tools to shape quantitative goals of macro-

prudential policy and ensure their achievement based on streamlining the capital requirements of banks.

We suggested considering the achievement of stability in the banking sector by the end of a given period as a strategic goal of macroprudential policy. We linked the stability in the banking sector with its ability to completely cover losses caused by a crisis, and the value of these losses — with the impairment of assets. Adjusted for inflation and calculated on national stock exchanges, stock indexes were offered as an indicator of impairment of assets.

We proposed introducing a new regulatory instrument — the reserve capital buffer — to achieve the strategic goal of complete stability in the banking sector. Essentially, the reserve capital buffer will be similar to the conservation capital buffer, since it aims at absorbing losses. However, this capital buffer will differ from the conservation capital buffer in a dynamic and adaptive manner as its size will be determined by the differential between the target and the achieved capital adequacy levels, both at the level of individual banks and the entire banking sector. Due to its specifics, that the reserve capital buffer is not only an instrument for regulating the stability of banks and the banking sector, but also an instrument for strategic management of financial stability. In this regard, we believe that the reserve capital buffer should not only be regulatory, but should also be used to assess the quality of risk management and affect the remuneration to the owners and heads of banks.

An empirical analysis of the opportunities and consequences of applying the developed analytical tools was carried out on the example of the Russian banking sector. For Russia, we chose the IMOEX index as the stock index. An analysis of the dynamics of this index showed that for the Russian banking sector, the total loss is 40% of risk-weighted assets. We used this criterion to shape quantitative goals of macroprudential policy implying a smooth transition from the achieved level of financial stability to complete stability in the banking sector. The studies have shown that

[9] Profit-to-Risk Ratios for Credit Institutions. URL: http://banki.iee.unn.ru/ (accessed on: 02.07.2019).

Table 2

Target values of total and reserve capital buffers for systemically important banks

Date	Total capital buffer (Xoi)							Reference: Profitability in 2018**
	Total	Including						
		Protective (Zi)	Counter-cyclical (Ki)	For systemic importance (Si)	reserve (Ri)			
					Total	Formed * (Rsi)	Additional (Rdi)	
Sberbank 01.01.2020 01.01.2021	3.5 5.5	2.5 2.5	0.0 0.0	1.0 1.0	0.0 2.0	3.1 3.1	0.0 0.0	3.86
ВТБ / VTB 01.01.2020 01.01.2021	3.5 5.5	2.5 2.5	0.0 0.0	1.0 1.0	0.0 2.0	0.0 0.0	0.2 2.0	2.31
Russian Agricultural Bank 01.01.2020 01.01.2021	3.5 5.5	2.5 2.5	0.0 0.0	1.0 1.0	0.0 2.0	1.5 1.5	0.0 0.5	0.21
Gazprombank 01.01.2020 01.01.2021	3.5 5.5	2.5 2.5	0.0 0.0	1.0 1.0	0.0 2.0	0.2 0.2	0.0 1.8	0.51
Otkritie Bank 01.01.2020 01.01.2021	3.5 5.5	2.5 2.5	0.0 0.0	1.0 1.0	0.0 2.0	8.2 8.2	0.0 0.0	0.18
Alfa Bank 01.01.2020 01.01.2021	3.5 5.5	2.5 2.5	0.0 0.0	1.0 1.0	0.0 2.0	3.5 3.5	0.0 0.0	4.75
Credit Bank of Moscow 01.01.2020 01.01.2021	3.5 5.5	2.5 2.5	0.0 0.0	1.0 1.0	0.0 2.0	0.2 0.2	0.0 1.8	1.21
Promsvyazbank 01.01.2020 01.01.2021	3.5 5.5	2.5 2.5	0.0 0.0	1.0 1.0	0.0 2.0	6.1 6.1	0.0 0.0	5.69
Raiffeisenbank 01.01.2020 01.01.2021	3.5 5.5	2.5 2.5	0.0 0.0	1.0 1.0	0.0 2.0	1.8 1.8	0.0 0.2	3.06
UniCredit Bank 01.01.2020 01.01.2021	3.5 5.5	2.5 2.5	0.0 0.0	1.0 1.0	0.0 2.0	4.6 4.6	0.0 0.0	2.06
Rosbank 01.01.2020 01.01.2021	3.5 5.5	2.5 2.5	0.0 0.0	1.0 1.0	0.0 2.0	0.8 0.8	0.0 1.2	1.42

Source: Profit-to-risk ratio for credit institutions. URL: http://banki.iee.unn.ru/ (accessed on 02.07.2019).

Note: * – according to the financial statements of credit institutions. URL: http://cbr.ru/credit/main.asp (accessed on 07.02.2019);

** – indicates the profitability of risk-weighted assets.

complete financial stability in the banking sector can be achieved by the Russian Federation by the end of 2030 without undue effort of its institutional units. In general, the empirical studies carried out in relation to the Russian banking sector proved the feasibility of applying the developed analytical tools to increase the effectiveness of macroprudential policy in the Russian Federation.

At the same time, we should noted that the study is based on the IMOEX index allowing to estimate the value of impairment of assets during crises. Applying other indicators in further research on this topic may clarify our results. The proposed analytical toolkit for shaping quantitative goals of macroprudential policy and streamlining of capital requirements for banks can be the subject of further research in terms of its adaptation to the banking systems of different countries. Summarizing these research results will help to formulate general standards and requirements for the bank regulation at the level of national jurisdictions and thereby contribute to the further improvement of Basel III standards.

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