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Measurement of auxiliary indicators of aggregate interest rates on loans to non-financial organisations

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Abstract

Currently newly issued loans with fixed rates, excluding loans to affiliates, are used to calculate Russian loan aggregates of interest rates on loans to non-financial organisations, which is generally in line with international practice. The structure of loans is evolving over times, the share of loans with floating interest rates is increasing. Data on the volumes and rates of such loans can be valuable for analysing and forecasting economic trends. This paper looks at approaches to calculating weighted average interest rates on loans to Russian companies with the division of loans for analytical purposes into separate lending segments: by rate type (fixed and floating), affiliation type, and the time of rate-setting relative to the moment of disbursement of funds. We assess the amplitude of variation between the rates calculated using different approaches. The use of a wider range of aggregates can be used for analytical and research purposes to assess changes in certain types of interest rates, as well as to clarify the effect of the interest rate channel of the monetary policy transmission mechanism.

Keywords: loan rates, non-financial organisations, floating rate, prolongations, quarterly projection model, error correction model

JEL codes: E43, E44, G21.

1. Introduction

Russian statistics employ a specific methodology[1] to calculate weighted average rates for loans to non-financial organisations, which is generally in line with international practice. Specifically, calculations use newly issued fixed-rate loans excluding those to affiliates of credit institutions. This paper explores possible approaches to calculating a wider range of weighted average rates indicators, assessing the range of variations between rates derived by different methods. This is important in the context of studying the transmission mechanism of monetary policy, when assessing the impact of changes in the key rate on the rates on corporate loans and further on inflation. The use of a wide range of indicators for research purposes can improve the understanding of the transmission mechanism.

Statistics on weighted average interest rates on loans to non-financial organisations cover a specific type of loans.

The Bank of Russia calculates the weighted average rate indicator to monitor changes in the credit market. Thus, excluding transactions with affiliates, which are likely to be non-market, is justified. Within the framework of this paper we measure the share of such loans and rates thereon, in a case of significant changes in these indicators the relation between this type of loan and financial stability may become more pronounced. Therefore, if a portion of the loan flow is non-market, it is crucial for risks monitoring purposes to measure its existing conditions.

In addition to the above factors (rate type, affiliation type), it is also vital for research to determine when the loan rate was agreed upon – whether under current economic conditions or long before the reporting period. The current aggregates of interest rates consider all newly issued loans. However, it may take some time between the date when the loan agreement was signed up until the date of actual funds' disbursement.

We analyse interest rates on corporate loans as follows:

- Fixed-rate loans and floating-rate loans.
- Loans to affiliates and loans to non-affiliates.
- New and old loans. For the purposes of this study we notionally categorise loans as new or old based on the time elapsed from the date when the loan agreement was signed up until the date when the loan was actually disbursed.

For this research we source the data from bank Reporting Form 0409303 starting from 2019.

Our findings indicate that the difference between the current aggregates and an additionally calculated wide range of interest rates can be as much as 2-3 percentage points (pp). This rate difference varies depending on the maturity of the loans and the period measured.

Information on the effects of rate type, affiliation, and timing of rate-setting, they have on rate level, may allow us to clarify the impact of monetary policy on the economy. To

[1] Summary Methodology Tables on Data on Extended Loans and Deposits of Individuals and Nonfinancial Organizations in Rubles, in US Dollars and in Euros, available at URL: http://www.cbr.ru/Content/Document/File/135989/meth_rates_e.pdf

verify this, we demonstrate how using additional indicators affect forecasting outcomes in the quarterly projection model (QPM) and alter assessments of the interest rate channel of the monetary policy. Using a simplified QPM, we demonstrate that output forecasts can vary by up to 0.6 pp while the inflation forecast remains the same. Estimation of the interest rate channel using the error correction model shows that sensitivity to loan interest rates may be higher than with existing aggregates.

The paper is structured as follows. Literature review at the beginning of the work is followed by data and methodology. A comparison between current aggregates and a wider range of additionally calculated indicators is conducted. Then we demonstrate practical applicability of using additional indicators based on quarterly projection model and assessing the monetary policy interest rate channel. Discussion of findings is followed by summarised conclusions.

2. Literature review

This section covers two subjects. First, the paper reviews how different types of loans are perceived in the literature, and whether they have different effects on the rate level and economic processes. The use of data on different types of loans underpins additional measures of interest rates. A review of the related literature will highlight the benefits of analysing a wide range of measures of interest rates on loans.

Second, we look at how different countries calculate existing interest rate aggregates on loans to non-financial organisations. We demonstrate that some countries calculate several interest rate indicators, using approaches which are different across countries. All these considerations compliment indirectly to the idea of usefulness of analysing a wide range of credit interest rate indicators.

2.1. The role of the interest rates in economic analysis

This subsection explores when and why considering loan structures and different types of loan rates may become beneficial.

First, we examine how loans are categorised by rate type: fixed-rate versus floating-rate loans. For fixed-rate loans, the interest rate is set for the duration of the loan; for floating-rate loans, it adjusts according to a linked benchmark (e.g. key rate or money market rate).

In rising interest rate environments, borrowers benefit from fixed-rate loans while banks gain from floating-rate loans. An increase in floating-rate loans shifts interest rate risks from lenders to borrowers (LaDue & Leatham, 1984). A firm's choice between fixed or floating rates may stem from hedging motives or future interest rate expectations (Chava & Purnanandam, 2007). In case of a positive correlation between operating cash flow before interest expenses and interest rates, it is advisable for companies to opt for floating-rate borrowings. This approach helps stabilise profit fluctuations – higher cash flows lead to higher interest payments; lower flows result in lower payments. However, according to empirical research of Chava & Purnanandam (2007), a strong correlation between cash flow and interest rates is rare among companies. Expectations about future interest rates also affect the choice between fixed or floating rates. If declining interest rates are anticipated, it is advantageous for companies to increase their proportion of floating-rate debt.

Chava & Purnanandam (2007) also demonstrate that the ratio of floating to fixed rate debt is influenced by the risk appetite of a company's chief financial officer, based on the data from the United States for years 1996-2000. Companies with financial managers more inclined to take risks tend to have a higher proportion of floating interest rates. It is implied that a manager's risk appetite is linked to whether they receive company stock or stock options as compensation. If the manager prioritises price stability, the company will adopt a less risky financial strategy and favour fixed-rate borrowing; otherwise, if options are available, the manager is more inclined to make risky decisions.

Now we look at the ratio of fixed to floating rate loans across various countries. Researchers at the Bank for International Settlements study how the loan structure has evolved over time.

Ampudia et al. (2023) analyse the balance sheets of companies during periods when foreign countries tightened monetary policy during the global financial crisis and between 2021-2023. From the early 2000s to the early 2020s, there was an increase in the share of long-term loans and fixed-rate loans. Companies benefited from a period of low interest rates and extensive economic support measures during the pandemic, which helped them better manage the beginning of monetary tightening.

Banerjee et al. (2023) observe that despite rising interest rates in recent years in foreign countries, floating rate loans continue to represent a significant portion of corporate liabilities. Only 30% of companies with debt in the UK and the US have exclusively fixed-rate debt, while countries in the euro area this figure averages below 10%. In Italy, for instance, over 60% of companies have more than half of their debt at floating rates. Banerjee et al. (2023) investigate the prevalence of floating rate loans and the hedging practices of firms in European countries during 2021-2022. Based on linguistic analysis of financial statements, it is concluded that approximately 50% of companies hedge their risks associated with floating rate debt. Hedging helps mitigate the reduction in both the interest coverage ratio and market capitalisation amid rising interest rates.

Therefore, floating-rate loans may be appealing to both banks and borrowers. As loan patterns evolve over time, tracking floating-rate loans can offer additional insights into the credit market.

The next focus of the paper involves loans to affiliates. Affiliates are individuals and legal entities capable of influencing the activities of legal entities and (or) individuals engaged in entrepreneurial activities (according to Law of the RSFSR No. 948-1, dated 22 March 1991). Due to their relationship with the bank, affiliated borrowers are likely to receive more favourable loan terms compared to other borrowers. This could subsequently influence how swiftly monetary policy measures impact the economy.

Looking at the Russian data for 2004 – 2015, Borzykh (2016) finds that while large non-state banks' loan volumes reacted to monetary policy measures, the response from medium and small banks was statistically insignificant. As possible explanation for this finding can be the fact that, for medium and small banks, the nature of their relationship with borrowers (which may be closely intertwined with specific companies) could be more influential than economic interest rates in shaping their loan portfolios. A similar effect is studied by Gambacorta (2001), based on the Italian data for 1986 – 1998, and Vonnák (2007), discussing the monetary transmission mechanism in Hungary.

The relationship between lender and borrower can result from long-term interactions or affiliation. When a bank has known the borrower for a long time, information asymmetry decreases; all else being equal, this reduced uncertainty about the borrower's quality can lead to lower interest rates for reliable borrowers. Lending to such borrowers is referred to as "relationship lending".

Berger & Udell (1995), Brick & Palia (2007), and Bharath et al. (2011) note that borrowers receive lower interest rates from banks where they have longstanding lending relationships. The presence of a relationship between lender and borrower can lead to less significant increases in interest rates during monetary tightening and a less volatile response in output to monetary shocks (Hachem, 2011). Banerjee et al. (2021) demonstrate that following the bankruptcy of Lehman Brothers, Italian banks offered more favourable lending terms to companies with which they had longer-standing credit relationships. However, after the European debt crisis (after 2011), which significantly affected Italy, offering lower rates to such borrowers became less common.

When lender and borrower are affiliated, specific agreements may be reached that result in different interest rate policies for affiliates compared to other borrowers.[2] This can affect the way monetary policy measures influence economic processes.

The third focus of the weighted average rate methodology is the moment of rate-setting, and whether the rate reflects the current economic conditions or it was set well before disbursement. Since it is challenging to ascertain this, the literature lacks studies specifically addressing this subject. Nevertheless, researchers explore a closely related issue – the use lines of credit.

Lines of credit serve as options within the lending sector (Acharya et al., 2023). They grant companies the right to secure funding in the future. The initial loan agreement may specify terms that borrowers can utilise later on. These refer to both loan amounts and interest rates.

International studies highlight an increasing trend in the share of loans issued as credit lines by banks (Acharya et al., 2023). Russia has a high percentage of lines of credit in total funding, too.

The widespread use of lines of credit also impacts the effectiveness of monetary policy transmission mechanisms. During monetary tightening, while the growth rate of traditional loan issuances may decrease, that of loans issued via lines of credit might remain stable or even increase (Morgan, 1998), potentially explaining why loan rates exhibit a weaker response to tighter monetary conditions (Bernanke, 1990).

Therefore, the fact that the use of lines of credit impacts the economic sensitivity to monetary policy indicates that, for analytical purposes, it may be useful to distinguish between loans with interest rates set in current economic conditions and those negotiated well before disbursement.

[2] In interbank lending, affiliates may receive larger loans with smaller credit spreads. Busch et al. (2022) observe that the European Central Bank's reduction in deposit facility rates in 2019 immediately affected affiliate rates, whereas other interbank lending rates remained unaffected by this cut.
Bagattini et al. (2023) explore interactions between banks and their affiliated financial institutions, such as mutual funds. Affiliates may be less affected by past poor financial performances because banks can provide liquidity support by purchasing shares from funds experiencing massive flights of capital.

Finally, at the end of this subsection below, we also note whether there is a correlation between loans to affiliates, floating rate loans, and the utilisation of lines of credit. Based on surveys conducted among small and medium-sized businesses in the USA from 1983 to 1998, Vickery (2008) demonstrates that the number of years the borrower has been with the bank, as an indicator of lender-borrower interdependence, does not influence the likelihood of choosing a fixed-rate loan. Moreover, the share of fixed-rate loans was the smallest among the loans, issued as lines of credit. Based on the Spanish data spanning 1993-2005, Jiménez et al. (2009) discover that as relationships between the bank and the borrower extend, firms increasingly avoid using lines of credit. This is due to the bank's lending limits for highly dependent borrowers.

2.2. Calculation of interest rates across countries

This subsection explores existing approaches to presenting information about the calculation of aggregates of various indicators of weighted average interest rates on loans to non-financial organisations. To this end, we refer to the experience of various foreign countries and look at the approaches to calculating interest rates in Russia.

Guidelines for calculation of rates by the national banks of the euro area are detailed in the MFI Manual on interest rate statistics (ECB, 2017). National banks may provide data for the entire set of observations or a representative sample that includes major credit institutions. The Manual (ECB, 2017) indicates that the sample of the EU countries comprises 30% of credit institutions, covering approximately 85% of all issued loans.

The European Central Bank Statistical Data Portal[3] publishes rates for the entire loan portfolio, newly issued loans, renegotiated loans, and newly issued loans excluding renegotiated ones ("pure new loans"). New loans are categorised by the amount of loan granted (up to EUR 0.25 million, over EUR 0.25 and up to EUR 1 million, and over EUR 1 million), whether they include/exclude collateral or a guarantee, and by the initial rate fixation period (up to 3 months, from 3 months and up to 1 year, up to 1 year, over 1 year, over 1 year and up to 3 years, over 3 years and up to 5 years, over 5 years, over 5 years and up to 10 years, over 10 years, up to 1 year initial fixation period but with an original maturity of over 1 year).

We focus specifically on the breakdown by initial rate fixation period (IRF). This indicator was introduced to clearly define the type of rate. A contentious issue in determining the type of rate (fixed or floating) arises when a loan is issued at a rate fixed for a specific period but may be adjusted before the loan is fully repaid. Consequently, the category "floating rate with an initial fixation period" is used, specifying the fixation period. Loans with a floating rate fall into the category "floating rate with up to 3 months (or up to 1 year) initial rate fixation". The overall maturity of the loan is not considered at all.

The US Federal Reserve conducts surveys to collect data on corporate lending rates. Until 2017, data from the Survey of Terms of Business Lending[4] (TBL survey) was published; currently, two surveys are conducted: the Small Business Lending Survey (quantitative assessments for companies with revenues under $5 million) and the

[3] MIR - MFI Interest Rate Statistics available at URL: https://data.ecb.europa.eu/data/datasets/MIR/data-information

[4] Available at URL:
https://www.federalreserve.gov/apps/reportingforms/Download/DownloadAttachment?guid=17f06900-60f8-4e39-9fec-598d1ac8a08c
https://www.federalreserve.gov/releases/e2/201703/default.htm

Senior Loan Officer Opinion Survey on Bank Lending Practices (qualitative assessments for the 8 largest US banks and 24 branches of foreign banks). The TBL survey data is segmented by "maturity/rate revision", i.e. the period from contract date to rate revision or loan repayment; floating rate loans are marked with zero. Data is also segmented by risk category, debt volume, and bank type (domestic (large/small)/foreign).

The Bank of England[5] publishes weighted average lending rates for private non-financial corporations categorised by fixed and floating rates across the entire loan portfolio and for new loans issued. *The Bank of Japan*[6] publishes rates for short-term and long-term loans segmented by bank type (city, regional, Shinkin).[7] *The Bank of Canada*[8] provides weighted average rates across the loan portfolio and for new loans, segmented by their association with non-residential mortgages.

The National Bank of the Republic of Belarus[9] reports weighted average rates by currency for all loans and for newly issued ones. Rates are also calculated excluding preferential loans. *The National Bank of Kazakhstan*[10] publishes weighted average interest rates for new loans, broken down by maturity and currency. *The Central Bank of Brazil*[11] publishes rates covering both fixed and floating rate loans; it also includes loans denominated in foreign currencies. A separate rate applies to loans under special regulation by the National Monetary Council, typically in housing, agriculture, and infrastructure sectors, where maximum possible rates are capped.

Thus, many countries compute rates both for the entire loan portfolio and for newly issued loans. There is a breakdown by rate type, maturity, and currency; additionally, special provisions may apply to loans for small and medium-sized enterprises and preferential loans.

The Bank of Russia employs advanced practices in calculating weighted average interest rates indicators and offers some of the most detailed data available. The Bank of Russia publishes lending interest rates by maturity, currency, and for small and medium-sized enterprises. The sample used to calculate weighted average rates includes loans from non-financial organisations excluding interest-free fund placement operations, transactions providing funds to affiliates, and loans issued at floating rates that vary based on external price indicators. Loans offered at non-market interest rates, and those where both rates and volumes are deemed untypical, are also excluded from the calculation. Further details on methodology can be found in Methodological comments to the tables of the section Interest rates on loans and deposits and structure of loans and deposits by maturity, available on the Bank of Russia's website.[12]

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[5] Effective interest rates available at URL: https://www.bankofengland.co.uk/statistics/visual-summaries/effective-interest-rates

[6] Average Contract Interest Rates on Loans and Discounts available at URL: https://www.boj.or.jp/en/statistics/dl/loan/yaku/index.htm

[7] City banks include five largest banks of Japan, while Shinkin banks are cooperative regional banks serving small and medium enterprises.

[8] Canadian interest rates and monetary policy variables: 10-year lookup available at URL: https://www.bankofcanada.ca/rates/interest-rates/canadian-interest-rates/

[9] Statistical Bulletin available at https://www.nbrb.by/publications/bulletin/stat_bulletin_2022_01.pdf

[10] Banking sector loans to the economy available at https://nationalbank.kz/file/download/88236

[11] Average interest rate of new credit operations available at https://www3.bcb.gov.br/sgspub/localizarseries/localizarSeries.do?method=prepararTelaLocalizarSeries

[12] available at URL: http://www.cbr.ru/Content/Document/File/135988/meth_rates.pdf

Dyachkov, Nurimanova (2017) consider selecting procedures for identifying untypical values.

To conclude the literature review, we note both the diversity of approaches used by regulators and researchers to calculate interest rates of corporate loans. This diversity is clearly visible in fixed and floating rate loans. UK counts rates for separate types of loans, Eurozone countries emphasise the notion of an *initial* rate fixing period and also present several measures of interest rates. Brazil includes both types of rates in a single aggregate, while many other countries do not count floating rate loans at all. At the same time, analysts and researchers are concerned about the changing structure of the credit flows and monitor (where possible) the dynamics of volumes and corresponding interest rates. The experience of other countries shows that the use of a wider range of interest rate indicators makes it possible to deepen the analysis of the market of corporate loans. In what follows we will build on these ideas using data on corporate loans (credit register) in Russia.

3. Data and methodology

This section outlines the data used to calculate additional indicators of interest rates on loans to non-financial organisations.

We source the analysis data from bank Reporting Form 0409303[13] from January 2019 through January 2024. The form was approved by Bank of Russia Ordinance No. 4927-U, dated October 8, 2018, 'On the List, Forms and Procedure for Compiling and Presenting Credit Institutions Reporting Forms to the Central Bank of the Russian Federation' (effective 1 January 2019). On 1 January 2024, the Bank of Russia Ordinance No. 6406-U, dated April 10, 2023, 'On the Forms, Deadlines, Procedure for Compiling and Presenting Credit Institutions (Banking Groups) Reporting Forms to the Central Bank of the Russian Federation, as well as a List of Information on the Activities of Credit Institutions (Banking Groups)' came into force.

Official statistical information on lending interest rate statistics is available on the Bank of Russia's website.[14]

This paper primarily focuses on calculating a wider range of interest rates indicators for loans to non-financial organisations. We analyse interest rates on corporate loans as follows:

- Fixed-rate loans and floating-rate loans.
  Bank Reporting Form 0409303 may list various interest rates such as fixed, floating, variable, or any combination thereof.[15] In this paper, loans with floating rates, as the first type of rate, are referred to as floating-rate loans (float). All

[13] These forms are also referred to as credit register data; however, they are distinct from data of credit history bureau. Refer for more information on the methodology and description to the Bank of Russia's website.
[14] Currently, this data set is published in the file 'Data on Loans to Nonfinancial orgnaizations in Rubles, US Dollars, Euros, and Yuan'.
[15] A fixed rate is set either for the entire loan duration or a specified period; the floating rate depends on a variable component (e.g. key rate), while changes in floating rates depend on specified contractual conditions (see Bank of Russia Ordinance No. 4927-U, dated October 8, 2018, and Bank of Russia Ordinance No. 6406-U, dated April 10, 2023).

other loans are categorised as fixed-rate loans (fix). This division aims to distinguish between loans included in the sample for calculating existing aggregates (fix) and those not included (float).

- Loans are differentiated between those granted to affiliates (aff) and non-affiliates (non-aff).
- New and old loans. Bank records do not specify whether the loan rate was set at the date when the loan agreement was signed up or upon fund disbursement. Therefore, we propose to make the following division.

  We define *new loans* as those loans, for which the time passed between the date when the loan agreement was signed up and disbursement date is below 31 days. In this instance, we can assert that the loan rate was set based on the economic conditions of the past month.

  Old loans are considered to be all other loans. With some probability, the loan rate is fixed at the time the contract is signed, in which case the rate is set based on the economic conditions prevailed when the contract was signed, not at the time the funds are disbursed. In this case, all loans with rates that may have been set well before the reporting period will be treated as old loans. However, the category of old loan will also include loans with rates determined based on the economic conditions of the last month, as sometimes rates are set just before funds are disbursed, not at the moment of signing the loan agreement.

More information on how criteria for distinguishing between old and new loans are chosen will be discussed in the subsection Old and new loans below.

Current aggregates are calculated based on fixed-rate loans, excluding loans to affiliates, without differentiating between old and new loans. All other features involved in calculating were also applied to the calculation of additional interest rates.

We graph the calculation of current aggregates and additional indicators and analyse the deviations in the weighted average rates. All metrics are calculated for two types of maturity. Short-term loans refer to those lasting up to one year, while long-term loans extend over one year. See further details in Appendix 1.

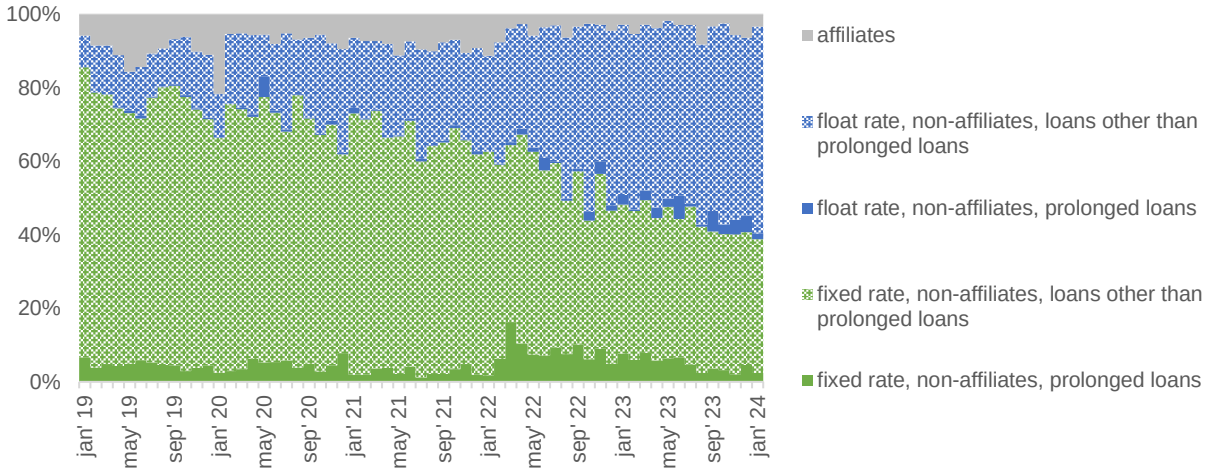
4. Approaches to measuring a broader range of interest rate indicators

4.1. Loan structure

To explore approaches to aggregates measurement, it is crucial to understand the structure of issued loans. This subsection examines how focused loan groups contribute to the total amount.

Chart 1 illustrates the loan structure, showing 100% coverage of loans with current aggregates before cut-off procedures (green areas), including floating rate loans and loans to affiliates. All other methodological details of existing aggregates were replicated for floating rate loans and loans to affiliates. See the structure of loans in ruble terms in Appendix 2.

Chart 1. Structure of issued loans



Note: 100% coverage of loans with current aggregates before cut-off procedures (green areas), including floating rate loans (blue areas) and loans to affiliates (grey area). Designations: (non-)aff - (non)affiliates, float - floating (non-fixed) rate, fixed - fixed rate.

The loan structure has evolved over time – the share of floating-rate loans increased from 10% to 58% over the past five years. A floating interest rate is linked to a variable component (typically the key rate), allowing the loan rate to change over time. Considering rates inclusive of floating-rate loans is essential to encompass a larger segment of the credit flow.

It is worthwhile to examine the reasons behind the growing share of floating-rate loans. Although identifying the cause-and-effect relationships is beyond the scope of this paper, we will mention a few factors that may have influenced such dynamics of the loan structure.

Choosing between fixed and floating rates is a matter of risk management. The maturity structure of the bank balance sheet is dominated by short-term liabilities and long-term assets. To hedge the interest rate risks associated with this balance sheet structure, banks utilise interest rate swaps with non-residents. Such swaps enable banks to pay a long-term fixed rate and to receive a floating rate. However, non-residents' exit from the Russian market in spring 2022 sharply curtailed banks' ability to hedge interest rates using interest rate swaps. At the same time, demand for receiving fixed interest rates has remained low in the domestic market (Bank of Russia, 2022, 2023b). In view of this, the level of risk-taking by banks is declining and they are increasingly shifting interest rate risks through floating-rate loans. Banks tend to offer floating-rate loans to large, stable businesses that are well aware of their interest rate risks (Bank of Russia, 2024a).

Another important aspect is the borrowers' ability to attract external sources of financing. In 2019–2021, companies obtained part of their financing through foreign loans and bonds. From 2022 onwards, external financing became scarce and the importance of credit from resident banks increased. Examining the profiles of borrowers and available sources of funding may be useful in discussing changes in the bank credit structure.

The choice between fixed and floating rates may also be related to borrowers' and lenders' expectations of a future interest rate path. If fixed rates properly reflect borrowers' expectations of interest rates, then borrowers will be insensitive to the type

of rate. If, however, borrowers and lenders have different expectations about future interest rates, then borrowers will switch between fixed-rate and floating-rate loans. For example, if borrowers expect lower interest rates than lenders, then floating-rate loans will be more beneficial to borrowers than fixed-rate loans. In this case, borrowers will prefer floating-rate loans.

In Chart 1, apart from breaking down loans by rate type, we also separately identify loans to affiliates, averaging 7%. While the proportion of loans to affiliates is decreasing, we measure their share and rates, as a significant changes in their share and rates can make the link between this type of loan and financial stability more pronounced.[16]

In analysing loan structures, we also focus on prolongations. The specifics of prolongations is discussed in the following subsection.

4.2. Prolongations

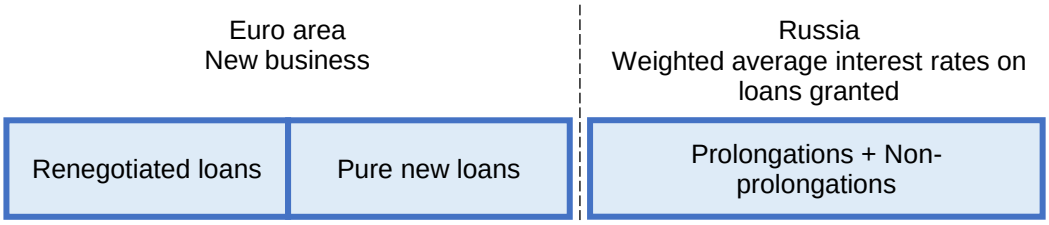
This section explores the role of prolonged loans in calculating interest rates for non-financial organisations, explaining why prolongations are considered and how they differ from other newly issued loans.

Prolongation means an extension of term of the agreement[17]. Prolonged loans will be below referred to as prolongations. Interest rates for extended loan agreements are treated as rates for newly issued loans in the month of extension Working capital loans have the major portion of prolongations, because companies probably need more time to bridge cash flow gaps and thus seek extensions from banks.

The practice of including prolongations in rate calculations is also prevalent globally. As previously mentioned, the EU countries categorise renegotiated loans separately from pure new loans (see Chart 2). Renegotiated loans include not only prolonged loans but also other loans with modified terms (e.g. the rate, amount, or maturity). Interest rates are calculated separately for renegotiated loans, separately for pure new loans, and collectively for both samples ("New business"). The purpose of division into two groups is to show not only the total funds provided in general but also the volume of funds generated in the current reporting period. Renegotiated loans make no new money arriving into the economy.

Note, Russian rate statistics include both prolongations and actual new issuances, whereas volume statistics do not account for prolongations (see Appendix 3).

Chart 2. Prolongations in Russia and renegotiated loans in the euro area

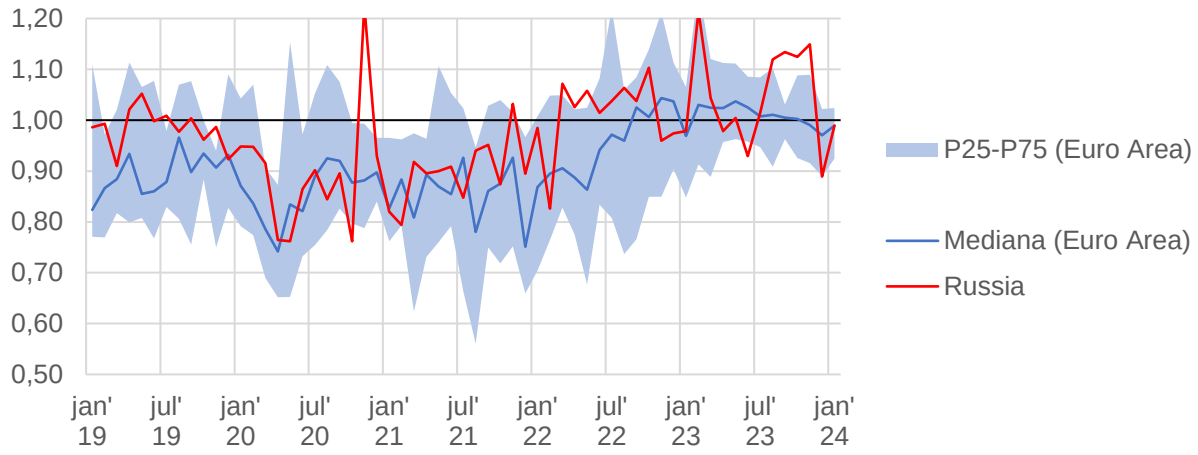


In the EU countries, renegotiated loans represent on average 14–33% of the value of all new loans issued. In Russia, the share of prolongations ranges from 5 to 15%.

[16] It should be noted, however, that these types of loans also fall under the provisioning norms.
[17] A loan that a borrower takes out to pay off a current loan is not a prolongation.

Look at Chart 3 which provides the assessment of comparison between the level of rates on renegotiated loans and pure new loans in the euro area and the rate level for prolongation and non-prolongation in Russia. Prior to August 2022, interest rates on pure new loans were lower than rates on renegotiated loans in most cases; beginning in September 2022, rates between the two types of loans equalised (according to the median of the distribution). In Russia, we see dynamics similar to the euro area. In Russia, until 2022 Q1, the rate on prolongations generally did not exceed the rate on other loans; from 2022 Q2, the ratio changed.

Chart 3. Ratio of rate on pure loans issued to renegotiated loan rate



Data sources for euro area: MIR — MFI Interest Rate Statistics, Statistical Data Portal, ECB; for Russia: credit register (form 0409303).

Note. The chart is based on the data from 19 EU countries: Austria, Belgium, Bulgaria, Germany, Spain, France, Croatia, Italy, Lithuania, Netherlands, Portugal, Slovenia, Slovakia. For Russia, the ratio of the weighted average rate on new loans (excluding prolongations) to the prolonged loan rate is given.

Thus, rates on prolongations do not always reflect the rates on loans actually issued. In an environment where prolongations do not imply new funds disbursement and no new money arrive in the economy, it can be useful to see the loan rate excluding prolongations. Therefore, going forward we exclude prolongations when designing additional indicators of interest rates.

4.3. Floating rate loans

In this subsection, we look at the role of floating rate loans, suggest what may explain the differences in interest rates on loans that include and do not include floating rate loans.

Note that the maturity of floating-rate loans is determined in our paper by the term of the loan agreement, although the interest rate is not specified for the entire term. The issue of defining the maturity of such loans is subject to discussion. It is worth recalling that, according to the ECB Manual, floating-rate loans in the euro area fall into the category with the shortest rate fixation period, regardless of the overall term to maturity. Given the complexity of defining and interpreting the maturity for such loans, not many foreign countries publish rates for new floating-rate loans. In what follows, when interpreting the results, we need to take into account the difference in meaning between the maturity for fixed-rate and floating-rate loans.

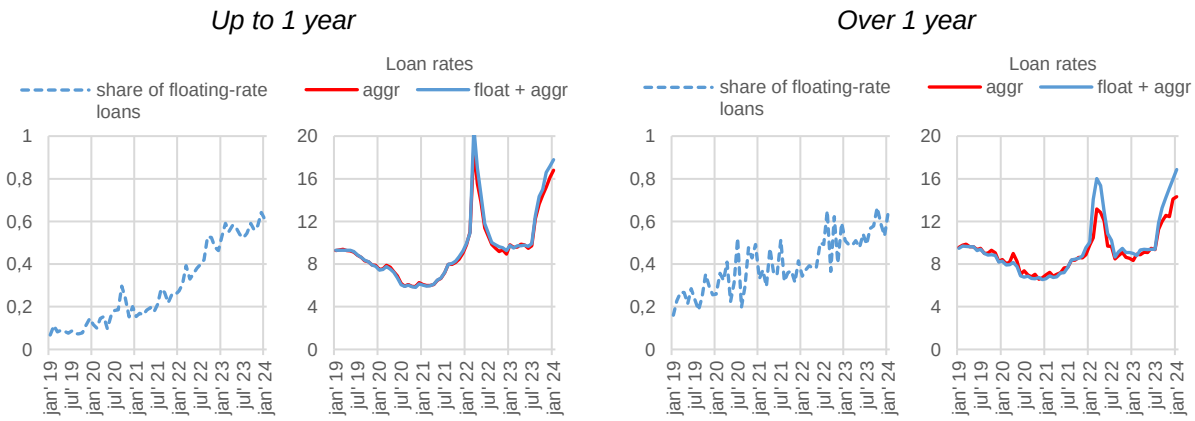
Chart 4 shows the share of floating-rate loans and the difference in interest rates for different groups of loans. The share of floating rate loans has increased from 10-20% to ~60% over the last 5 years, this is typical for both short term loans and long term loans.

In Chart 4, the blue line represents the value of the current interest rate aggregate with the addition of a sample of floating rate loans.

For short-term loans up to 2023 Q3-Q4, the indicator difference was minimal. The price formation for fixed and floating-rate loans is likely similar for loans with short-term maturity. Starting in October 2023, the disparity began to grow due to loans with maturity from 181 days to one year, representing the longest maturity within the one-year category. The difference averages 1.1 pp.

For long-term loans, significant higher rates for floating-rate loans were seen in February-April 2022 (3 pp) and from September 2023 to January 2024 (2 pp). However, while the proportion of floating-rate loans was about 36% in February-April 2022, it rose to 60% between September 2023 and January 2024. Relying on a wider range of indicators, we observe these higher spikes in rate levels that increasingly cover a larger share of the credit flow.

Chart 4. Share of floating-rate loans and loan rates



Note. The share of floating-rate loans is calculated as the ratio of the volume of floating-rate loans without prolongations (float) to the total volume of floating-rate loans without prolongations and loans recorded in the current aggregate[18] (float + aggr).

It is worthwhile looking at the principles of loan pricing for the rationale behind the indicators differences. We outline some of the factors that could potentially explain the variations in rates.

Lending rates are driven by the transfer rate curve[19] for the relevant maturity, plus costs, risk premiums, fees for using the bank's capital and interest margins (Bank of Russia, 2023a). In turn, the transfer curve is driven by OFZ yields, which are influenced by the key rate path expectations, the Ministry of Finance's offering of new bonds and other factors. Thus, lending rate dynamics are affected by the key interest rate and expectations of its future path, albeit not directly. For short-term rates, the current key rate plays a more significant role than expectations, whereas for long-term rates, it is the opposite. Upon achieving the inflation target, the key rate stabilises at a neutral level

[18] Hereinafter, the existing/current aggregate (aggr) is calculated according to the interest rate methodology. For more details, see Summary Methodology URL: https://www.cbr.ru/Content/Document/File/135989/meth_rates_e.pdf

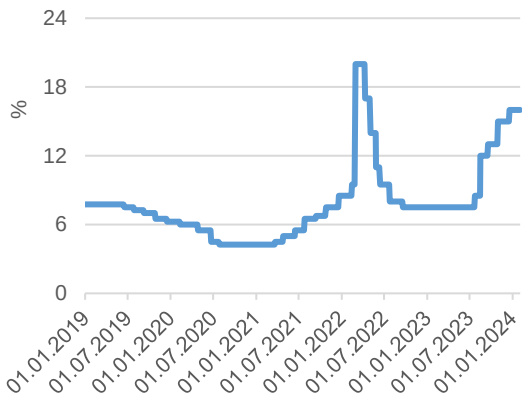
[19] The transfer rate curve calculated by the banks allows banks to set prices for operations in different market segments (for details see Bank of Russia (2023 (a))).

estimated at 5-7% for the years 2019-2023 (Bank of Russia, 2023a), which is lower than recent years' values (the local minimum was 7.5% during 2022-2024, see Chart 5). This suggests that an intermediate point between the current rate (16%) and expectations (5-7%) will be lower than the current rate value (16%). This could explain why maximum long-term rates are lower than those of short-term rates.

It is worthwhile noting the difference between fixed and floating rates for borrowers and banks. With fixed rates, banks absorb the risks associated with changes in overall economic interest rates, allowing borrowers to hedge these risks. In contrast, with floating rates, borrowers bear the risks associated with rate fluctuations. Banks prefer floating rates as their interest income remains unaffected by rate changes (i.e. zero duration of loans). From this it can be assumed that floating rates, being preferable for banks, should be lower than fixed rates to attract more borrowers. However, we have not observed it, then this factor is not decisive in loan pricing.

Probably, lower fixed rates for loans over six months and above reflect expectations of a future lower key rate path, whereas floating rates do not incorporate these expectations into current levels (rates will automatically adjust in the future). This assumption works for the periods February-April 2022 and September 2023-January 2024. These periods are marked by a sharp increase in the key rate followed by several months of overall high level of rates (see Chart 5).

Chart 5. Bank of Russia key rate



Source: Bank of Russia.

During the periods of gradual key rate changes (through 2022) or stability (2022 H2 and 2023 H1), there is little noticeable difference between rates on fixed and floating-rates loans. In this relatively more stable environment, loan pricing is likely influenced by other factors.

Expectations about the future path of the key rate and the risk management policies of economic agents influence the differences in interest rates on loans with fixed and floating rates. For monetary policy decisions, it is useful to monitor a wider range of indicators on both fixed-rate and floating-rate loans to understand the conditions under which companies actually receive financing and what expectations they have in response to the economic decisions of monetary authorities.

4.4. Loans to affiliates

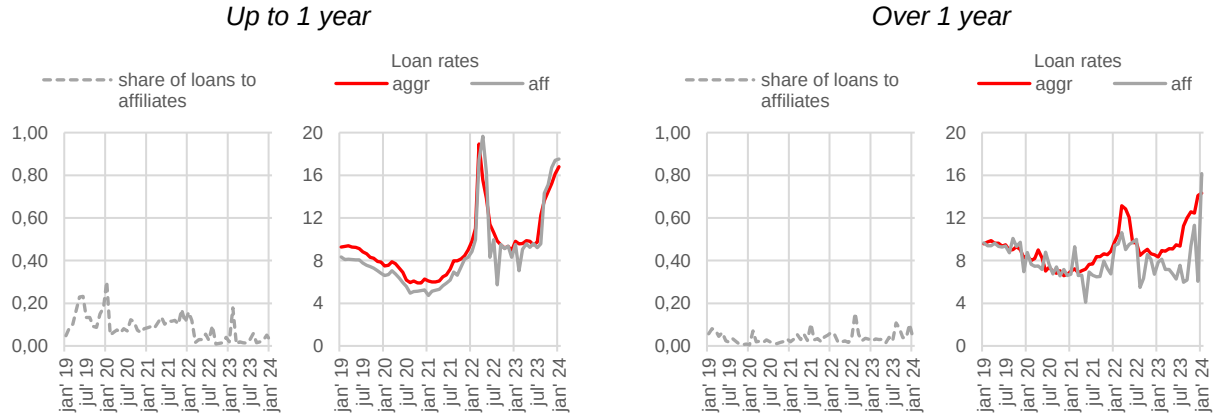
This subsection examines how the inclusion of loans to affiliates impacts the interest rate levels and highlight the importance of monitoring rates on this type of loan.

On average, loans to affiliates constitute 5–10% of the total (see Chart 6). Thus, incorporating this sample into the current aggregates slightly affects the indicators. Hence, we suggest examining weighted average rates calculated specifically for loans to affiliates.

Interest rates on loans to affiliates are more volatile compared to those on loans to non-affiliates. Such volatility may stem from relatively small sample sizes, making weighted average rates sensitive to individual loan rates.

Typically, rates offered to affiliates are lower than those offered to non-affiliates. This can be attributed to banks being well-acquainted with their affiliated borrowers and aiming to provide them with favourable terms. However, it may be common that rates for affiliates are higher, possibly due to the quality of the loans issued. The rate difference is minimal for loans with maturity up to 30 days.

Chart 6. Share of loans to affiliates and loan rates



Note. The share of loans to affiliates is the ratio of the volume of loans to affiliates less prolongations (aff) to the total volume of affiliate loans less prolongations and loans recorded in the current aggregate (aff + aggr).

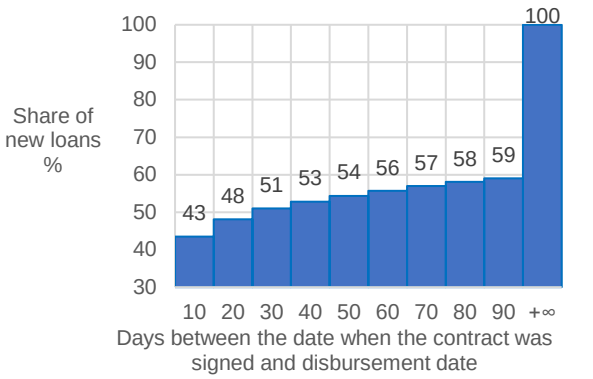
Monitoring interest rates on loans to affiliates allows to track non-market terms on loans. Large differences in rates may indicate risk accumulation, especially when it comes to differences for agents with similar credit risk assessments. Monitoring rates on loans to affiliates is an additional tool to identify such situations.

4.5. Old and new loans

This subsection explores the difference in interest rates between old and new loans and the likely causes of such differences.

According to current methodology, rate calculations consider loans disbursed within the current month. But we suggest separating the loans whose rates could have been set not in the current economic environment. As noted in the section Data and methodology, new loans include those disbursed no more than 31 days after the loan agreement was signed. The 31-day threshold was selected as it corresponds to one month and approximately bisects the sample into old and new loans. Choosing a 31-day cutoff is the first attempt to distinguish between old and new loans. It is acknowledged that this threshold can be determined differently.

Chart 7. Distribution of new loans at various thresholds



Note: 100% represents loans covered by current aggregates regarding rates. The share is calculated based on volumes.

In particular, we examined how the sample divides at different thresholds (see Chart 7). We found that just over 30% of all funds were disbursed on the first day following the date when the contract was signed. Subsequently, the pace of fund disbursement gradually decreases. There is no observed trend where companies strive to manage to get funds within a specified timeframe. Thus, setting a boundary at 31 days appears acceptable.

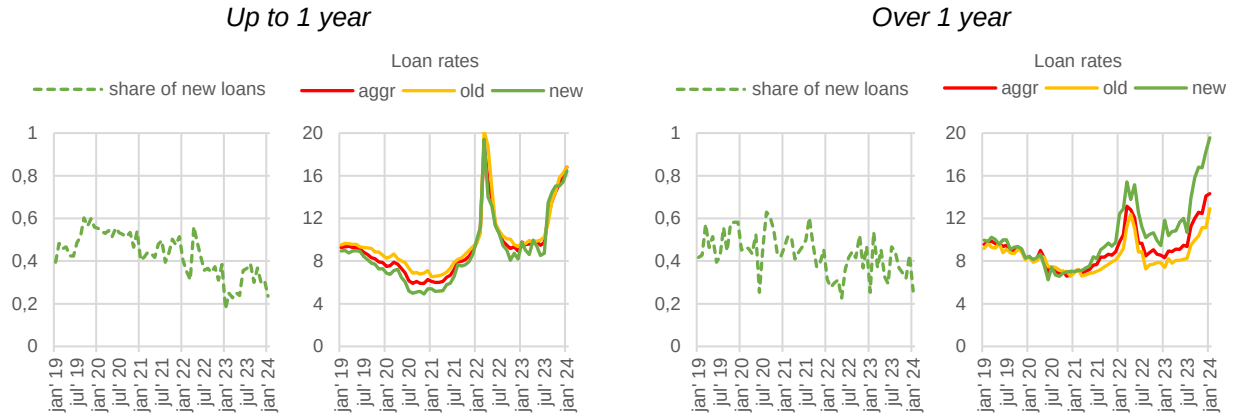
It is fair to point out that the features of old and new loans defined in this way be different from those of the true old and true new loans (the true loan category could have been determined by knowing when the loan rate was set). Our estimate of old loans takes into account true old loans and adds some of the true new loans to them. Thus, the estimate is different from the rate on true old loans and is slightly closer to the rate on true new loans. We assume that the difference we observe below is the minimum difference between new and old loans. The actual difference may accordingly be even larger.

In Appendix 4, we consider as new those loans where both the signing agreement and disbursement dates fall within the same reporting period. Employing an alternative method for defining old and new loans did not significantly alter our subsequent findings.

Chart 8 illustrates the shares of new loans within the total of old and new loans. It appears that only about 50% of the credit flow recorded in current aggregates can definitively be classified as new loans. The other half of the sample cannot be similarly classified. The share of new loans decreases over time, and this is more pronounced for short-term loans. For long-term loans, the share of new loans exhibits greater volatility. An increasingly smaller fraction of credit funds is disbursed immediately after the agreement signing.

Rate ratio between old and new loans vary depending on their maturities and specific time intervals. From September 2019 to 2021 H1, the average rates on new short-term loans were 1.5 pp lower than those on older short-term loans, while the average difference for long-term loans was negligible. Since 2021 H2, the average difference in rates for short-term loans was close to zero, though rates on older loans were generally higher than those on newer ones. From 2021, the average difference between rates for new and old long-term loans was 3.2 pp.

Chart 8. Share of new loans and loan rates



Note. The share of new loans is calculated as the ratio of new loan volumes to the total volumes of both new and old loans (less prolongations).

This rate disparity likely reflects the overall dynamics of interest rates in the economy. The key rate was declining until 2021 Q1 (see Chart 5), reaching a plateau in July 2020. This reduction is evident in short-term rates, where old loans typically carry higher rates than new ones. However, long-term rates on both old and new loans were similar.

The period from 2021 to April 2022 and from August 2023 onwards is marked by a rise in the key rate. With rising interest rates, it is expected that rates on new loans will be higher than those on old loans. This is observable in the long-term rates.

From April 2022 to July 2023, there was a decrease in the key rate; however, we do not observe new loan rates falling below those of old loans. Probably, other pricing factors played a role in the rate dynamics between new and old loans during that period.

Interest rates on old and new loans combined do not always accurately reflect the economic conditions in which these rates were set, so analysing additional indicators – rates and volumes separately for old and new loans allows us to estimate what part of the credit flow can respond more quickly to monetary policy measures, and how large this difference in response is.

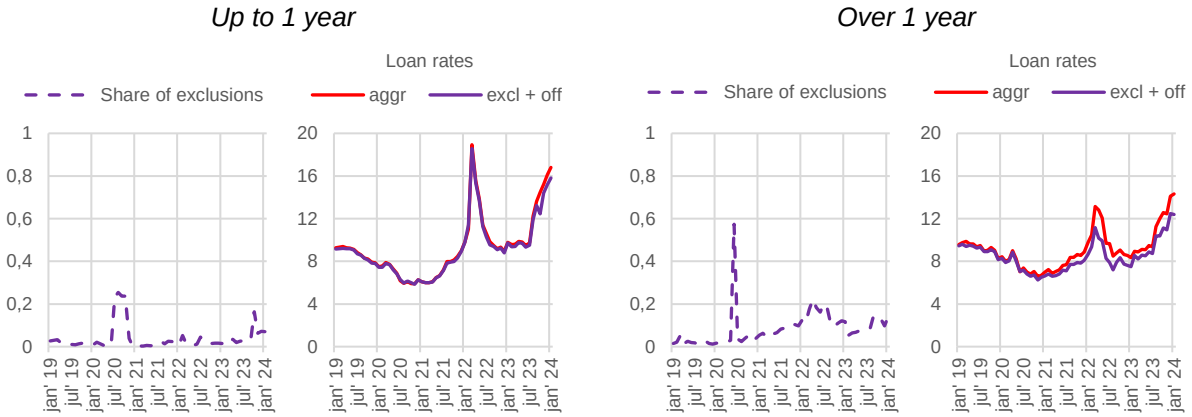
4.6. Excluded loans

The current methodology has a filtration procedure for excluding loans with non-market interest rates and untypical transactions. Formal definitions of excluded loans are detailed in the methodology for calculating current aggregates, the essence of which is that loans with interest rates or volumes higher than maximum border or lower than minimum border. Potentially excluded loans may pose accumulated risks. This subsection explores how filtration affects the rate levels and identifies which loans are typically excluded.

The share of excluded loans (excl) averages 6% (see Chart 9). For short-term loans, the difference in the level averages 0.2 pp (a minor difference). For long-term loans, differences began to grow in 2021 H2, averaging 1 pp.

Typically, rates on excluded loans are lower than those on other loans. Most of these are loans to companies from the agriculture and construction sectors[20]. However, not all loans to companies from these sectors are excluded from the calculation of the current interest rate aggregates. Only some loans granted at the lowest rates are excluded.

Chart 9. Share of exclusions and loan rates



Note. Share of exclusions is the ratio of excluded loan volumes (excl) to the total volume of both excluded and loans recorded in the current aggregate (excl + aggr).

4.7. Composite indicator

We have reviewed various options for calculating weighted average interest rates. We have shown that interest rate levels may differ for different groups of loans. An advantage of credit register data is that we can construct different interest rate aggregates depending on the purposes of analysis or research without limiting ourselves to a single indicator. As an example, we introduce a composite indicator that reflects the level of rates prevailing in the current economic environment. The composite indicator incorporates several focuses discussed in this paper.

First, the composite indicator includes only loans actually disbursed during the reporting period. For this purpose, we exclude any prolongations. This ensures that only loans creating new money in the economy are considered.

Second, we include loans with floating interest rates. As floating-rate loans become a larger part of the credit flow and differ from fixed-rate loans, including them provides additional insights into economic interest rate levels.

Third, we focus solely on new loans, excluding old ones from consideration. Groups of old loans include loans with rates that may have been set well before the reporting period. Excluding old loans allows us to concentrate on those issued under the current market conditions.

Additionally, like the methodology of current aggregates, we exclude loans to affiliates since they make up a minor portion of the credit flow and do not have a significant impact on the level of interest rates. We also implement a filtration procedure to exclude non-market transactions, aiming to omit loans influenced by other than purely market conditions.

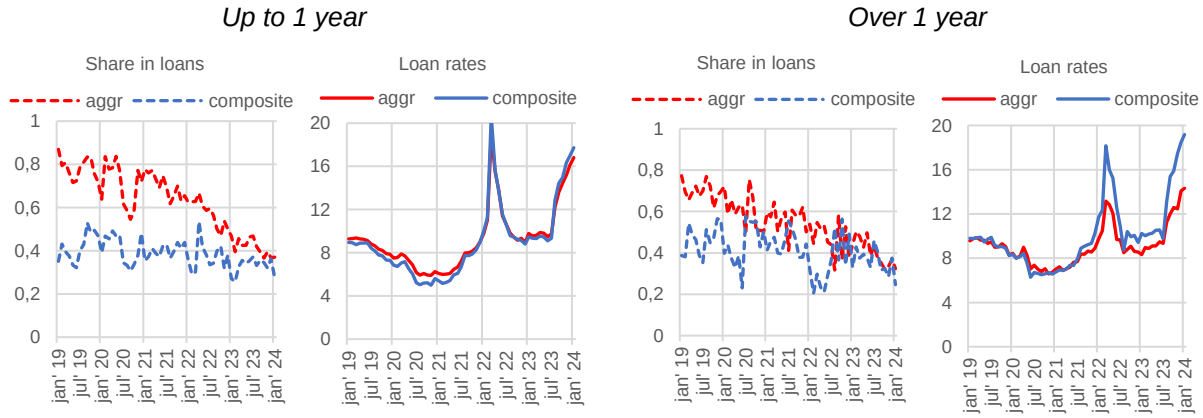
[20] Rates on loans to construction companies depend on filling-up of escrow accounts. Active filling-up of escrow accounts enables lenders to offer lower rates on housing construction project financing.

Chart 10 illustrates the dynamics of the indicator (composite) and the share of credit flow covered by the composite indicator and the current aggregate. Despite including floating-rate loans, the composite covers a smaller portion of the credit flow than the current aggregate, though recently these proportions have nearly aligned.

For short-term rates, the average difference between the composite and the current aggregate is a minor 0.5 pp (modulo), which appears to be a small difference.

The average rate difference for long-term rates was no greater than 0.7p (modulo) until October 2021, and from November 2021 it averages 2.1p, reaching 4.9p in January 2024. Appendix 5 presents an estimate of the interest rate variance.

Chart 10. Share of exclusions and loan rates



Note. 1 - coverage includes loans with floating rates and loans to affiliates.

5. Application of a wider range of indicators

This section looks at the use of a wider range of credit aggregates. First, we compare how conclusions from the quarterly projection model vary. Second, we explore how sensitive lending rates are to changes in monetary policy measures.

5.1. Loan rates in the simplified quarterly projection model

The Bank of Russia employs, among other things, a quarterly projection model (Orlov, 2021; Mogilat, 2021) for analysing and predicting trends in the Russian economy, supplemented by other methodologies. A key component of this model is the loan interest rate aggregate. This subsection examines how using a composite indicator can affect.

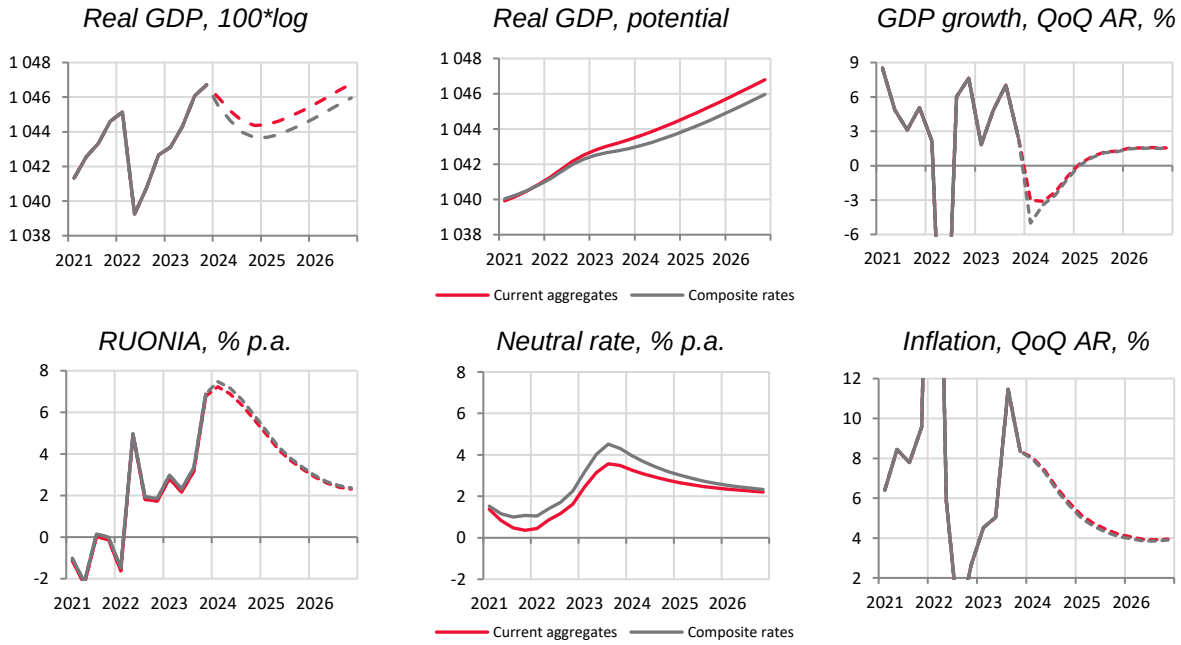
We conducted a simulation experiment using a simplified model without incorporating updated data from the joint forecasting rounds held at the Bank of Russia (the model from Nelyubina (2024) is taken as a basis). Only the main equations of the model were taken for the experiment. Estimates of the effects of the quarterly forecast model are sensitive to the modelling assumptions. Due to the fact that we use a simplified model different from the quarterly forecast model of the Bank of Russia (Orlov, Sharafutdinov, 2024, Orlov, 2021), the obtained conclusions The conclusions presented below should not be viewed as actual estimates or forecasts by the Bank of Russia, but should be perceived as a result of the authors' research findings.

We calculated estimates and forecasts within the Quarterly Projection Model (QPM) for two scenarios: using the current aggregate and the composite indicator. It is important

to note that for the composite indicator of interest rates we did not recalibrate the model to solely assess differences arising from changing data sets. This exercise can be seen as the first step towards understanding how the new data set impacts estimates and forecasts. Looking ahead, we also note that forecast errors between the two scenarios are minor, which implies that there is no reason to think that the current calibration does not fit the model with the composite indicator.

Chart 11 presents the evaluation results. Different methods of measuring lending rates give a variance in GDP forecasts (year-over-year) up to 0.6 pp. The neutral interest rate appears higher. This is due to the following. The gap between economic rates and the neutral rate reflects the tightness of monetary policy. The rigidity of monetary policy impacts the output gap. Given that actual output remains constant when analysing new data set on lending rate, the output gap estimate remains unchanged as well. Thus, maintaining a constant output gap necessitates unchanged monetary policy rigidity. Since composite lending rates are higher, maintaining consistent monetary policy rigidity is feasible at a higher neutral rate.

Chart 11. QPM assessments using different interest rates



Note. The figure shows estimates of the simplified QPM, which differs from the official QPM of the Bank of Russia. These estimates and forecasts should not be regarded as actual estimates and forecasts of the Bank of Russia.

Forecasts for the RUONIA money market rate and inflation are close. Forecast errors (RMSE) are also close (not shown separately). This is likely due to structural shifts during a relatively short evaluation period starting from 2019.

Thus, using composite rates influenced by current economic environment results in lower GDP forecasts and a higher neutral rate estimate, while forecasts for inflation and the money market rate remain largely unchanged. Such analysis has a beneficial application for implementing monetary policy measures.

5.2. Interest rates response to monetary policy changes

Lending rates are utilised to evaluate the effectiveness of the interest rate channel of the monetary policy transmission mechanism. This subsection illustrates how using a

wider range of aggregates impacts the assessment of the interest rate channel of monetary policy.

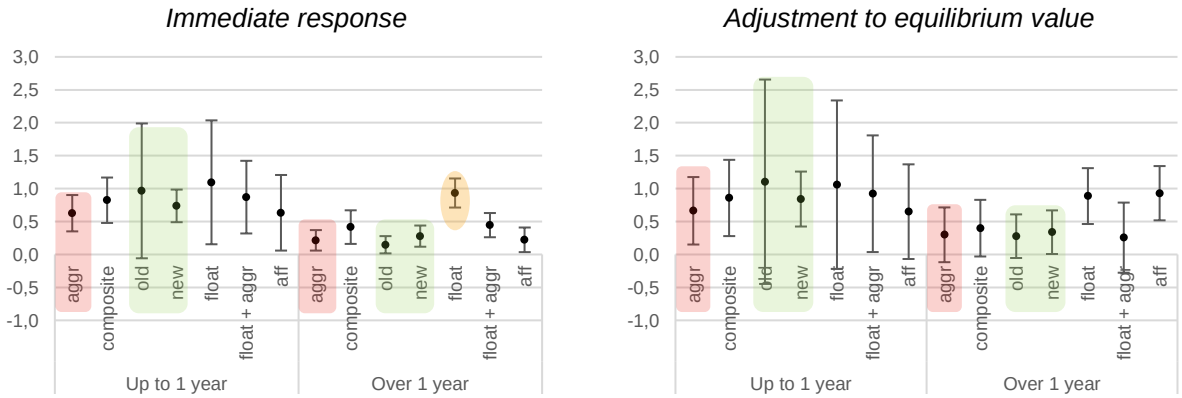
The interest rate channel can be assessed using an error correction model (Egorov, Borzykh, 2018; Mogilat, 2021; Konovalova et al., 2021). We estimate the following model:

$$\Delta i_t = \mu + \alpha \Delta r_t + \beta(\gamma r_{t-1} - i_{t-1}) + \varepsilon_t$$

Where i_t is the lending rate at time t, r_t is the money market rate (MIACR), Δ is the first difference, ε_t are random errors. Then γ represents the long-term relationship between rates, α captures the immediate response of lending rates to changes in the money market rate, and β indicates the adjustment speed to the equilibrium value.

Chart 12 shows that the composite indicator adjusts more quickly to changes in the monetary policy rate, although the difference may be insignificant (we see the intersection of confidence intervals). This quicker adjustment is probably due to the inclusion of floating-rate loans. Specifically, for loans over one year, the immediate response of floating-rate loans to rate changes is significantly greater.

Chart 12. Assessing the interest rate channel



There are no significant differences in rate responses between new and old loans.

5.3. Discussion

On the effect of Interest rate channel

When making a decision on the key rate, the Bank of Russia considers lending dynamics such as volumes, rates, and structure. At the meeting of the Bank of Russia Board of Directors on the key rate on 16 February 2024, it was noted that corporate lending was less sensitive to interest rate changes compared to consumer lending, and growth of corporate loan portfolio was slowing, though less pronouncedly (Bank of Russia, 2024b). In this context it is worth noting that when it comes to the corporate lending volumes both fixed and floating-rate loans are included (see Appendix 3). Given the diversity of the statistics analysed, it is essential to compare rates and volumes for the same group of loans.

The analysis enhances understanding of the monetary policy transmission mechanism. We demonstrate that the interest rate channel related to lending is probably more effective – lending rates rise more extensively following the monetary policy changes. The change in the loan structure by interest rate type played a notable role in this. The

use of floating-rate loans enables firms to maintain desired lending levels while anticipating lower rates in the future.

We should note that our research does not aim to analyse the monetary policy transmission mechanism or to estimate the simplified quarterly projection model, so the analysis performed is incomplete. In particular, we consider loans only to non-financial organisations, while loans originated within financial ecosystems remain outside the scope of our analysis. However, lending to financial organisations (brokers, management companies, factoring firms and financial leasing companies) indirectly affects the credit supply to businesses and households. Therefore, a more complete assessment of aggregates (loan rates and volumes) is possible when taking into consideration lending to financial organisations. At the same time financial and non-financial organisations represent different classes of borrowers with distinct business models.

On a wider range of interest rate indicators

This paper introduces several additional indicators of interest rates. As we show, different aggregates can be useful for different tasks. Moreover, the analysis should not be limited to the metrics presented.

Additionally calculated-indicators may be useful to gauge a particular type of processes or phenomena. If we need to study the behaviour of banks in response to a change in monetary policy, a composite indicator would be relevant. If we want to assess the rates at which companies generally receive loans, an indicator that combines fixed-rate and floating-rate loans may be useful. If we need to highlight non-market loan terms, rates on loans to affiliates or preferential loans can be looked at. Comparing different aggregates can be useful for assessing expectations about future key rate movements.

Analysts and researchers may face any other task, and the Bank of Russia's data help design a task-specific aggregate.

Newly issued loans were reviewed as part of this study. However, additional aggregates can be calculated for the overall debt portfolio, and this would also be of practical relevance. Loan portfolio interest rates are utilised to estimate debt burden (Donets, Ponomarenko, 2017).

An aggregate indicator that takes into account the structure of a portfolio consisting of both fixed-rate and floating-rate loans would provide better numerical estimates of debt burden.

6. Conclusions

The credit flow structure evolves over time. Calculating additional loan interest rate indicators becomes pertinent, including for research and analysis purposes. Multiple indicators can be considered as well as a single composite. As an illustrative example, we proposed a composite indicator with the addition of floating-rate loans (while excluding loans without real disbursement in the current economic environment). Using an additional composite indicator for research and analytical purposes provides new insights when analysing economic indicators and broadens understanding of ongoing processes in the credit market.

Values of interest rate aggregates may vary depending on the coverage. For this reason, it is essential to use comparable values when analysing loan volumes and rates.

As the share of floating-rate loans is growing, it would further be useful to analyse in more detail the causes of changes in the loan structure, to find out the optimal ratio of fixed-rate and floating-rate loans, to study loans at fixed and floating rates issued to the same borrower at the same bank within the same period. In this case, the difference in loan rates may reflect the expectations of market participants with regard to future interest rate movements.

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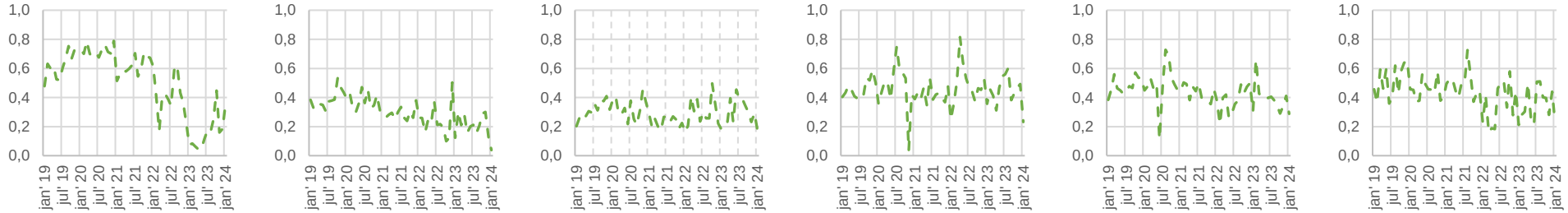
Appendix

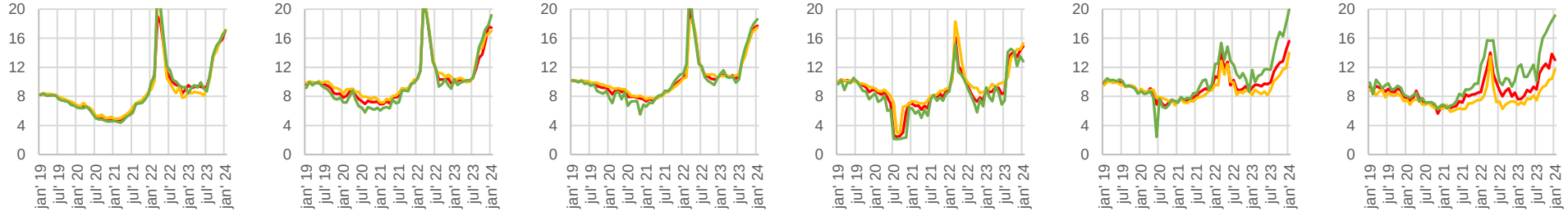
Appendix 1. A wide range of aggregates for six groups of maturity

Up to 30 days | *From 31 up to 90 days* | *From 91 up to 180 days* | *From 181 days up to 1 year* | *From 1 year up to 3 years* | *Over 3 years*

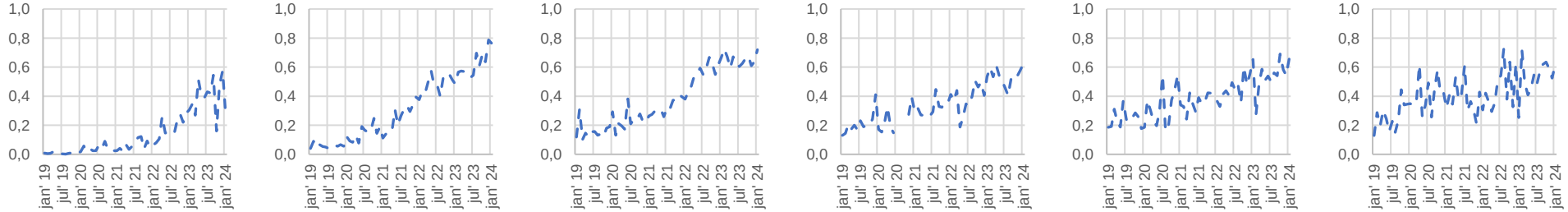
Share of new loans



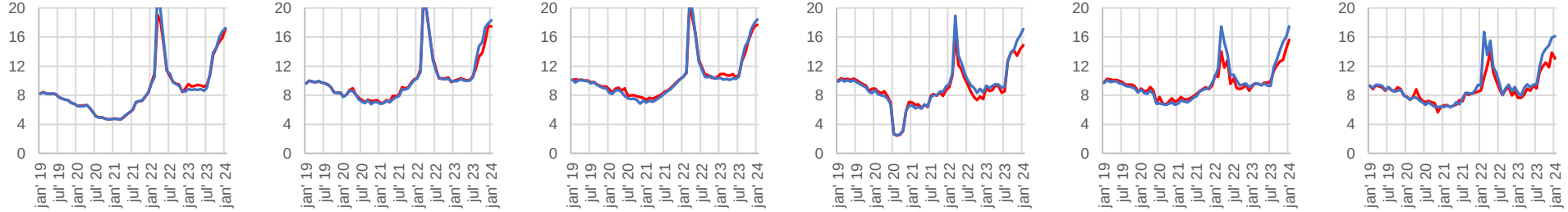
Loan rates per categories: aggr, new, old

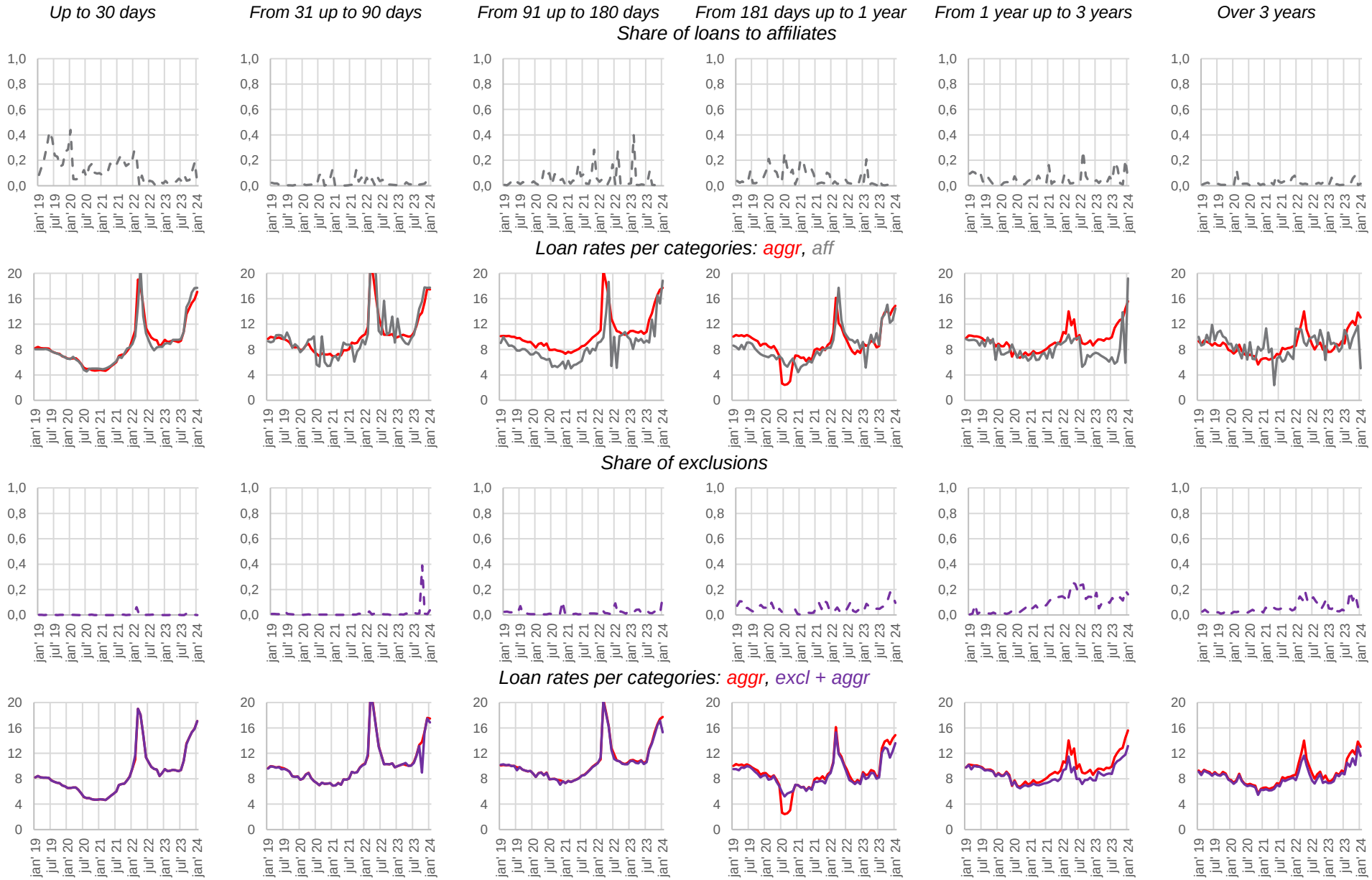


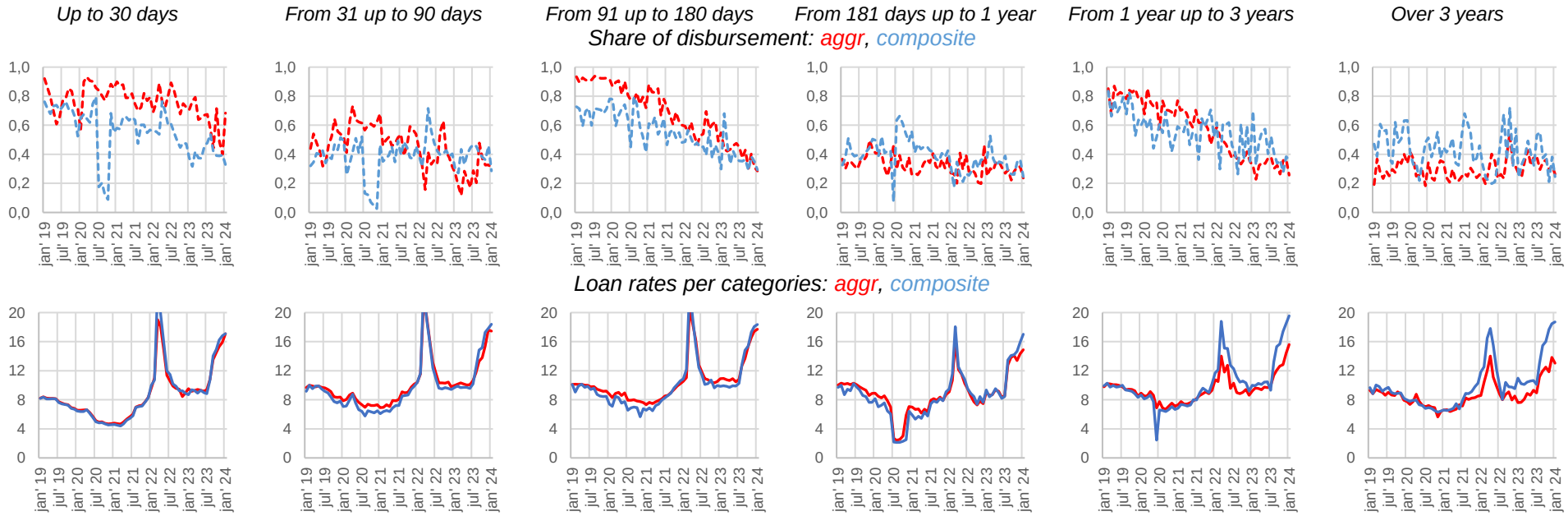
Share of floating-rate loans



Loan rates per categories: aggr, float + aggr




Up to 30 days
From 31 up to 90 days
From 91 up to 180 days
From 181 days up to 1 year
From 1 year up to 3 years
Over 3 years
Share of loans to affiliates
Loan rates per categories: aggr, aff
Share of exclusions
Loan rates per categories: aggr, excl + aggr



Note.

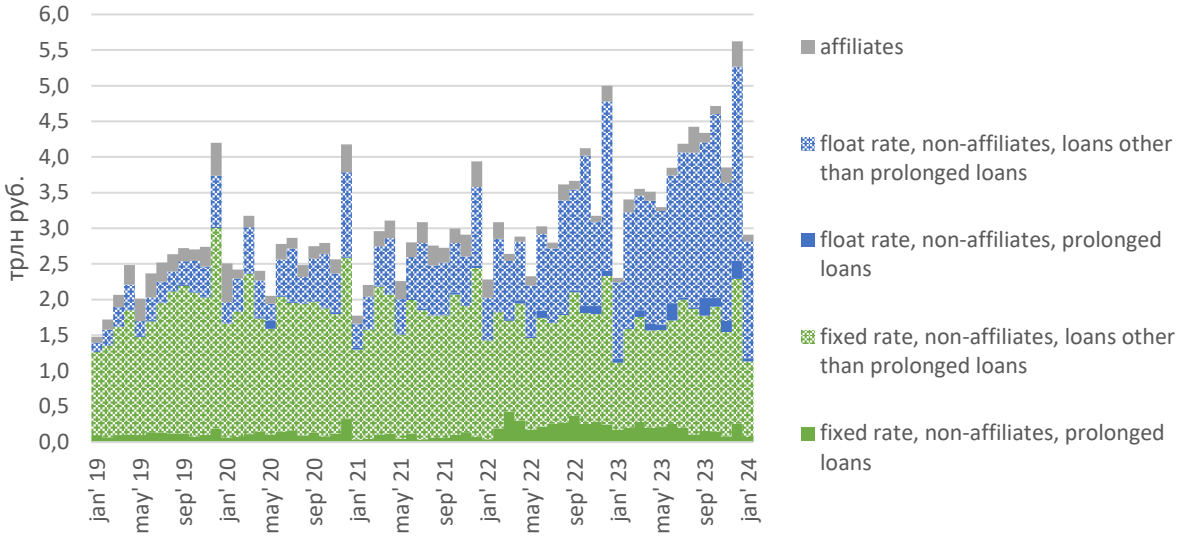
The share of floating-rate loans is calculated as the ratio of the volume of floating-rate loans without prolongations (float) to the total volume of floating-rate loans without prolongations and loans included in the calculation methodology of the current aggregate (float + aggr).

Share of loans to affiliates is the ratio of the volume of loans to affiliates without prolongation (aff) to the sum of the volume of loans to affiliates without prolongation and loans included in the calculation methodology of the current aggregate (aff + aggr).

The share of new loans is calculated as the ratio of new loan volumes to the total volumes of both new and old loans (less prolongations).

Share of exclusions is the ratio of excluded loan volumes to the total volume of both excluded and loans included in the calculation methodology of the current aggregate (excl + aggr).

Appendix 2. Structure of new loans in ruble terms



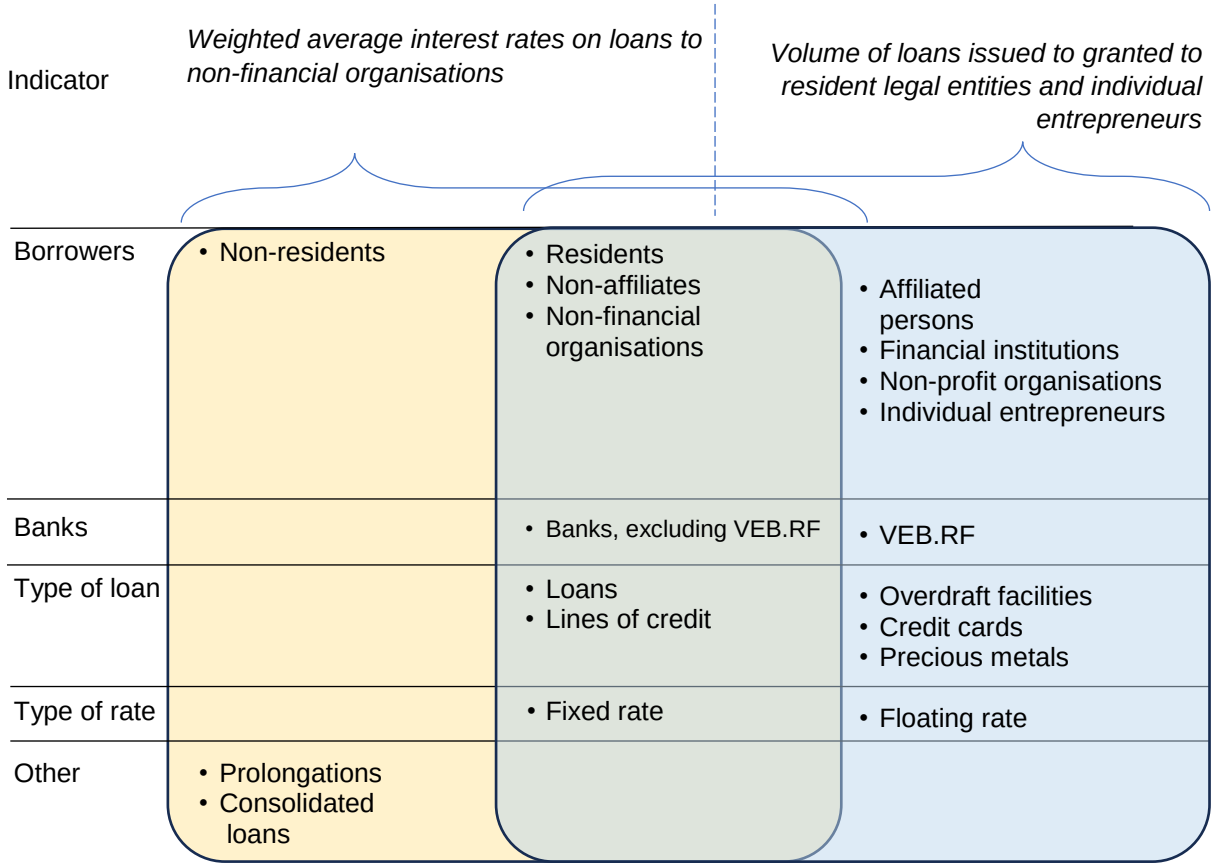
Note. The existing methodology for calculating the current aggregates considers green areas (fixed rate, unaffiliated borrowers). Designations: (non-)aff - (non)affiliates, float - floating (non-fixed) rate, fixed - fixed rate.

Appendix 3. Rates and volumes on loans granted in the reporting period: differences in coverage

Chart 13 displays differences in loan coverage.

Quantitatively, a major difference stems from the inclusion of financial institutions in the calculation of loan volume indicator. Since 2019, these loans have averaged 34% of the total volume (about 23% in 2023). Floating-rate loans also constitute a substantial portion of our focus. Their quantitative impact was addressed in the section Loan structure. Overdrafts account for an average of 12% of the loan volume, with the other categories accounting for less than 10%.

Chart 13. Differences in methods for calculating the volume of issuances and the weighted average rates on newly issued loans



Source: compiled by the authors based on published methodologies (volumes and rates) and consultations with colleagues from the Bank of Russia Statistics Department

Appendix 4. Alternative definition of old and new loans

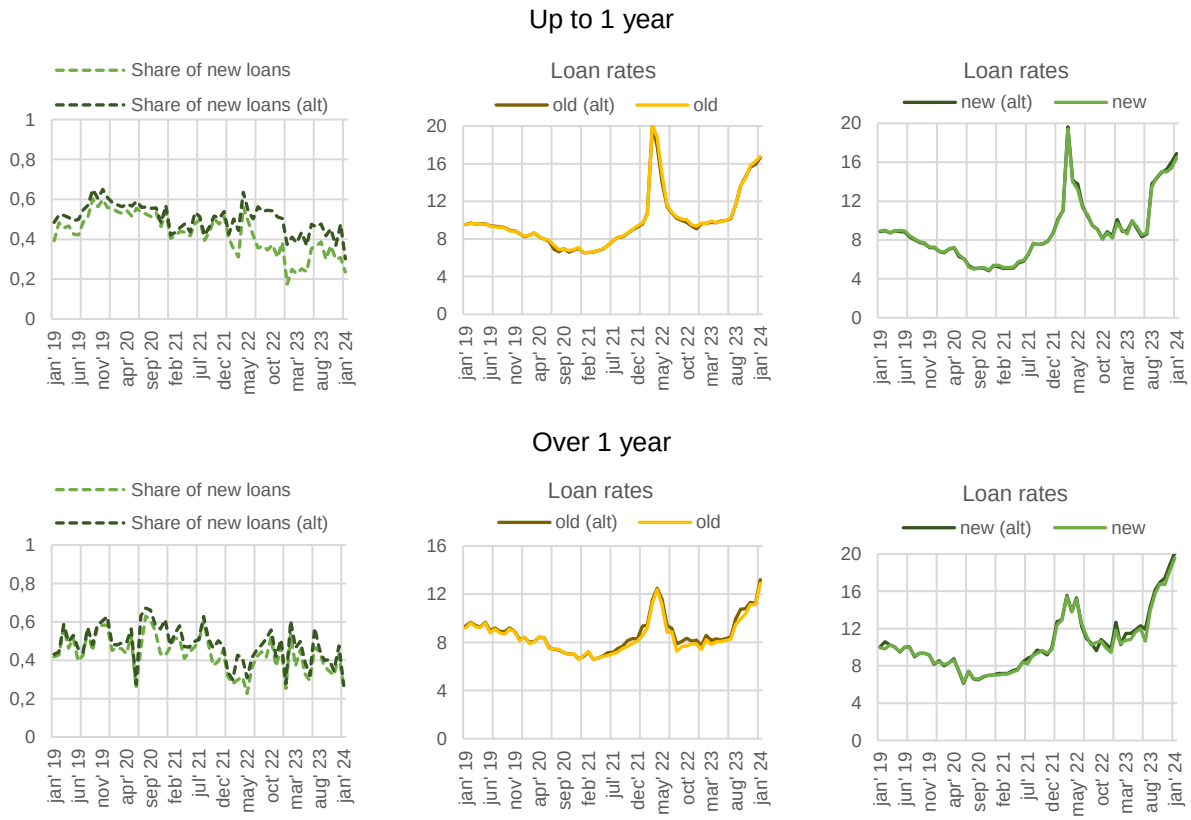
This subsection explores an alternative method for measuring old and new loans. It shows whether the alternative definition results in fundamentally new findings.

Within the framework of alternative definition, loans with the signing agreement and disbursement dates within the same reporting period are considered new loans.

Chart 14 illustrates the differences in the rate levels resulting from the use of the alternative definition. According to this approach, the share of new loans increases, while the rates show minimal visual differences. On average, the rate difference within the same group ranges from 0.1 to 0.2 pp, occasionally reaching up to 0.9 or 1.2 pp.

Using the alternative definition to segmenting the sample into new and old loans does not produce additional information for the analysis of this paper.

Chart 14. Share of new loans and loan rates: alternative measurement method(alt)



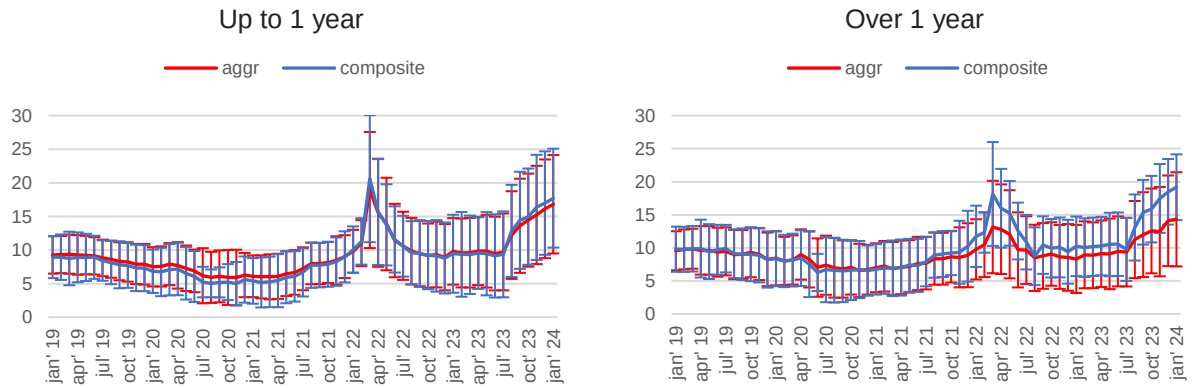
Note. The share of new loans is calculated as the ratio of new loan volumes to the total volumes of both new and old loans less prolongations.

Appendix 5. Interest rate variance

Chart 15 shows the weighted average interest rates and the standard deviations of interest rates for each period.

Although there are differences, the variance does not exceed one standard deviation of each interest rate.

Chart 15. Interest rate variance



Note: Error margins are drawn based on one standard deviation.