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Interest Rates on Short- and Long-term Loans: Factors Affecting Their Formation and the Relevance of Regulatory Measures

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ABSTRACT

The aim of the article is to study the factors that influence the bank short-term and long-term interest rates. **The relevance:** in modern conditions the interest rate policy is considered not only as a way to ensure bank efficiency and financial stability, but also as a tool to stimulate economic activity. **The purpose** of the study is to identify the factors that determine the short-term and long-term interest rates and, on this basis, to determine economic and/or regulatory measures to improve the bank interest rate policy for the purposes of national economy. **The scientific novelty** includes the identification of the factors that determine the banking interest rate policy in the short-term and long-term aspects. **The research methodology** is based on statistical modeling using the vector autoregressive distributed lag model. The statistical database includes the Russian banking sector financial indicators and a significant range of macroeconomic variables. **Results.** The authors identified the factors of bank loans interest rates. The key parameters include macroeconomic variables: the money market interest rate and the structural liquidity deficit of the banking sector. The impact of macroeconomic parameters differs with respect to long-term and short-term rates, as nominal GDP is significant only for long-term interest rates. Loan portfolio quality indicators do not affect interest rates. Based on the study's findings, the authors proposed directions to develop the current banking regulation: to set regulatory alignment between the credit risk premium and the loan loss reserve requirement; to limit the corporate floating rates lending; to introduce an additional credit instrument of the Bank of Russia – a secured loan to systemically important banks for a one year.

Keywords: bank; interest rates; short-term and long-term interest rates; pricing factors

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INTRODUCTION

Banks' interest rate policies play an important role in stimulating the economy and are a key source of risk management and efficiency for credit institutions. In recent years, several macroeconomic factors, the complexity of banking operations, competition, and the evolution of banking regulations have led to a reduction in the interest margins of credit institutions, which is a direct reflection of the efficacy of banks' interest rates policies. This process is shown in *Fig. 1*.

We emphasize the significance of the interest margin in determining the financial performance of credit institutions, which underscores the importance of banks' interest policies. *Fig. 2* demonstrates the trend in the proportion of the interest margin's contribution to banks' gross revenue: in recent years, this percentage has significantly increased, exceeding 50%.

Thus, on the one hand, the formation of an interest rate policy by banks that ensures a sufficient level of interest margin and, consequently, business profitability, is a key condition for the effectiveness of their operations and financial stability. This was confirmed by a study conducted on the largest Russian banking groups, which are leaders in the banking sector. The results showed that interest margin plays a significant role in the financial stability of banks [1]. On the other hand, the interest rate channel, which relates to the impact of interest rates on consumption, investment, and saving decisions, is a crucial transmission mechanism in the Russian economy.¹ Changes in the key interest rate indirectly influence the cost of borrowing for borrowers and the attractiveness of depositing for lenders through money market rates and bond yields. In today's economic climate, the government and central bank are more concerned than ever about ensuring that banks' interest rates align with their monetary and

economic policies. Banks' interest rates on loans must simultaneously transmit the signals of monetary policy to the economy without hindering the growth of priority sectors.

In this context, it would be beneficial to consider whether additional economic or regulatory measures could be taken by the Bank of Russia to influence bank interest rates and ensure that they support the goals of monetary and economic stability.

The object of the research is to investigate the interest policy of banks and the factors that influence interest rates for short- and long-term loans.

The aim of our research is to identify the factors that affect the level of interest rates on bank loans in Russia, and to suggest economic and/or regulatory measures that could be taken to influence these rates in the interest of the national economy. The relevance of this study lies in the fact that pricing factors of bank loans in the modern Russian economy have not been thoroughly explored, despite a significant number of studies dedicated to the formation of value for other financial instruments [2–7]. To achieve the goal of this research, we aim to accomplish the following scientific objectives: systematize and analyze scientific literature, which will form the basis for generating research hypotheses; verify these hypotheses through economic and mathematical modeling; and develop measures to stimulate bank interest rates in line with the needs of the national economy.

LITERATURE REVIEW AND FORMULATION OF THE RESEARCH HYPOTHESIS

The issue of setting interest rates for loans has been well-researched in Russian and international academic literature. Generally, the development of pricing theory has taken place against the backdrop of two approaches to setting prices:

a) centralized, when production and distribution costs are considered along with other, mainly political and social factors;

¹ The main directions of the unified state monetary policy for 2025 and the period 2026 and 2027. p. 89. URL: [https://cbr.ru/Content/Document/File/164702/on_2025\(2026–2027\).pdf](https://cbr.ru/Content/Document/File/164702/on_2025(2026–2027).pdf) (accessed on 10.09.2024).

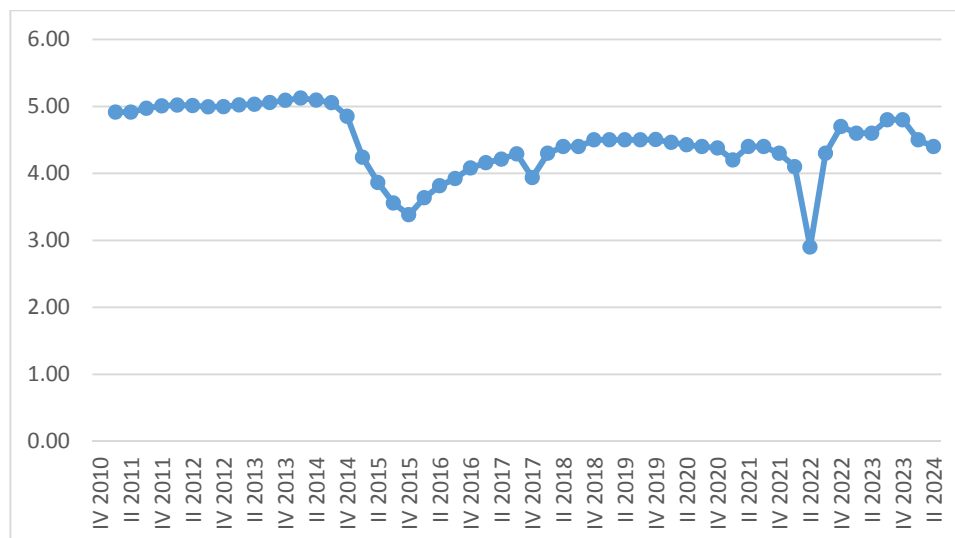


Fig. 1. Quarterly Dynamics of the Interest Margin in the Banking Sector (Excluding Distressed Assets)

Source: Compiled by the authors according to the data of the Bank of Russia. URL: <https://cbr.ru> (accessed on 10.09.2024).

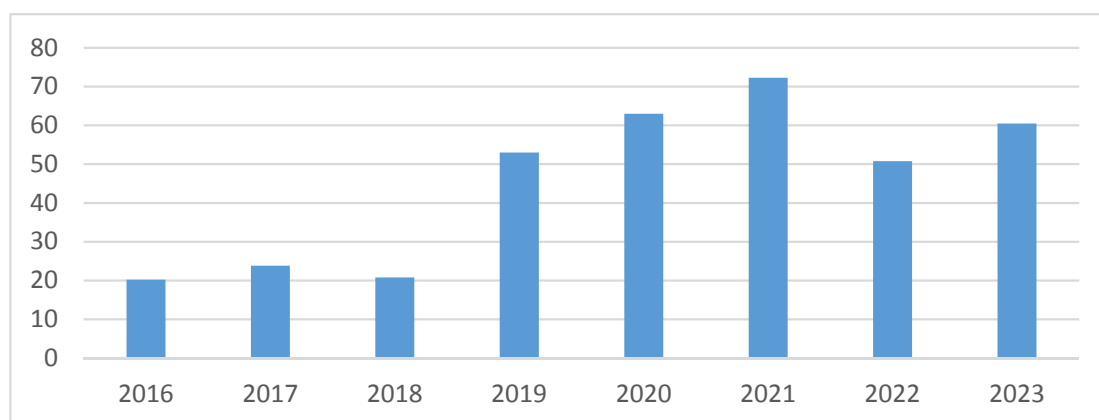


Fig. 2. The Dynamics of the Ratio Between Interest Margin and Gross Income for Russian Banks

Source: Compiled by the authors according to the data of the Bank of Russia. URL: <https://data.imf.org/?sk=51B096FA-2CD2-40C2-8D09-0699CC1764DA> (accessed on 10.09.2024).

b) based on the relationship between the actual demand for and supply of a given product, its price is set according to its position in the market.² This approach is also used when determining bank interest rates.

In a planned economy, and consequently, with a centralized management of credit relations, the level of interest rates and their differentiation were determined solely by the subjective objectives of the state's monetary policy.

Within the framework of a market economy, bank interest rates on active operations are

determined by the market level of loan interest and a variety of factors. These factors include, among others, the cost of resources, other operating expenses, compensation for risk, and profit margins. Additionally, discounts and premiums are taken into account, depending on the competitive position of the bank.

Sometimes, the pricing of loans is based on a so-called "prime rate" and additional risk premiums. This rate is used as a benchmark for determining the interest rate on loans.

Among the most well-known authors who have studied this issue are P.S. Rose [8], Y.F. Brigham and M.S. Erhardt [9], N. Baxter, G. Panova, and V. Platonov [10]. An interesting

² Chudakov A.D. Prices and pricing: A textbook for universities. Moscow: Publishing House of the Russian Orthodox Church; 2002:4–5 (In Russ.).

perspective is provided by the American economist D. Sincy [11], who argued that the market bank interest rate takes into account the following factors: the reward for foregoing consumption, the inflation premium, the default risk premium, and the interest rate risk. Subsequent works on the topic of banking risk management have developed more complex, multi-factor models for pricing credit products [12]. The interest rate is determined by the cost of borrowing funds, taking into account the expenses related to the bank's active operations, a risk premium for potential losses, and a premium that reflects the bank's cost of capital. For example, the works of E.A. Mamiy and A.I. Bocharova [13] argue for the last thesis. If a bank implements a transfer pricing system (TPS), interest rates are based on transfer prices that include operating costs, a risk premium, and a commercial price premium. This topic is well-represented in foreign scientific studies, which consider various aspects of how the transfer interest rate is formed [14–17]. Russian authors' works are mostly about the organizational aspects of implementing the TPS in commercial banks [18–20].

I.F. Yelfimova offers a different approach to pricing bank credit products, which depends on the optimal deposit rate [21].

An interesting method has been proposed by S.V. Murzaev. He suggests determining interest rates on both attracted and placed funds by solving a linear programming optimization problem. The objective function in this problem is to maximize the amount of placed funds, subject to a set of constraints. One of these constraints is the specified interest margin [22].

In addition to the studies mentioned above, which focused on the formation of bank interest rates at the micro level, there has also been significant scientific research conducted on the modeling of interest rates at the macro level and their impact on the economy. For example, A. Porshakova and A. Sinyakova studied the factors that determine the equilibrium interest rate [23], N.P. Pilnik and S.A. Rodionov predicted interest rates based on scenarios developed by the authors [24], D.A. Krepzev and

S.M. Seleznev examined the impact of money market interest rates on the bank interest rate for non-financial organizations [25], and O.N. Afanasyeva analyzed the influence of the Bank of Russia's key interest rate on bank interest rates for loans [26]. An important area of research has also been the study of the impact of interest rates on the formation of demand for credit [27], economic growth, and innovation processes [28–30].

In modern scientific publications by foreign authors, the topic of interest rate formation on bank loans is presented in a much more comprehensive manner. For instance, the results of a study conducted by B.N. Ashraf and Y. Shen [31] suggest that the uncertainty in the government's economic policies is an essential risk factor for the pricing of bank loans, as interest rates tend to increase due to an increased risk of default by borrowers. T.C. Nguyen, T.H. Thuy [32] showed that geopolitical risk is associated with higher loan prices and stricter non-price lending conditions. Based on their modeling, T.C. Nguyen and T.T. Ho argue that the liberalization of lending regulations, on the contrary, reduces the cost of bank loans [33]. In the work of I. Drumond and J. Jorge, it is presented how the impact of the BCBS capital requirements on the bank interest rates on loans depends on the market structure of the banking industry. The authors showed [34] that in oligopolistic markets, interest rates increase when implementing capital requirements for risk coverage, while in competitive markets, this does not happen. In the article by W. Chen et al. [35], a significant decrease in the prices of bank loans was proven due to the regional level of financial technology development. Other pricing factors identified by foreign researchers include the liquidity of loans (availability of a secondary market) [36], the growth of local government debt, which increases the price of bank loans [37], and the availability of information and past banking experience in lending to similar competing enterprises [38].

In a market economy, the interest rate policy of banks is influenced by commercial

interests and government policies. There are several basic theoretical models that can be used to determine bank interest rates, but they all have some common features. As banking management and information technology continue to evolve, these models will continue to change and adapt. A common approach to determining the interest rate for a loan is to combine individual components. The origin of methodological approaches depends on the content of these components and how they are combined. It is widely acknowledged that the pricing of credit products should consider macroeconomic factors and the risks assumed by banks. The above information allows us to develop the following hypotheses for this research:

Hypothesis 1: The main factors that influence the level of interest rates on bank loans are macroeconomic indicators such as GDP, oil price fluctuations, money market interest rates, and exchange rates.

Hypothesis 2: Credit risk is a major factor that influences the level of interest rates for bank loans.

Hypothesis 3: The level of interest rates in banks is determined by various parameters that reflect the stability of the banking industry, such as the adequacy of capital, liquidity of assets, and the level of liquidity deficit within the sector.

Additionally, the size of the interest margin also plays a role in determining interest rates.

Hypothesis 4: In addition to objective variables that characterize macroeconomic parameters and indicators of the banking sector, the level of interest rates on loans is also influenced by evaluative and emotional factors, such as the level of trust in banks, changes in the terms of bank lending, and demand for loans.

The hypotheses in this study were examined in relation to interest rates on short- and long-term loans in the Russian banking sector. This is a novel aspect, as there have been no similar studies focused on the Russian market. The work of A. Porshakov and A. Sinyakov is worth mentioning, as they studied the factors that

determine the equilibrium interest rate in both the short and long term. This is an “integral part” of all modern macroeconomic models that are used for monetary policy decisions [23].

RESEARCH METHODOLOGY

The present study was conducted in several stages.

The first stage involved the study of Russian and foreign scientific literature and the formulation of research hypotheses.

The second stage involved the preparation and analysis of statistical data, as well as their evaluation and modeling. This statistical database includes financial indicators that characterize the Russian banking sector³ and a wide range of macroeconomic variables. These variables also include indicators that describe the conditions of bank lending to various categories of borrowers, which are published by the Bank of Russia. The source of information for calculating the indices is the Bank of Russia’s quarterly survey of credit institutions, which is conducted through questionnaires.⁴ The indices of Russian citizens’ trust in banks are based on the NAFI⁵ survey. The analysis period covers 2014–2021, and the data is presented on a quarterly basis. *Appendices A and B* provide statistical information used in the modeling process.

In accordance with the formulated hypothesis, the modeled (explained) variables in this work are the quarterly levels of interest rates on short-term (up to one year) and long-term (more than one year) loans in the Russian banking system during the period from the first quarter of 2014 to the fourth quarter of 2021. The interest rate level for short-term loans in the period $t = (\text{year}, \text{quarter})$ is denoted below by the symbol $Y1_t$, and for long-term loans by $Y2_t$. *Fig. 3* shows a graph of the dynamics of the variables $Y1_t$ and $Y2_t$.

³ URL: https://cbr.ru/banking_sector/statistics (accessed on 10.09.2024).

⁴ URL: https://cbr.ru/statistics/dkp/bank_lending_terms (accessed on 10.09.2024).

⁵ URL: <https://nafi.ru/projects/finansy/nps-2023-loyalnost-polzovateley-roznicnykh-bankovskikh-uslug> (accessed on 10.09.2024).

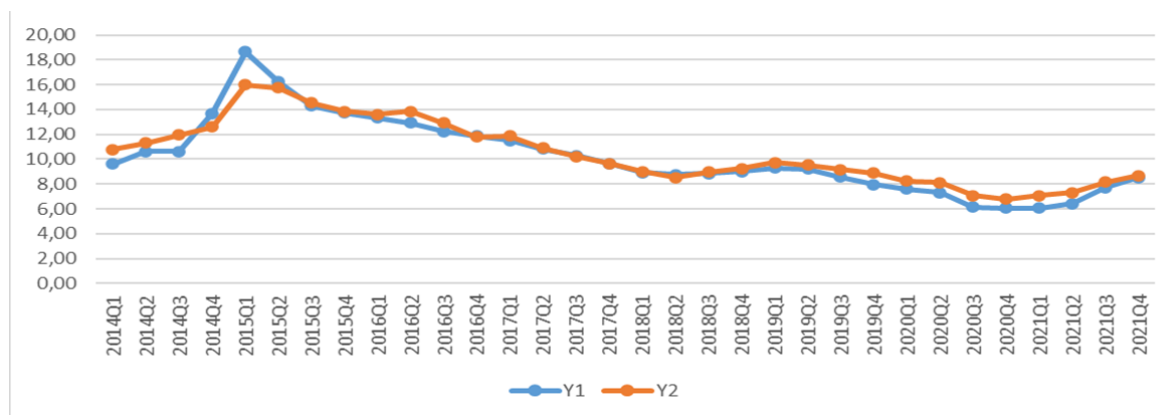


Fig. 3. The Dynamics of Interest Rates for Short-term Y1 and Long-term Y2 Loans in the Russian Federation

Source: Compiled by the authors according to the data of the Bank of Russia. URL: https://cbr.ru/banking_sector/statistics/ (accessed on 10.09.2024).

The following factors are a priori accepted as variables explaining the values of $Y1_t$ and $Y2_t$:

1. $PD_t = x_{1,t}$ — share of overdue loans from non-financial organizations (in shares);
2. $PPLL_t = x_{2,t}$ — level of reserves for possible losses on loans in the Russian banking sector (in shares);
3. $CA_t = x_{3,t}$ — capital adequacy ratio (%);
4. $CSA_t = x_{4,t}$ — the ratio of cash and securities to total assets (in shares);
5. $NIM_t = x_{5,t}$ — net interest margin (%);
6. $MPR_t = x_{6,t}$ — rate of lending (depositing) in the Moscow money market (Mosprime Rate, %);
7. $IMOEX_t = x_{7,t}$ — Moscow Interbank Currency Exchange Rate Index (MICEX) (after multiplying by 0.001);
8. $LSD_t = x_{8,t}$ — structural deficit (+) / surplus (-) of liquidity of the banking sector (in trillion rubles);
9. $ER_t = x_{9,t}$ — direct exchange rate of the national currency (the price of the US dollar in rubles);
10. $Oil_t = x_{10,t}$ — Brent crude oil price (in dollars per barrel);
11. $LTB_t = x_{11,t}$ — bank confidence index;
12. $GDPS_t = x_{12,t}$ — nominal quarterly GDP of Russia after seasonality is excluded (in trillion rubles);
13. $TBLS_t = x_{13,t}$ — index of bank lending conditions for short-term loans;
14. $TBLL_t = x_{14,t}$ — index of bank lending conditions for long-term loans;

15. $CDLS_t = x_{15,t}$ — the level of demand for short-term loans;

16. $CDLL_t = x_{16,t}$ — the level of demand for long-term loans.

In the corresponding model equations (see below (1.1)), the set of explanatory variables includes both the lagged levels of the factors listed above $x_{j,t-1}$ and the lagged levels $Y1_{t-1}$ and $Y2_{t-1}$ of the explanatory variables $Y1_t$ and $Y2_t$. This technique ensures that both equations of model (1.1) are not spurious regressions, and therefore least-squares estimation of model (1.1) will lead to benign estimates of its parameters [39]. In addition, the set of explanatory variables will include dummy variables $SanY1_t$ and $SanY2_t$, which reflect the impact of Western sanctions on the explanatory variables $SanY1_t$ and $SanY2_t$. Indeed, the impact on $Y1_t$ and $Y2_t$ is clearly visible in the graphs: a sharp increase in the values of these variables in 2014 (the year of the sanctions) to their absolute highs in the first quarter of 2015, followed by a long period of decline in the values of $Y1_t$ and $Y2_t$ as the Russian banking system adapts to the sanctions. The method of determining the values of the variables $SanY1_t$ and $SanY2_t$ is presented in the paper.⁶

To explain the values of the variables $Y1_t$ and $Y2_t$, we adopt the vector autoregressive distributed lag model (commonly abbreviated

⁶ Byvshev V.A. Modeling the adaptation of the national economy to the sanctions of Western countries. A textbook. Moscow: Prometheus;2023:77. (In Russ.).

as $VarX(p, q)$ [40]. There are several reasons for this, one of which is the non-stationarity of both the time series $Y1_t$ и $Y2_t$, and many of the time series of factors $x_{j,t}$. Below is the specification of the (1.1) $VarX(1,1)$ model for interest rates $Y1_t$ и $Y2_t$:

$$\left\{ \begin{array}{l} Y1_t = a_0 + a_1 \cdot Y1_{t-1} + a_2 \cdot Y2_t + a_3 \cdot Y2_{t-1} + a_4 \cdot SanY1_t + \sum_{j=1}^{16} \alpha_j \cdot x_{j,t} + \\ \quad + \sum_{j=1}^{16} \delta_j \cdot x_{j,t-1} + u_{1,t}; \\ Y2_t = b_0 + b_1 \cdot Y2_{t-1} + b_2 \cdot Y1_t + b_3 \cdot Y1_{t-1} + b_4 \cdot SanY2_t + \sum_{j=1}^{16} \beta_j \cdot x_{j,t} + \\ \quad + \sum_{j=1}^{16} \gamma_j \cdot x_{j,t-1} + u_{2,t}. \end{array} \right. \quad (1.1)$$

$t - 1 \in [Q1\ 2014 - Q3\ 2021]$

$t \in [Q2\ 2014 - Q4\ 2021]$

The symbols $u_{1,t}$ and $u_{2,t}$ denote random perturbations, these are the parts, respectively, of the variables $Y1_t$ and $Y2_t$, which are generated unaccounted for in the model (1.1) factors. The coefficients a_j , b_j , α_j , δ_j , β_j , γ_j measure the private influence of the explanatory variables on the explained variables Yi_t .

We emphasize that the coefficients a_4 and b_4 with dummy variables $SanY1_t$ and $SanY2_t$ have a different meaning: a_4 — is increasing $Y1_t$ on the time interval [Q3 2014 — Q1 2015] the start of the sanctions; b_4 — increase of $Y2_t$ for temporary period Q3 2014 — Q1 2015 the start of the sanctions.

In addition, we note that the right-hand side of the first equation of the model (1.1) with the explanatory variable $Y1_t$ includes the current variable $Y2_t$, which is the explanatory variable in the second equation of the model (1.1). This allows us to check whether the current value of $Y2_t$ affects the interest rate on short-term loans $Y1_t$. The situation is similar in the second equation of the model (1.1).

The third stage involved drawing conclusions based on the findings of the statistical analysis.

RESULTS AND DISCUSSION

Next, the estimated model (1.1) is presented, in which only the significant explanatory variables are retained, (2.1) is the estimation of the first equation, and (2.2) is the estimation of the second equation of the model (1.1), with the standard errors of the coefficient estimates in parentheses. It should be noted that the models (2.1) and (2.2) successfully passed all the standard diagnostic procedures.

$$\begin{aligned} \widetilde{Y1}_t = & 2,6 + 0,86 \cdot MPR_t - 0,21 \cdot IMOEX_{t-1} + 0,19 \cdot LSD_t + 16 \cdot SanY1_t \\ & (0,2)(0,02) \quad (0,05) \quad (0,01) \quad (3) \\ & R^2 = 0,999. \end{aligned} \quad (2.1)$$

$$\begin{aligned} \widetilde{Y2}_t = & 0,47 \cdot Y2_{t-1} + 0,42 \cdot MPR_t + 0,14 \cdot LSD_t + 0,032 \cdot ER_t + 0,012 \cdot Oil_t - 0,046 \cdot GDPS_t + 9 \cdot SanY2_t \\ & (0,03) \quad (0,03) \quad (0,03) \quad (0,009) \quad (0,004) \quad (0,024) \quad (2) \\ & R^2 = 0,999. \end{aligned}$$

Based on the results of the model (2.1), the following conclusions can be drawn.

1. Not all explanatory variables from specification (1.1) turned out to be significant for explaining the interest rate values for short-term loans $Y1_t$, in particular: capital adequacy of the banking sector (CA_t), index of confidence in banks (LTB_t), index of bank lending conditions

for short-term loans ($TBLS_t$), demand for short-term loans ($CDLS_t$).

2. The main factor influencing the level of interest rates on short-term loans ($Y1_t$) from banks is the level of money market rates: for example, the Mosprime Rate (MPR_t) has a positive effect – an increase of MPR_t by 1 percentage point leads to an expected increase of $Y1_t$ by about 0.86 percentage points. Another factor influencing the level of interest rates with direct. The effect is a structural shortage of liquidity in the banking sector. Indeed, an increase in the liquidity deficit by one trillion rubles causes an increase in short-term loan rates by about 0.19 percentage points. On the contrary, the index of the Moscow Interbank Currency Exchange has the opposite effect on short-term interest rates: if the index decreases by a thousand units, then interest rates fall by about 0.21 percentage points.

Analyzing equation (2.2), we can draw the following conclusions.

1. Also, as in the first case, not all explanatory variables from the specification (1.1) turned out to be significant for explaining the interest rate values on long-term loans $Y2_t$.

2. As in the first case, the main factor influencing the level of interest rates on long-term loans ($Y2_t$) from banks is the Mosprime Rate (MPR_t): an increase of MPR_t by 1 percentage point leads to an expected increase of $Y2_t$ by about 0.42 percentage points. The second most important factor with a direct effect is the structural liquidity deficit of the banking sector: an increase in the liquidity deficit one trillion rubles causes an increase in long-term interest rates by about 0.14 percentage points. Other factors of changes in the interest rate on long-term loans ($Y2_t$) are (if other parameters remain unchanged) changes in the exchange rate (ERT) and the price of Brent crude oil (Oil_t) the influence of these factors is direct. The current level of nominal GDP ($GDPS_t$), on the contrary, has the opposite effect on long-term interest rates: with Russia's quarterly GDP growing by one trillion rubles, interest rates decrease by about 0.5 percentage points.

3. The interest rate $Y2_{t-1}$ on long-term loans in the previous period has a positive effect on the current interest rate $Y2_t$. Specifically, an increase of $Y2_{t-1}$ by 1 percentage point (pp) increases, all other things being equal, the value $Y2_t$ by 0.47 pp. This indicates that the interest rate policy on long-term loans is sufficiently consistent.

Variables $SanY1_t$ and $SanY2_t$ reflecting the impact on the explained variables $Y1_t$ and $Y2_t$ sanctions of Western countries, in both cases showed a significant impact.

Finally, let's interpret the value of the coefficient of determination $R^2 = 0,999$. The value 0.999 means that in the models (2.1 and 2.2), the explanatory variables account for almost 99.9% of the values $Y1_t$ and $Y2_t$. So the real models match reality very well. Let's add that the standard error of approximation for the first equation (2.1) is 0.11%, for the second equation (2.2) the standard error of approximation is 0.21%.

Appendix A provides statistical information on the basis of which the model (2.1) was obtained. The last column of this table contains the forecast values $\hat{Y}1_t$ calculated using the model (2.1). *Appendix B* contains similar statistical information for Model 2.2.

CONCLUSIONS AND PROPOSALS

According to the results of the study, Hypothesis 1 was fully confirmed. Macroeconomic variables, such as the level of money market rates and the structural liquidity deficit in the banking sector, have a significant impact on the level of interest rates for both short- and long-term bank loans. However, their influence is not identical. The current level of nominal GDP ($GDPS_t$), for example, has an impact on long-term interest rates but not on short-term rates.

The results of the simulation did not support Hypothesis 2. The proportion of overdue loans and the reserves formed by banks to cover potential losses did not act as factors influencing interest rates for short- or long-term loans.

This implies the need to strengthen the relationship between loan risk, the amount of interest (which takes risk into account), and reserves for covering losses in lending.

Hypothesis 3 is supported by the results of the study to some extent. One of the factors that influences the rates on both short- and long-term loans is the structural shortage of liquidity in the banking sector, as confirmed by the findings.

Hypothesis 4 was not confirmed by the simulation results. The parameters considered in the study, which represent the level of customer confidence in the bank and the bankers' assessment of changes in bank lending conditions and the demand for loans for short- and long-term loans, did not have an impact on the level of bank interest rates. Therefore, it can be concluded that these psychological factors do not influence the pricing of loans.

In conditions of high interest rates, the issue of banks' interest rate policy becomes especially significant. At the same time, we agree with V.E. Dementiev's argument that efforts to stimulate economic growth solely through lowering interest rates will not be successful without the development of innovation, which requires a flexible combination of industrial policies with measures such as selective credit and fiscal policy [30].

Based on the results of our economic and mathematical modeling, and within the context of our study's objectives, we believe it is appropriate to implement several regulatory measures.

1. At the regulatory level, it seems relevant to establish a relationship between the estimated level of risk on loans, the interest rate amount (which takes into account risk), and reserves to cover losses in bank lending. Indeed, banks are currently assessing the risk of a loan, however, the results of the simulation did not show a relationship between the level of interest rates and the magnitude of the estimated credit risk and the size of reserves formed. This fact should be considered by the Bank of Russia when developing approaches to the creation of reserves to cover losses on short-term and

long-term bank loans. Specifically, it is necessary to establish a regulatory correlation between the interest rate margin to cover credit risk and the amount of loan reserves.

2. The next step in regulatory development is the elimination of capital requirements for banks for loans under targeted government programs.⁷ Currently, this approach is partially used in stimulating regulation related to priority areas of state policy in the Russian Federation, such as investment activities aimed at achieving technological sovereignty and economic structural adaptation. According to our estimates, this will allow banks to save capital and reduce interest rates on loans by 150–200 basis points, while preventing an increase in credit risk. This practice will only apply to loans of quality categories 1 and 2 according to the Bank of Russia's methodology (Regulation 590-P).

3. The simulation results show that the level of bank interest rates is greatly influenced by the size of the money market interest rate. Therefore, we believe it is important to pay attention to the volume of loans with floating interest rates provided by banks to borrowers (51% of loans to legal entities and individual entrepreneurs have floating rates).⁸ An increase in the market interest rate automatically leads to a change in the interest rate on a loan, and the new rate may not meet the conditions of a feasibility study for issuing a loan. To minimize the interest rate risk on its balance sheet, a bank shifts the risk of rising interest rates to its borrowers by offering floating interest rates. This can lead to an increase in loan defaults, as the borrower's ability to repay the loan may be affected by changes in interest rates. Therefore, it is difficult to agree with the positive assessment of the current practice of using floating interest rates [41], as it can have negative consequences for borrowers and financial stability. We also note that professional financial risk management is primarily the

⁷ URL: <https://programs.economy.gov.ru/programs> (accessed on 10.09.2024).

⁸ URL: https://cbr.ru/vfs/statistics/BankSector/Loans_to_corporations/02_03_Debt_structure_by_benchmark_interest_rate_type.xlsx (accessed on 10.09.2024).

responsibility of credit institutions. Under these circumstances, it seems appropriate at the legislative level to ban the provision of loans to individual borrowers with floating interest rates, and to significantly limit this practice for non-financial organizations by either introducing a standard (the percentage of loans to non-financial organizations with floating rates) or making it mandatory to set a maximum interest rate in the contract.

As an additional guideline for increasing the predictability of banks' interest rate policies, we recommend that the Bank of Russia introduce an additional long-term secured loan instrument for systemically important credit institutions with a minimum term of one year and a disclosed interest rate. We believe this instrument could become a new significant indicator of the central bank's monetary policy in addition to its key interest rate.

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Statistical Information for the Model (2.1)

t	$Y1_t$	MPR	IMOEX.1	LSD	$SanY1_t$	$Y1_t$ forecasts
2014Q2	10.60	8.31	1.423	4.707	0.009	10.52
2014Q3	10.62	8.26	1.405	5.267	0.017	10.72
2014Q4	13.69	11.40	1.397	5.846	0.032	13.79
2015Q1	18.64	16.13	1.473	7.454	0.062	18.62
2015Q2	16.23	13.41	1.678	7.025	0.056	16.06
2015Q3	14.29	11.40	1.651	6.415	0.050	14.13
2015Q4	13.71	11.54	1.682	5.065	0.045	13.91
2016Q1	13.34	11.16	1.748	4.271	0.041	13.34
2016Q2	12.92	10.98	1.832	3.042	0.036	12.87
2016Q3	12.23	10.51	1.914	2.149	0.033	12.21
2016Q4	11.87	10.37	1.965	1.806	0.030	11.96
2017Q1	11.50	10.28	2.109	1.259	0.027	11.70
2017Q2	10.81	9.47	2.083	0.647	0.024	10.85
2017Q3	10.29	8.89	1.932	0.626	0.022	10.34
2017Q4	9.64	8.26	2.006	0.589	0.019	9.74
2018Q1	8.91	7.46	2.092	-0.498	0.017	8.79
2018Q2	8.74	7.28	2.286	-0.108	0.016	8.64
2018Q3	8.82	7.36	2.302	0.294	0.014	8.76
2018Q4	8.99	7.64	2.381	1.064	0.013	9.11
2019Q1	9.29	7.84	2.372	0.732	0.011	9.20
2019Q2	9.19	7.84	2.501	1.172	0.000	9.07
2019Q3	8.57	7.34	2.664	1.032	0.000	8.58
2019Q4	7.96	6.61	2.742	0.724	0.000	7.88
2020Q1	7.60	6.18	2.958	0.819	0.000	7.49
2020Q2	7.29	5.66	2.790	1.860	0.000	7.27
2020Q3	6.15	4.37	2.710	1.224	0.000	6.05

t	$Y1_t$	MPR	IMOEX.1	LSD	$SanY1_t$	$Y1_t$ forecasts
2020Q4	6.07	4.37	2.928	2.007	0.000	6.15
2021Q1	6.04	4.41	3.029	2.197	0.000	6.20
2021Q2	6.41	5.00	3.388	1.180	0.000	6.45
2021Q3	7.73	6.46	3.702	1.295	0.000	7.66
2021Q4	8.53	7.53	3.931	1.723	0.000	8.62

Source: Compiled by the authors according to the data of the Bank of Russia, Moscow Exchange, analytical agencies. URL: https://cbr.ru/banking_sector/statistics/; <https://www.moex.com/ru/indices>; <https://finance.yahoo.com> (accessed on 10.09.2024).

Statistical Information for the Model (2.2)

t	$Y2_t$	$Y2_{t-1}$	MPR_t	LSD_t	ER_t	$Oilt$	$GDPS_t$	$SanY2_t$	Forecasts $Y2_t$
2014Q2	11.29	10.78	8.31	4.707	35.57	109.99	19.430	0.0750	11.40
2014Q3	11.93	11.29	8.26	5.267	35.06	101.29	19.928	0.0900	11.68
2014Q4	12.58	11.93	11.40	5.846	41.64	71.11	20.166	0.0600	12.93
2015Q1	15.97	12.58	16.13	7.454	61.81	56.31	20.359	0.0752	16.00
2015Q2	15.72	15.97	13.41	7.025	54.68	65.31	20.550	-0.0075	15.54
2015Q3	14.55	15.72	11.40	6.415	59.02	51.58	20.894	0.0008	14.53
2015Q4	13.84	14.55	11.54	5.065	65.02	43.67	20.997	-0.0001	13.93
2016Q1	13.59	13.84	11.16	4.271	74.99	36.77	21.083	0.0000	13.56
2016Q2	13.84	13.59	10.98	3.042	67.65	49.16	21.246	0.0750	13.77
2016Q3	12.90	13.84	10.51	2.149	64.83	46.19	21.705	0.0000	12.76
2016Q4	11.81	12.90	10.37	1.806	63.83	51.63	22.035	-0.0150	12.10
2017Q1	11.86	11.81	10.28	1.259	60.09	54.70	22.363	0.0000	11.51
2017Q2	10.89	11.86	9.47	0.647	57.13	49.99	22.702	0.0000	10.95
2017Q3	10.20	10.89	8.89	0.626	59.06	54.19	23.313	0.0000	10.34
2017Q4	9.66	10.20	8.26	0.589	58.13	63.85	23.887	0.0000	9.81
2018Q1	9.02	9.66	7.46	-0.498	57.29	68.37	24.620	0.0000	9.07
2018Q2	8.52	9.02	7.28	-0.108	60.02	77.22	25.395	-0.0020	8.89

Appendix B (continued)

t	$Y2_t$	$Y2_{t-1}$	MPR_t	LSD_t	ER_t	$Oilt$	$GDPS_t$	$SanY2_t$	Forecasts $Y2_t$
2018Q3	8.97	8.52	7.36	0.294	63.90	78.11	26.260	0.0000	8.86
2018Q4	9.26	8.97	7.64	1.064	66.63	62.15	26.703	0.0000	9.16
2019Q1	9.72	9.26	7.84	0.732	66.55	65.44	26.999	0.0000	9.36
2019Q2	9.55	9.72	7.84	1.172	64.84	67.95	27.183	0.0000	9.60
2019Q3	9.16	9.55	7.34	1.032	64.33	61.62	27.399	0.0000	9.19
2019Q4	8.86	9.16	6.61	0.724	64.40	62.89	27.150	0.0000	8.70
2020Q1	8.22	8.86	6.18	0.819	62.91	45.01	26.782	0.0000	8.14
2020Q2	8.13	8.22	5.66	1.860	73.66	33.92	26.755	0.0000	7.97
2020Q3	7.07	8.13	4.37	1.224	71.43	43.12	27.588	0.0000	7.31
2020Q4	6.80	7.07	4.37	2.007	76.74	45.46	28.895	0.0000	7.06
2021Q1	7.06	6.80	4.41	2.197	74.31	61.85	30.652	0.0000	7.02
2021Q2	7.30	7.06	5.00	1.180	74.85	70.67	32.637	0.0000	7.29
2021Q3	8.14	7.30	6.46	1.295	73.36	75.95	34.825	0.0000	7.94
2021Q4	8.69	8.14	7.53	1.723	72.36	78.05	36.341	0.0000	8.76

Source: Compiled by the authors according to the data of the Bank of Russia, Moscow Exchange, analytical agencies. URL: https://cbr.ru/banking_sector/statistics/; <https://www.moex.com/ru/indices>; <https://finance.yahoo.com> (accessed on 10.09.2024).