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Structural features and  
interest-rate dynamics of  
Russia's interbank lending market



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Alexey Egorov and Olga Kovalenko

## Structural features and interest-rate dynamics of Russia's interbank lending market

### Abstract

Russian banks exhibit a range of behaviors that have led to distinct segmentation within the interbank lending market. This paper provides an overview of the core groups of banks operating in the market (state banks, private banks, and foreign-owned banks), as well as a discussion of their assets and liability structures. The 2007–2010 financial crisis had considerable impact on the Russian financial sector. As conditions deteriorated and recovered in global money markets, Russian banks adjusted their behavior with respect to other domestic banks and foreign banks. We conduct a comparative analysis of the Russian interbank lending market structure in the pre-crisis period and during recovery to reveal the tactical shifts in the various bank groups.

JEL: C22, E43, E44

Keywords: interbank markets, Russia, interest rates

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## Introduction

The interbank lending market is critical to Russia's banking system. As a significant share of the liabilities of Russian banks consists of interbank lending transactions, the interbank lending market acts as an important channel for liquidity redistribution within the banking system.

The unsecured overnight loan market plays a crucial role in the transmission of monetary policy as commercial banks participate in refinancing and deposit operations with the Central Bank of Russia (CBR) to offset their daily liquidity imbalances. Not only are interest rates on interbank overnight loans highly sensitive to CBR interest rate changes, but interbank lending rates also respond rapidly to other segments of financial market, price expectations of market participants, and the financial conditions of commercial banks operating in the market. Thus, analysis of interest rates and trading in Russia's interbank lending market (a large segment of the money market) offers a potentially valuable area for research.

This paper seeks to analyze the main features of the Russian interbank lending market and build a model that captures specific interest-rate dynamics.

Section 1 provides a short overview of the historical evolution of the Russian banking with an overview of the more important banks grouped by e.g. ownership structure and credit quality.

Section 2 gives an overview of main segments of the interbank lending market. Russia's heterogeneous interbank lending market complicates the process of liquidity redistribution. With over 600 banks from different regions of Russia participating in interbank lending, their strategies are influenced by such factors as financial position, branch network development, and client base. As a result, banks have different costs associated with borrowing from and lending to other banks.

Section 3 presents our analysis of changes in bank behavior in the interbank lending market as the global financial crisis progressed during 2008–2009. The crisis was preceded with a period of ruble appreciation that allowed Russian commercial banks to increase their lending in global money markets. The sharp ruble depreciation during the crisis then drove up the cost of such loans, while turbulence in world financial markets made loan refinancing complicated. The combination of falling share prices and a swelling stock of non-performing loans eroded the confidence of market participants and caused the market to stratify. Interest-rate spreads in different segments of the interbank lending market sharply increased. These processes evidence a strong connection between the money market and other segments of the Russian financial market.

In Section 4, we develop an econometric model to capture differences in pricing of loans for different groups of borrowers in the money market. The model helps in identifying specific features in pricing of interbank loans for different groups of borrowers, as well as understanding the strategies of the market participants. Specific features of separate segments of the interbank lending market are also analyzed.

Section 5 summarizes the three main findings of this work.

# 1 Specific features of the Russian banking sector

## 1.1 Evolution of the Russian banking sector

Economic reforms in Russia were accompanied by rapid expansion of the banking sector. Some 1,360 banks were registered in Russia at the end of 1991. That number exceeded 2,500 by 1998. Even so, the role of the banking system in economy was relatively insignificant. The total stock of bank credit extended to enterprises and households corresponded to a mere 10 % of GDP.

The Russian banking sector began to play a more prominent economic role in the 2000s thanks to favorable macroeconomic conditions and institutional development, particularly improvements in banking regulation. Assets held by the banking sectors witnessed vast growth. Russian confidence in the banking system and an increase in deposits were supported by the implementation of a deposit insurance scheme in 2004 that boosted deposits. Improvement in the balance sheets of Russian companies doing business with commercial banks promoted growth in bank lending. As foreign investors gained confidence in the Russian economy, the opportunities for Russian banks to borrow money from international markets increased. By the beginning of 2013, assets of the Russian banking sector exceeded 79 % of GDP (up from 33 % at the beginning of 2000).

Growth in bank assets was accompanied by structural changes in the banking system that included:

- Tougher capital adequacy requirements and development of a retail credit market that encouraged mergers and acquisitions in the banking sector. Between 2000 and 2013, the number of banks fell by more than half (Figure 1).
- Robust growth of the Russian economy that improved the business climate and attracted foreign investment in the Russian banking sector. From 2000 to 2013, the number of banks in Russia controlled by non-residents rose from 32 to 117. The share of banks with foreign participation more than doubled.
- Mergers and acquisitions led to the creation of several large privately held domestic banks. Leading transnational banking groups entered the Russian market. The result was increased competition, development of new financial instruments, and adoption of modern banking technology. State-owned

Sberbank, nevertheless, continued to retain its status as the largest bank in Russia, despite a modest loss of market share in recent years.

Although the Russian banking system of today comprises around 1,000 banks, a small core of 40–50 banks controls about 80 % of total assets in the Russian banking system.<sup>1</sup> These core banks tend to be the main participants in international financial market operations. Most have credit ratings from the main global credit-rating agencies (Table 1 in the Appendix). As a rule, their ratings are at least equivalent to a Standard & Poor's rating of BB-, suggesting a decent level of financial sustainability. Most of these core banks maintain national branch networks and are headquartered in Moscow. A universal banking model prevails among these banks, i.e. they operate in the wholesale and retail segments of the credit market, capital markets, and the foreign exchange market, as well as provide a wide spectrum of financial services.

Small and mid-sized banks, in contrast, tend to specialize in a specific segment of the Russian financial market. Over half of these smaller banks have fewer than ten branches. Many serve a single regional market. As small and mid-sized banks are focused mainly on the domestic market, most of these banks have not been rated by international ratings agencies. Banks in this category with ratings usually to have creditworthiness scores below S&P BB-.

## 1.2 Major groups of banks

Although core banks share similarities, they are quite heterogeneous. The biggest distinguishing factor is structure of ownership. Banks with the state as the majority shareholder (*state banks*) have the highest credit ratings and most assets (Figure 2). Six of the seven Russian banks with assets exceeding 1 trillion rubles are state-owned. The large asset figures for these banks reflect their affiliations with large state companies. The state banks are all based in Moscow, with the exception of VTB Bank in St. Petersburg. They operate na-

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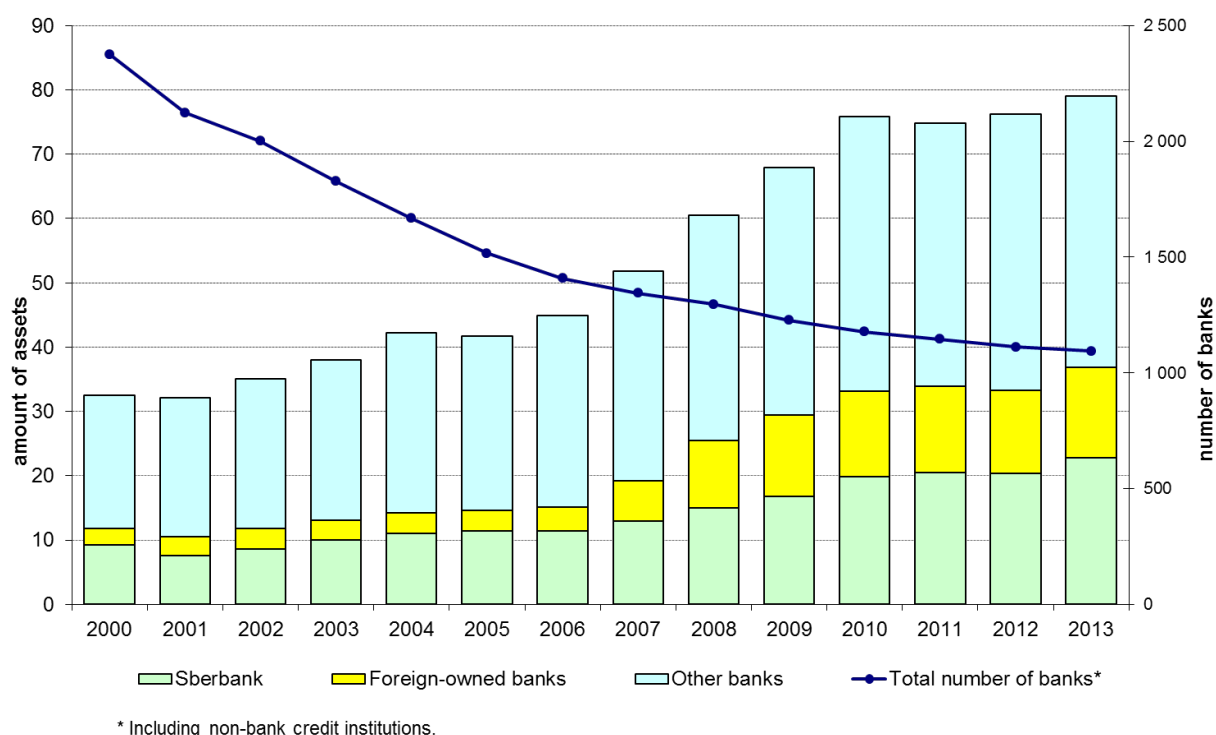
<sup>1</sup> For the purposes of our analysis, a bank is ranked “large” if it held assets exceeding RUB 100 billion (\$3.1 billion) at the start of 2013.

tional branch networks<sup>2</sup> that impact economic activity in all Russian regions. Sberbank alone operates over 40% of all Russian bank branches in the country at the middle of 2013.

Banks with a foreign owner (*foreign-owned banks*) usually have high credit ratings (at least the equivalent of S&P BB-), but lower total asset figures. Some 18 of the 20 large foreign-owned banks keep their head offices in Moscow. Foreign-owned banks are focused mainly on the wholesale segment of the credit market or specific segments of the retail market. Some have extensive branch networks.

Banks controlled by private capital (*private banks*) have transaction volumes comparable to foreign-owned banks, but typically carry slightly lower credit ratings (from S&P B- to BB). Some have their head offices outside Moscow (6 of 27) and serve regional markets. Private banks typically focus on a specific segment of the credit market and lack extensive branch networks.

Figure 1 Total assets of Russian banking sector (% of GDP), 2000–2013



<sup>2</sup> In analyzing branch networks, we include statistics on branches of operating credit institutions in Russia, branches of credit institutions abroad, representative offices of operating credit institutions, additional offices of credit institutions, external cash desks, and cash credit offices.



Figure 2 Structure of the Russian banking sector (Standard & Poor's rating criteria)



## 2 Specific features of the interbank lending market in Russia

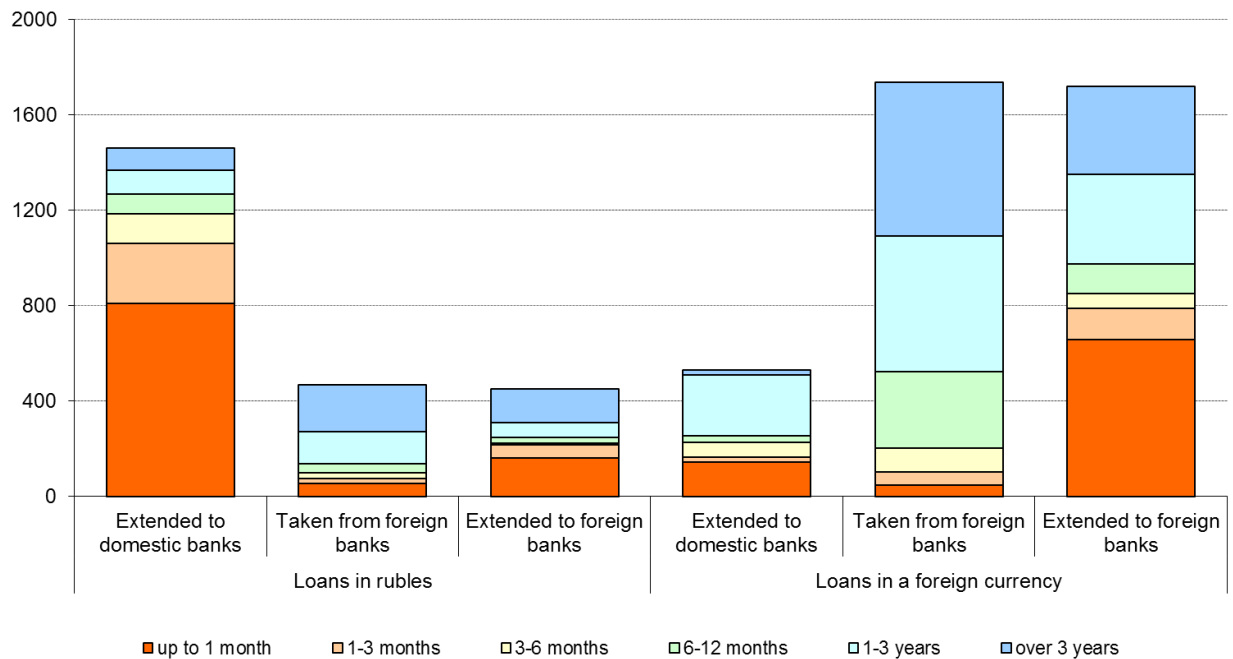
### 2.1 Major segments of the market

At the start of 2013, interbank loans constituted about 9 % of the total assets and liabilities in the Russian banking sector.<sup>3</sup> The average daily volume in this market in January-May 2013 exceeded 380 billion rubles (over \$11 billion). Over half of these transactions were conducted with foreign banks. Not only does the strong connection with world money markets make the Russian interbank market sensitive to changes in global banking, the structure of operations of the Russian banks with domestic and foreign banks differs by currency (Figure 3). Over 80 % of interbank lending transactions with foreign banks in 2013 involved foreign currency, while ruble operations predominate in transactions with domestic banks. Nearly 75 % of total liabilities and claims on interbank transactions between domestic banks in 2013 were denominated in rubles.

<sup>3</sup> To cover interbank lending activity of Russian banks in full, we provide information about interbank claims and liabilities with all maturities in domestic and foreign currencies, with and without collateral.

Russian banks operating with foreign banks face extra transaction costs that have to be offset by finding customers willing to accept through less advantageous interest rates or by exploiting opportunities to raise funds for longer terms. Thus, the average maturities where Russian banks are active in operations with foreign banks are much longer than those with domestic banks. Over 48 % of transactions in the domestic market involve claims of one month or less, whereas only 24 % of transactions involve claims of more than a year. In operations for raising interbank loans from foreign banks, the respective shares of lent funds for the term of up to one month is just 5 % against 38 %, and the respective shares of loans with terms over one year is 70 % compares to 44 %.

Figure 3 Interbank claims and liabilities of Russian banks (RUB billion)



## 2.2 Differences in participant behaviour

Russian banks operating in the interbank lending market have different focuses when it comes to maturity, currency, and main contractor partner. Activity in a segment of the interbank lending market depends on the preferences of the bank and its business model (Figure 4).

## Ownership structure

State banks are active in the interbank lending market, with their share of total claims and liabilities in this market exceeding their share of total assets of Russia's banking sector.<sup>4</sup> State banks extend credit and borrow mostly on a long-term basis (even excluding Sberbank, over 80 % of long-term interbank loans on domestic market are granted and taken by state banks).

The active participation of state banks and focus the long-term end of the market reflects state commitment to preserving the stability of the Russian banking system in the event of a crisis. The largest state banks often receive huge long-term loans from state organizations, including state development bank Vnesheconombank.<sup>5</sup> Some of the money is state funds provided by state banks to the other systemically important credit institutions. Claims and liabilities on these loans assure that state banks hold the largest market portfolios in interbank lending and borrowing. In 2013, state banks accounted for 46 % loans granted to domestic clients and 59 % of borrowing from the domestic market. They controlled about 27 % of total assets of the banking sector.

The extensive involvement of state banks in the interbank market does not come solely from their role in injecting liquidity into the system during periods of crisis. State banks are also closely affiliated with Russia's largest state companies. Large-scale payments of these companies induce huge fluctuations in bank liquidity, thereby increasing demand for liquidity management instruments. This historical legacy of working with state companies and their relatively stable financial positions have allowed many state banks to assume roles as market makers in the Russian money market.

Sberbank, of course, is the special case among the state banks. Due to its unique position in the domestic financial market, it is less involved in interbank lending than one might expect of a commercial bank of such stature. Sberbank has its own extensive network of branches and payment system. It works with a huge number of small and medium-sized enterprises, so payments from customer accounts into other customer accounts have no net impact on its liquidity position and create no need to get involved with the interbank lending market. Most personal savers keep their deposits with Sberbank (a legacy from

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<sup>4</sup> The group of state banks here excludes giant Sberbank. As discussed below, its money market operations differ from those of other state banks.

<sup>5</sup> Here, we only analyze the volume of interbank lending transactions between commercial banks. We exclude state development bank Vnesheconombank.

pre-deposit-insurance times), which means the bank has access to inexpensive long-term liabilities.

Foreign-owned banks typically have large transaction volumes with banks in other countries, in part because transactions with foreign banks, including their affiliated structures, are possible under more favorable terms than those available to other Russian banks. In 2013, over 80 % of the interbank loans taken by foreign-owned banks from the external market were long-term, compared to 65–70 % for the other groups of banks. Foreign-owned banks are typically not burdened with the costs of finding a foreign contractor. These factors in combination make operations in the foreign market more attractive for them.

Privately held banks are less involved with long-term interbank lending operations than short-term operations. In 2013, share of these banks in long-term loans taken from foreign banks is less than 7 % and share of these banks in long-term loans taken from domestic banks is less than 8 %, while private banks hold over 13 % of total assets of the Russian banking system. The low activity of private banks in the long-term interbank lending market reflects the lack of government guarantees support and intermediation of transnational financial structures. Provision of long-term loans for such banks is also unattractive due to the harsh terms involved. The share of total assets of private banks in the Russian banking system is in line with their liabilities and claims at the short-term end of the interbank lending market.

## Bank size

Banks behavior in the interbank lending market also depends on size (Figure 5). Large banks, as a rule, are extensively involved in raising money and placing funds in international money markets. They enjoy a scale advantage that confers relatively lower transaction costs from larger transaction volumes. In the domestic market, Russia's large banks tend to focus on long-term operations. The share of interbank loans over a year taken and given out by this group of banks is quite high. Large banks also appear to enjoy greater opportunities for diversification of their long-term assets and liabilities than other banks.

## Branch networks

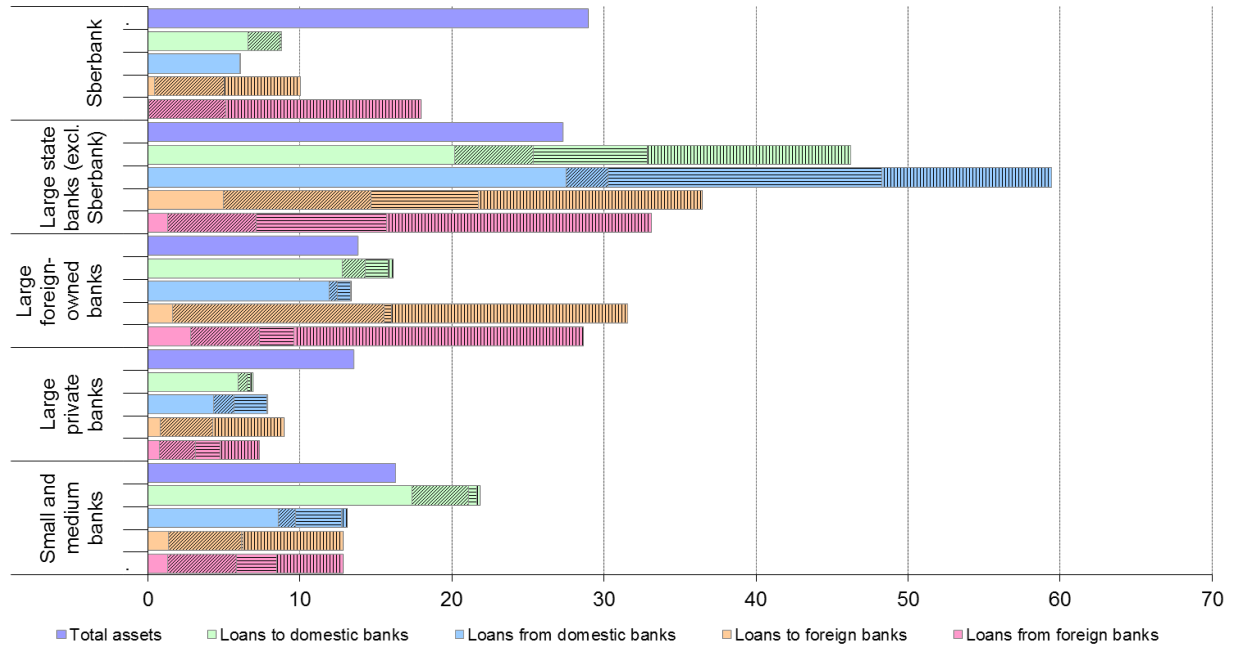
Whether or not a bank has an extensive branch network is also a significant factor in setting its priorities in the interbank lending market (Figure 6). Banks with the fewest branch offices tend to be the most active in the interbank lending market. They have little access to the retail market, and work mainly with the wholesale segment of the financial market, including the interbank lending market.

At the other end of the scale, banks with a large number of branches also tend to be less involved with the interbank lending market – with the exception of long-term currency credit. Banks with 500 and more branches account for over 95 % of long-term currency loans placed by the Russian banks in the domestic market (although it still only amounts to only 12 % of total assets of the Russian banking sector). This is because retail banks hold large amounts of household deposits, including foreign currency deposits. To minimize interest-rate risks and currency risks, retail banks hedge their deposits with instruments in the same currency at terms comparable to those at which they were taken. In short, such banks are glad to give out currency credits to the other banks, but are averse to borrowing money in the interbank market due to their highly diversified retail liabilities.

## Credit ratings

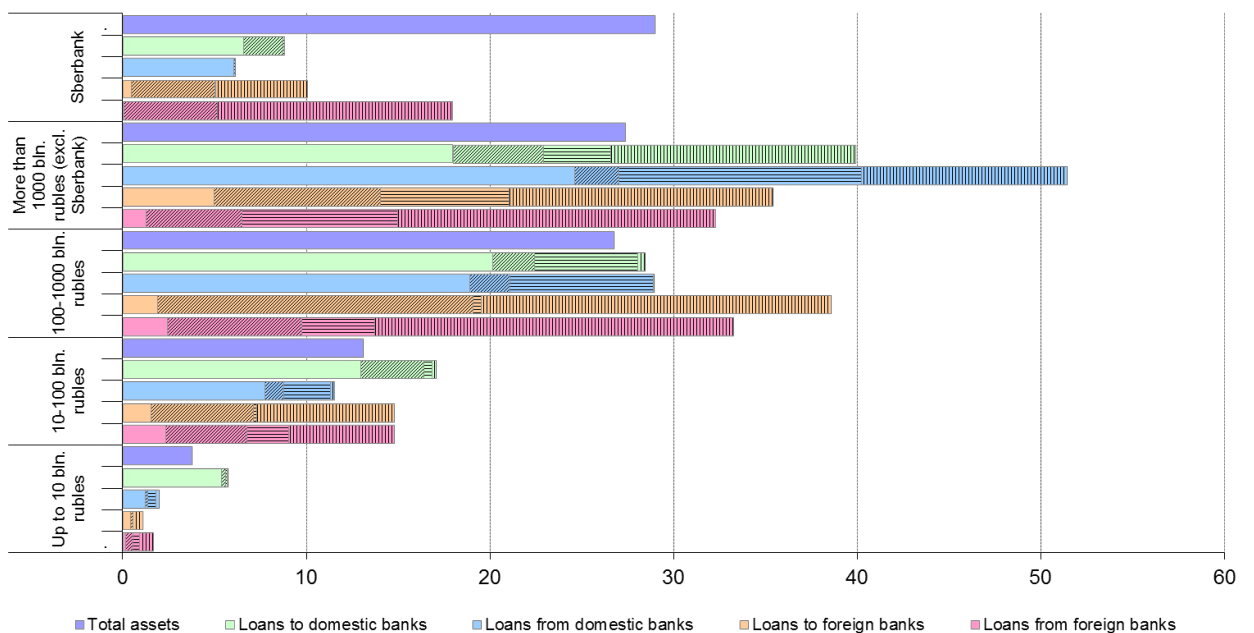
A bank's credit rating can sometimes predict its behavior in the interbank lending market (Figure 7). Banks with high credit ratings tend to be active at the long-term end of the market, enjoying the confidence of international and domestic market participants. Differences in bank borrowing from the interbank market at the long- and short-term ends of the market are reflected in perceived creditworthiness as the average market rate on borrowing for a specific term is influenced by the term itself and the credit quality of borrowers.

Figure 4 Grouping by type of bank: share of banks in consolidated balance sheet indicators of the Russian banking sector (%) \*



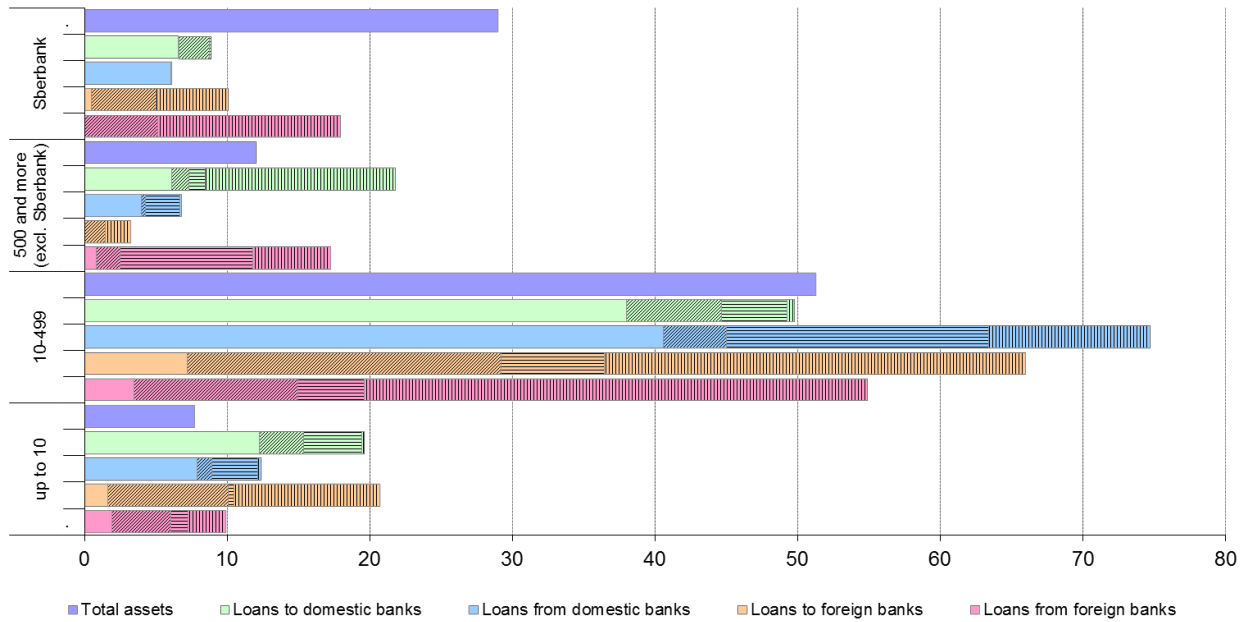
\* Diagonal grid pattern = currency loans of up to one year; horizontal grid = ruble loans of more than a year; vertical grid = currency loans of more than a year; and gridless field = ruble loans of less than a year.

Figure 5 Grouping by size of bank: share of banks in consolidated balance sheet indicators of the Russian banking sector (%) \*



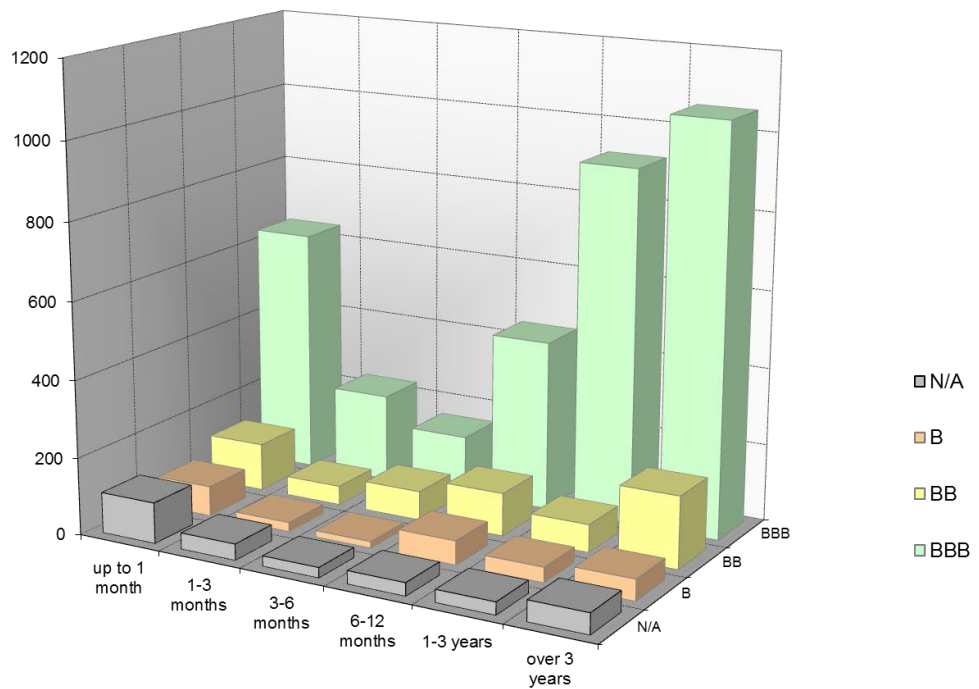
\* Diagonal grid pattern = currency loans of up to one year; horizontal grid = ruble loans of more than a year; vertical grid = currency loans of more than a year; and gridless field = ruble loans of less than a year.

Figure 6 Grouping by extent of branch network: share of banks in consolidated balance sheet indicators of the Russian banking sector (%)\*



\* Diagonal grid pattern = currency loans of up to one year; horizontal grid = ruble loans of more than a year; vertical grid = currency loans of more than a year; and gridless field = ruble loans of less than a year.

Figure 7 Structure of borrowing liabilities of domestic banks: loan maturity and borrower credit rating (liabilities in RUB billion)



## 3 Interbank lending in Russia during the global financial crisis

### 3.1 Common changes in the banking sector

Ruble appreciation was a key driver of interbank lending activity of Russian banks ahead of the global financial crisis as it reduced the servicing cost of foreign currency loans to near zero (or even negative) in ruble terms (Figure 11). Russian banks piled into interbank loans from foreign banks. By mid-2008, such loans represented 12 % of the total liabilities of Russian banks (Figure 8).

With the collapse in global commodity prices in mid-2008, there came a sharp increase in foreign capital outflows from Russia to cover the servicing costs of foreign currency loans taken by banks. Foreign banks became extremely reluctant to lend to Russian banks. The ruble was devalued as oil prices fell, causing flight from ruble-denominated securities and large declines in Russian equity prices. Mass margin calls in the repo market appeared. When some participants failed to meet their settlement deadlines, the market fell into disarray.

As confidence in Russian banks eroded, counterparties shunned exposure to possible further declines in securities and rising costs of currency-denominated liabilities that would eat away at the financial position of banks. The situation was aggravated by post-Lehmann contagion from the US housing market collapse that continued to force bankruptcies and reorganizations of major Western banks. Some banks found themselves fending off runs by depositors.

As credit risk associated with bank liabilities rose sharply, interbank lending rates nearly quintupled (Figure 10). Notably, the rise in long-term rates was not as high as on short-term operations. After several months the interbank lending market saw such distortion of the term structure that rates on loans for over a year were lower than overnight lending rates. This partly reflects that the most reliable banks were those borrowing for the long term, as well as an expectation of banks that the interbank lending market would eventually recover.

Lacking other sources of funding, banks were helpless in the face of rising interbank lending rates and lack of access to sources of finance. To raise funds, they sold off



securities even in the midst of a collapse in stock prices. Some banks faced investor attacks that resulted in a second wave of deterioration of the Russian financial market.

At this point, the Russian government and CBR stepped in to provide liquidity and prevent further destabilization of the banking sector. The CBR made access to refinancing easier for banks, rehabilitated problem banks, and concluded agreements to provide compensation for losses incurred in the interbank lending market. Credits given out by the CBR to commercial banks helped offset reduced interbank lending. By early 2009, over 12 % of the Russian banking system liabilities were formed due to funds provided by the CBR to commercial banks. Besides, the conclusion of agreements to provide compensation for losses incurred in the interbank lending market promoted decrease in credit risks under these operations. The interbank lending market situation gradually stabilized and interest rates fell.

The events of 2008–2009 exposed weaknesses in the financial tactics of Russian banks operating in the interbank lending market. Banks began to modify the structure of their claims and liabilities.

First, as banks better understood the risks on foreign loans, they gradually shifted toward raising funds domestically rather than from international markets (Figure 8). By mid-2010, the share of interbank loans from foreign banks had been cut to around 5–6 % of the total liabilities of Russian banks. This level of exposure has remained about the same since, even if costs in rubles for foreign currency loans again decreased on the recovery in commodity prices (Figure 11).

Second, as banks revisited their liquidity risk, they began to focus more heavily on the long-term end of the interbank market (Figure 9). In 2008, before the crisis struck in Russia, nearly 70 % of domestic borrowing involved loans of one month or less. By early 2011, this parameter share of borrowing had fallen to 40 %.

Figure 8 Indicators of bank liabilities (% of total liabilities)

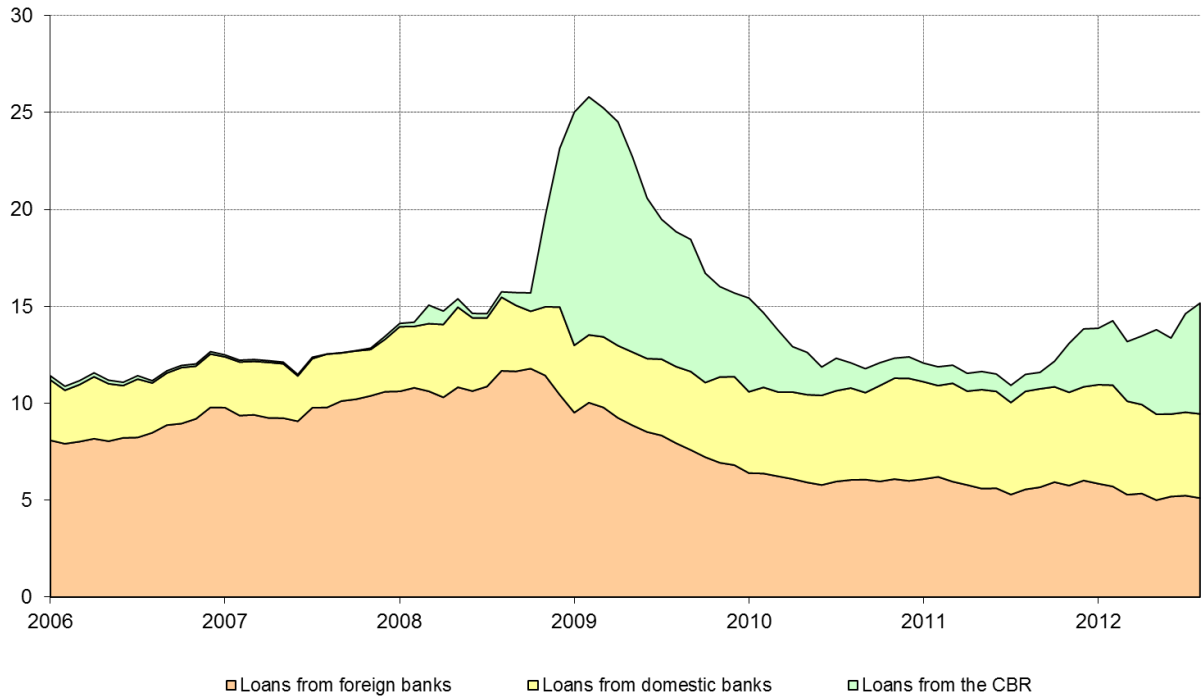


Figure 9 Structure of interbank loans placed in the domestic market (RUB billion)

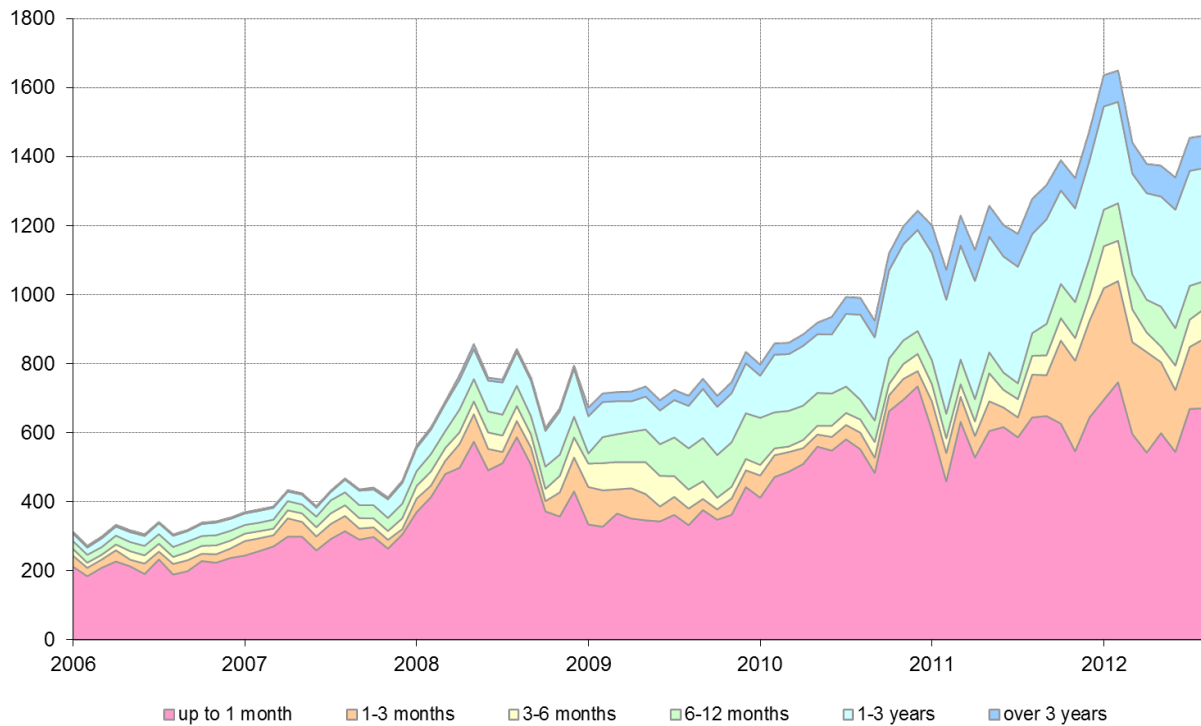


Figure 10 Interbank ruble lending rates (% p.a.)

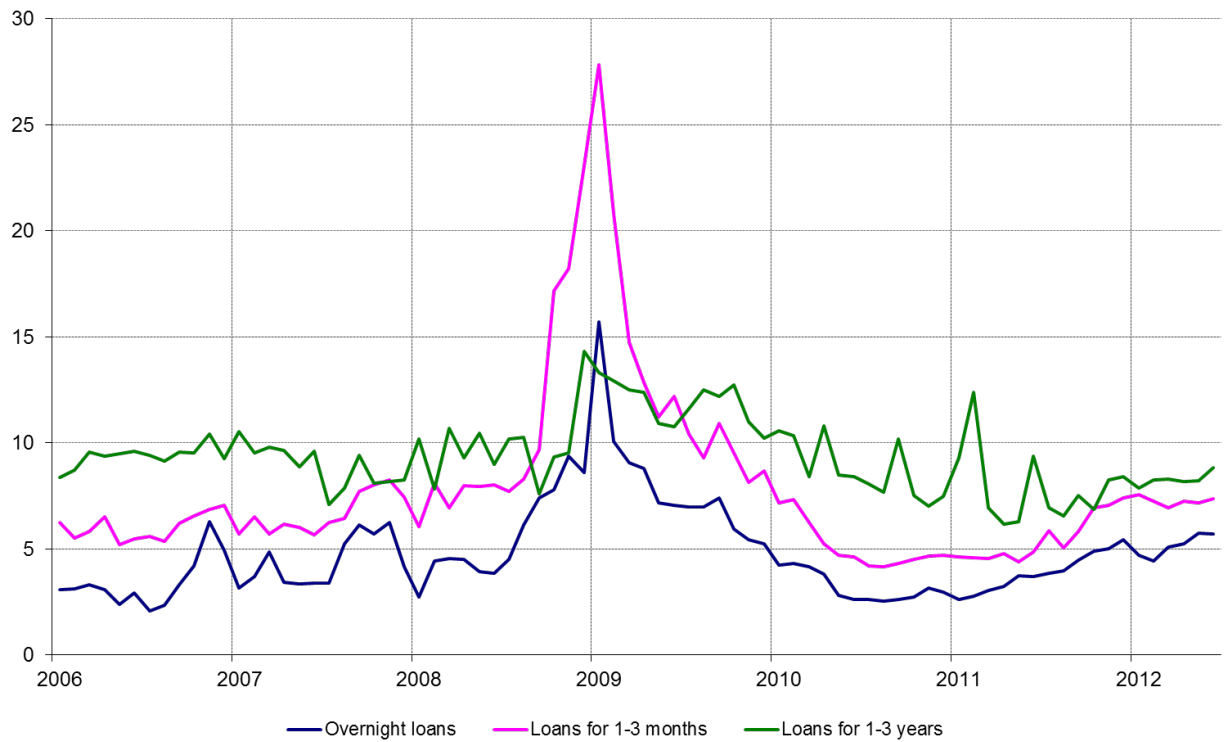
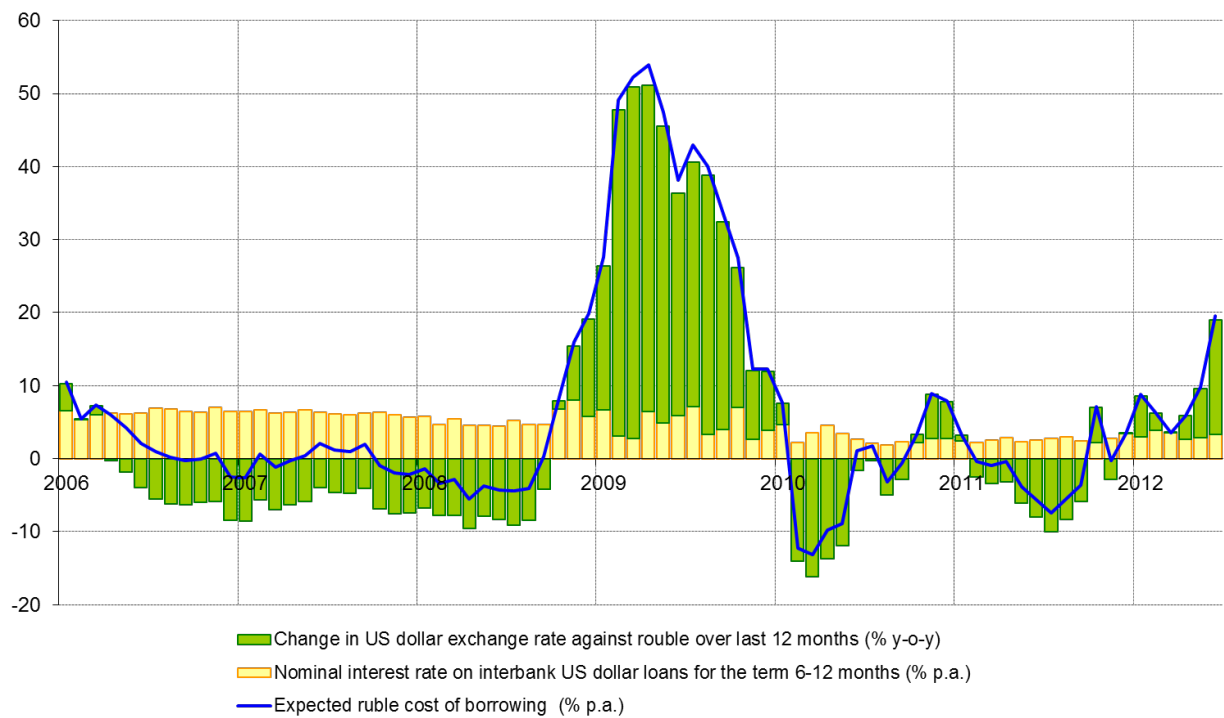


Figure 11 Expected ruble cost of borrowing on USD interbank loans taken by Russian banks (% y-o-y; % p.a.)



## 3.2 Behavior changes in different groups of banks

Most Russian banks adjusted their behavior on the interbank lending market in similar way. They increased the interest rates on loans issued, cut borrowing from foreign banks, and shifted to loans with longer maturity. Closer scrutiny of various groups of banks shows differences in these general tendencies.

Indeed, the destabilization of the Russian financial sector resulted in a sharp stratification of banks according to financial solidity and reputation (i.e. credit ratings). Amid growing uncertainty, borrowing in the money market became more complicated as fewer banks were willing to lend to other banks. Banks with a poor credit rating or no credit rating faced the huge challenges, while large banks with good credit ratings offered other Russian banks a “safe harbor.” High-reputation banks became the focus of interbank loans on the domestic interbank lending market (Figure 16).

Stratification in the banking sector was aggravated by heterogeneity of banks in their access to CBR refinancing instruments. Banks with a high credit rating found it much easier to turn to the CBR for funds than other banks (Figure 15). In the first half of 2009, these creditworthy banks accounted for over 70 % of commercial bank borrowing from the CBR. Regarding loans for over a year, they accounted for over 95 % of borrowing from the CBR. Good credit ratings, as a rule, go to banks with prudent lending and borrowing policies. In particular, these are the banks that hold large portfolios of low-risk government bonds or other fairly liquid, low-risk securities that can serve as high-quality collateral for the CBR. Moreover, systemically important Russian banks tend to be those that can count on the CBR for funds on favorable terms, and, as a rule, have good credit ratings.

Thus, banks with strong credit ratings found it easy to raise funds in the interbank lending market. Banks with lower or no credit ratings had little leverage and were forced to accept agree on high interest rates or worse conditions. The spread between interest rates on overnight loans to banks with a speculative-grade rating B and loans to banks with an investment-grade rating BBB before the crisis was no more than one percentage point. In the depths of the crisis, the spread reached eight percentage points. Similar dynamics characterized rates on interbank loans in foreign currencies (Figures 12 and 13).

Stratification of the market participants manifested not only in interest rate spreads, maturities as well. Uncertainty and aversion to liquidity risk pushed banks to focus on the longer end of the interbank loan market. Longer maturities and rising credit risk

made creditors more reluctant to lend to banks with low credit ratings. Term structures of each group of banks became quite distinct. The share of loans for more than a year in total amount of loans from banks with a credit rating BBB increased from 19 % at the beginning of 2008 up to 61 % at the end of 2009. The similar parameter for banks with credit rating BB increased from 4 % to 39 %, while banks with credit ratings of B increased from 3 % to 16 % (Figure 16).

With the gradual stabilization of the Russian banking system, the spread between rates on loans to banks with a different credit rating decreased. At the same time, the distinct term structures for each group of banks classed by credit quality that emerged during the financial crisis persists to this day.

The substitution of international sources of funding with domestic sources was another market change that occurred during the crisis. Here, structures of ownership played a big role in distinguishing various bank groups, amplifying pre-crisis behavior of Russian banks in the global interbank lending market. Unlike other groups of banks, state banks remained hesitant about borrowing from foreign lenders.<sup>6</sup> In short-term lending operations, before the crisis period (up to mid-2008) Russian state banks were typically in the position of net creditor to foreign banks, while in the long-term end of the market they were net borrowers. This is an important reason state banks were able to shrug off the crisis. In contrast, privately held banks, and foreign-owned banks in particular, pursued more risky strategies that boosted net liabilities to non-residents in both short-term and long-term borrowing. The shock from realignment of pricing of short-term loans after the ruble's "accelerated depreciation" damaged the financial position of these banks in late 2008 and early 2009.

During the crisis, Russian banks began to reduce their net long-term borrowing from foreign banks and simultaneously increase net short-term lending to non-residents. The speed of reaction and degree of change in lending operations differed across the major groups of banks. State banks reacted first. By late 2008, they had begun to reduce their net long-term borrowing, taking this exposure close to zero by mid-2010. Private banks got a later start in restructuring their foreign claims and liabilities. For a while, they were even net creditors in the global interbank lending market as their net short-term assets exceeded net long-term liabilities. Throughout the crisis period, private banks remained net borrow-

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<sup>6</sup> Net borrowing is the difference between the total amount of loans taken by Russian banks from foreign banks and those granted by Russian banks to foreign banks.

ers in long-term operations. Foreign-owned banks, which had little short-term exposure to start with, did little to reduce their net long-term liabilities and actually increased net short-term assets. As their total liabilities exceeded total assets, they remained net borrowers. The structure of operations between Russian and foreign banks that evolved during the crisis has persisted to this day.

Figure 12 Interbank rates on overnight ruble loans: borrowing grouped by bank credit rating (% p.a.)

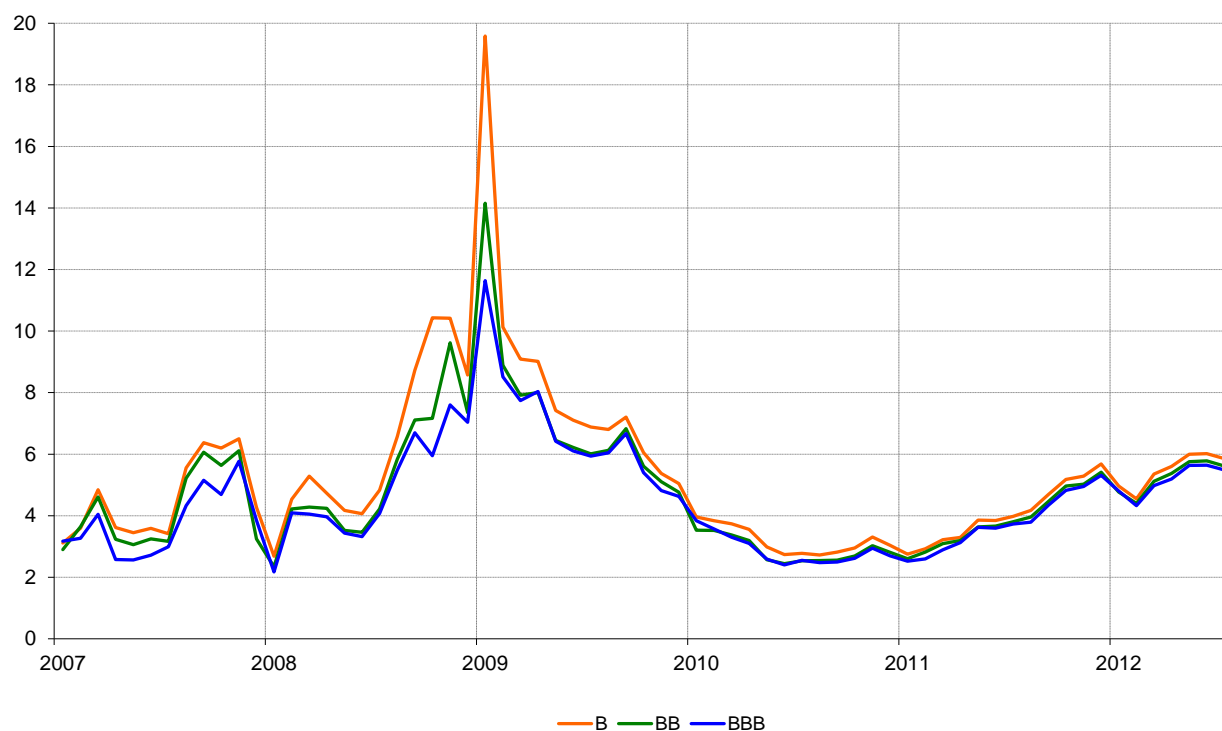


Figure 13 Interbank rates on overnight US dollar loans: borrowing grouped by bank credit rating (% p.a.)

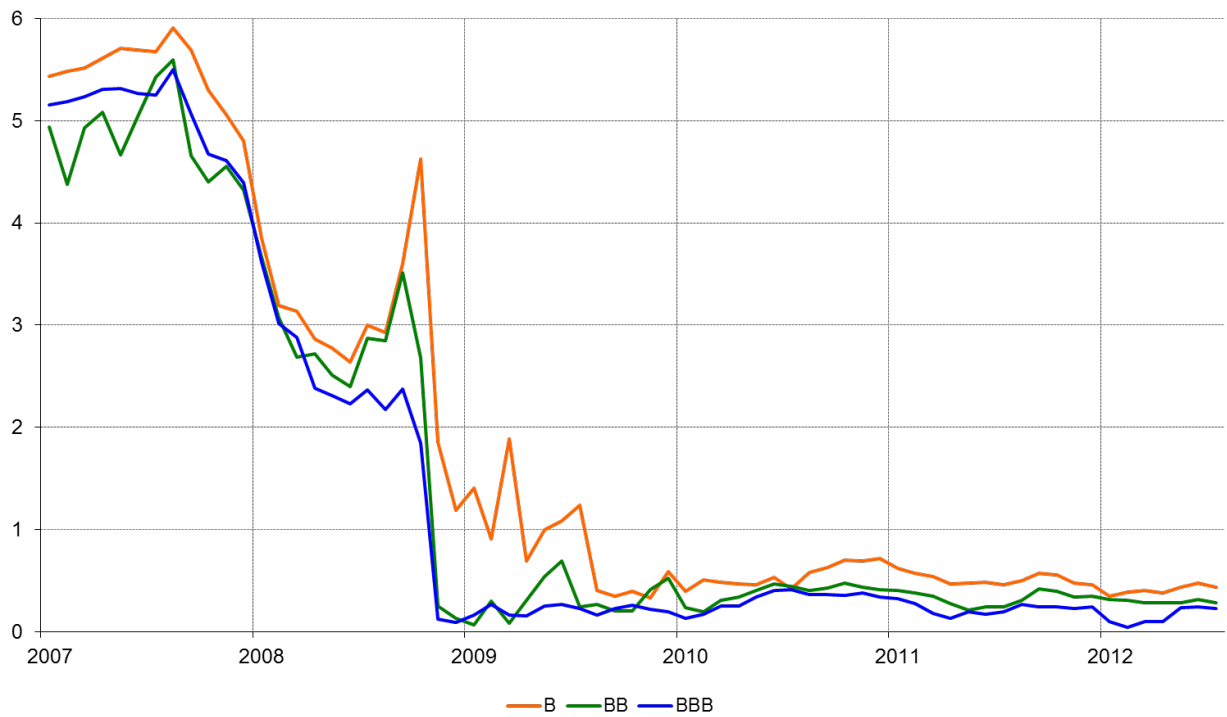


Figure 14 Net borrowing of Russian banks from foreign banks (RUB billion)

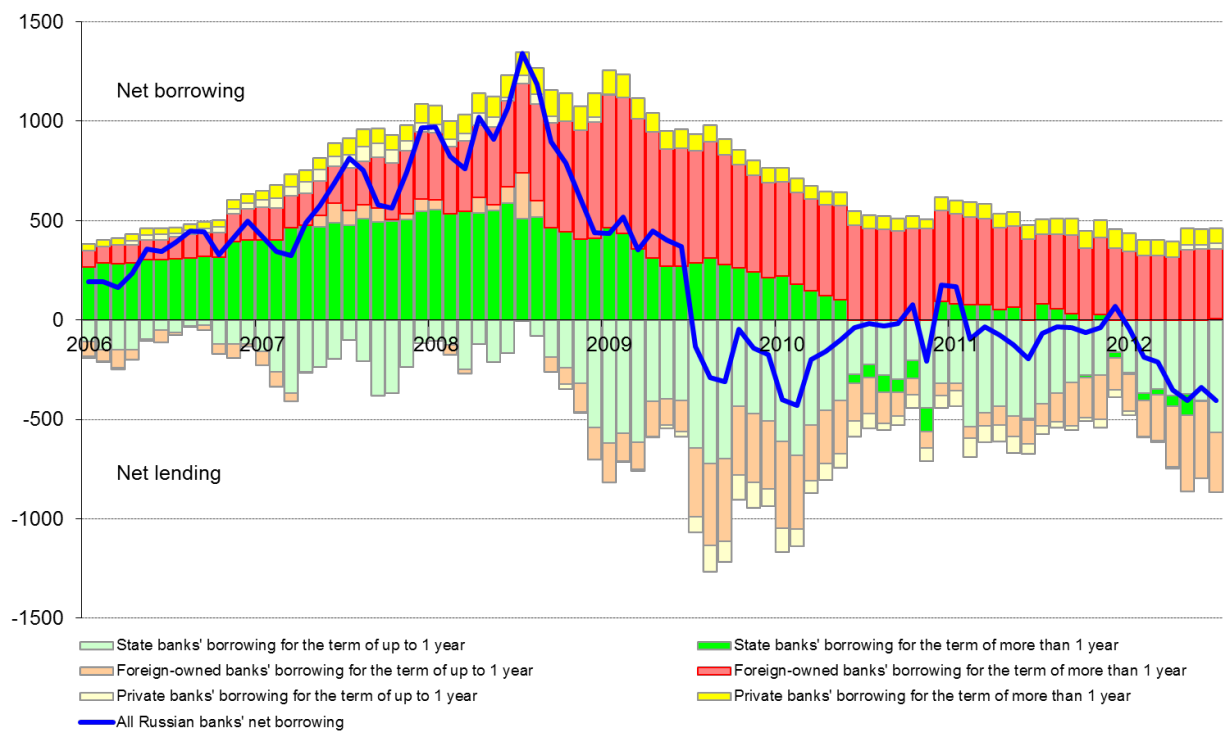


Figure 15 Liabilities of Russian banks to the CBR grouped by bank credit rating (RUB billion)

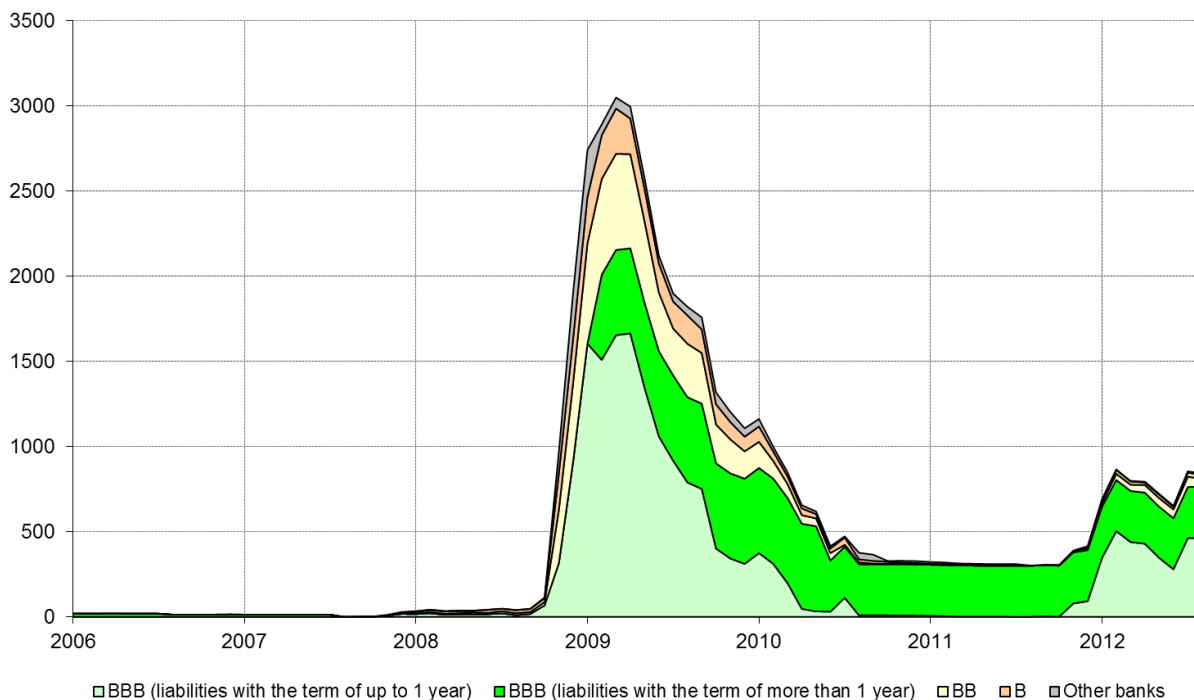
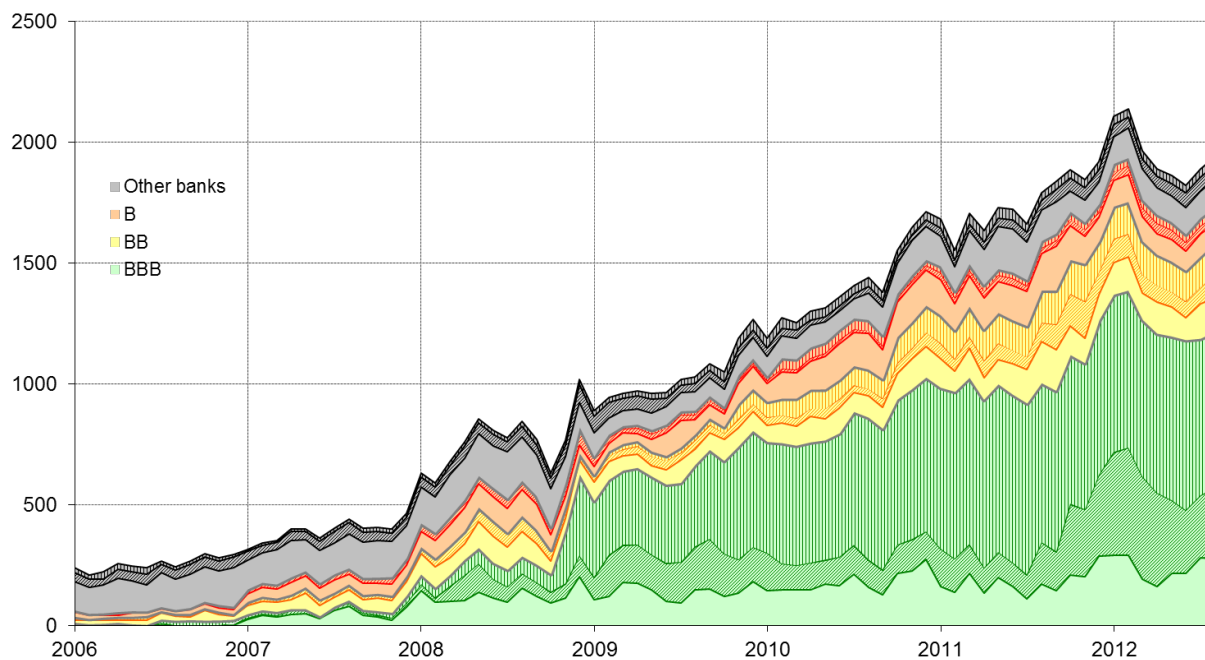


Figure 16 Term structure of interbank loans taken by Russian banks grouped by credit rating\* (RUB billion)



\* Diagonal grid lines indicate loans with terms of 1–12 months; vertical grid lines indicate loans with terms of over a year; no grid indicates loans of less than 1 month.



## 4 The price-setting mechanism of Russia's overnight interbank lending market

### 4.1 Main factors influencing ruble interbank lending rates

The complexity of the price-setting mechanism in the interbank market and high interest-rate volatility stem from such factors as the complicated structure of the Russian interbank lending market, differences in financial strategies pursued by banks in specific segments of the interbank market, the large number of institutions, and a lack of transparency.

The term of an interbank loan reflects its borrower's motivations, so the factors that determine rates are appropriate for that specific term. As noted in sections 2 and 3, these distinctions in price-setting for loans with shorter and longer maturities are aggravated by who is participating in that particular end of the market.

While a full analysis of pricing in all segments of the Russian interbank lending market is beyond the scope of this work, an analysis of the overnight segment of the market provides useful insights. Moreover, it is the most interesting part of the market both for the monetary authorities and market participants. The overnight lending segment is the biggest and the most liquid segment of the Russian interbank lending market. MIACR sampling from 2013 shows overnight transactions accounted for over 90 % of the interbank lending volume. Thus, the rates on overnight interbank loans are the most sensitive indicators of changes in banking system conditions and the Russian economy as a whole.

Empirical analysis of the dynamics of money market rates allows identification of a spectrum of fundamentals that influence interest rates. Two crucial factors in price-setting are the CBR's standing facilities and open market operations.

About 500 commercial banks in Russia, including most of large banks, are qualified to borrow or place deposits with the central bank. The CBR provides an alternative to these banks to borrowing or placing funds on the money market. If the offered money market rates are outside the central bank's interest-rate corridor, commercial banks can turn to the CBR. As a result, money market rates rarely leave the rate corridor set by the CBR's standing facilities (Figure 17).<sup>7</sup>

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<sup>7</sup> Rare cases of dynamics of the money market interest rate outside this range usually reflect restrictions on transactions imposed by the CBR (e.g. restrictions on transaction volume, transaction timing, and acceptable collateral).

The level of the interbank lending rate within the range described above is mainly determined by the liquidity stance in the banking system. Thus, during periods of substantial liquidity surplus interbank lending rates approach the lower boundary of the interest-rate corridor, whereas in times of liquidity shortage interest rates move toward the upper boundary of the corridor.<sup>8</sup> When the volume of liquidity in the banking system approaches equilibrium, interbank lending rates settle close to the middle of the interest-rate corridor. As the volume of banking sector liquidity exceeds the equilibrium liquidity level, interbank market rates move toward the CBR's deposit facility rate.

Here, we use the indicator of structural liquidity position of credit institutions to measure the liquidity stance of the banking system. This is calculated as the difference between correspondent and deposit account balances of credit institutions with the CBR less the average value of required reserves held by credit institutions on the correspondent accounts with the CBR, and the total amount of CBR claims on credit organizations for such operations as direct repo, overnight loans, asset-based and guaranteed loans, and unsecured loans.<sup>9</sup>

A feature of money market interest-rate dynamics is the pronounced hikes of interbank rates that typically occur in the final days of the reserve maintenance period. This reflects tax payments coming due at the end of the month, the timing of which is largely the product of Russian legislation.<sup>10</sup> VAT is due on the 20<sup>th</sup> of the month, and a number of other taxes are due at the end of the month including the corporate profit tax, minerals resource extraction fees, and the excise tax.

Until November 2009, this "end-of-the-month effect" was aggravated by the fact that the reserve-averaging period coincided with the end of the calendar month. Starting from December 2009, the reserve-averaging period was set from tenth calendar day of current month to the tenth calendar day of next month. This contributed to a smoothing of seasonal peaks in money market rates. However, higher demand for liquidity at the end of the month and a spike in money market rates remains a familiar pattern in Russia.

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<sup>8</sup> The CBR uses a wide spectrum of liquidity provision instruments with various interest rates. Thus, in periods of low liquidity, the money market rate usually stays in the range between the minimum interest rate on repo auctions (the lowest rate at which the CBR provides liquidity) and the CBR's overnight credit rate (the highest rate of the CBR's liquidity provision instruments).

<sup>9</sup> The indicator of a structural liquidity position does not include CBR bonds and preferential long-term loans granted by the CBR to systemically important banks in a period of crisis.

<sup>10</sup> Similar daily dynamics in interbank lending rates can be observed in China's money markets (see Porter and Xu, 2009).

Other factors have influenced the Russian interbank lending market at various times in its development. In periods of market instability, credit risk and trust among banks have played important roles in interbank loan pricing. Large-scale growth in interest rates at the end of 2008 and the beginning of 2009 involved the structural liquidity deficit and the decline in trust among banks. Russian banks pre-crisis were active in the short-term borrowing from foreign banks, and changes in the ruble's exchange rate against major world currencies strongly affected money market rates. Banking sector liquidity is affected by interest rates on the CBR's operations and shifts in e.g. collateral requirements and operation limits, as well as dynamics of the interbank rate. These various factors have come to prominence in episodes of stress in the interbank lending market.

## 4.2 Econometric model of ruble interbank lending rate dynamics

### 4.2.1 Data

In this section, we present a small econometric model to analyze overnight interbank lending rates in Russia. There have been many adjustments to interest rates on CBR refinancing and deposit operations over the past decade. This has been reflected in money market rates and their volatility. To abstract from changes in CBR interest rates and analyze pure changes in money market rates caused by liquidity effects, we here use the normalized spread between the interbank lending rate and CBR's tom-next deposit rate. The spread is given by:

$$S = \frac{I - I_D}{I_R - I_D} \quad (1)$$

where  $I$  is the overnight interbank lending rate,  $I_D$  is CBR's tom-next deposit rate, and  $I_R$  is CBR's fixed repo rate. We would expect the spread to range between 0 (when the interbank market rate equals to the CBR's tom-next deposit rate) and 1 (when the interbank market rate equals the CBR's fixed repo rate). Values of  $S$  outside the (0,1) range should only be observed during periods of extreme market volatility.

The spread  $S$  should depend strongly on the liquidity position of the banking sector, so we construct a unique measure of structural liquidity position (SLP). SLP is defined as the sum of banking sector's assets and liabilities vis-à-vis the CBR (see Table 1). Figure

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18 plots daily observations from January 2008 to May 2013 of our indicator of banking sector liquidity against the spread.

During the crisis period, the sharp rise in interbank lending rates is accompanied by a substantial weakening of the link between rates and the level of banking sector liquidity. In the most dramatic phase of the crisis (from August 2008 to February 2009), spikes in spread  $S$  occurred even on calendar days when the structural liquidity position was positive (Figure 18). Figure 19 depicts the same sample excluding all observations during the most dramatic phase of the crisis. Visual inspection confirms spread  $S$  and SLP are linked through a non-linear relationship. When the structural liquidity position is close to zero, even small changes of the latter indicator have a noticeable effect on spread  $S$ . As the absolute value of the SLP grows, the liquidity elasticity of money market rates and spread  $S$  seems to gradually decline (Figure 19).

Figure 19 clearly shows an “end-of-the-month effect.” Most days when the value of  $S$  exceeds 0.4 (when SLP was positive) and 0.8 (when SLP was negative) correspond to the last six days of the calendar month.

The end-of-the-month effect is not observed over the entire estimation sample. Sometimes the level of money market rates at the end of the month does not differ significantly from the average interest-rate level for respective SLP volume.

The biggest increase in the interest rate takes place during the last days of the calendar month. Four to six days before the end of the month, interest rates may also rise, but this occurs less frequently and its magnitude is lower than the growth of the final three days of the month. The change reflects tax payments coming due at the end of calendar month and a corresponding drop in banking sector liquidity. The end-of-the-month effect also coincides with the rise of the interbank lending rate that results from the decrease in liquidity. Notably, during periods of excess liquidity, interest rates also rise on calendar effects.

The descriptive statistics of the parameters used in the analysis are shown in Table 1.

Table 1 Descriptive statistics of interest rates and bank liquidity indicators,  
daily data from January 9, 2008 to May 31, 2013

Data type	N	Parameter	Mean	Std. deviation	Min.	Max.	Observations
Interbank rates, % p.a.	1	MIACR	5.19	2.48	1.19	27.95	1341
	2	MIACR-IG*	4.24	1.34	0.39	6.45	843
	3	MIACR-B*	4.53	1.33	0.68	6.83	843
CBR rates, % p.a.	4	CBR's tom-next deposit rate	4.05	1.32	2.50	7.75	1341
	5	Fixed repo rate	7.67	1.57	6.25	12.00	1341
Banking sector liquidity indicators, RUB billion	6	Required reserves (on correspondent account balances with the CBR)	312.03	184.32	37.00	666.00	1341
	7	Excess reserves (on correspondent account balances with the CBR)	306.48	134.87	-80.80	990.10	1341
	8	Balances on deposit accounts with the CBR	320.54	239.56	61.50	1171.90	1341
	9	Liabilities for repo operations with the CBR	406.30	567.46	0.00	2168.29	1341
	10	Liabilities for other credits of the CBR	258.34	267.77	0.00	921.84	1341
	11	Liabilities for unsecured credits of the CBR	263.17	513.84	0.00	1924.12	1341
	12	Liabilities for overnight credits of the CBR	12.58	58.73	0.00	383.15	1341
	13	Liabilities for Lombard credits of the CBR	12.52	15.54	0.01	58.58	1341
14	Structural liquidity position (SLP) (7)+(8)-(9)-(10)-(11)-(12)-(13)	-275.1	1059.9	-2617.7	1457.2	1341	

\* Data available from 2010. Source: CBR

Figure 17 Banking sector liquidity indicators and money market rates

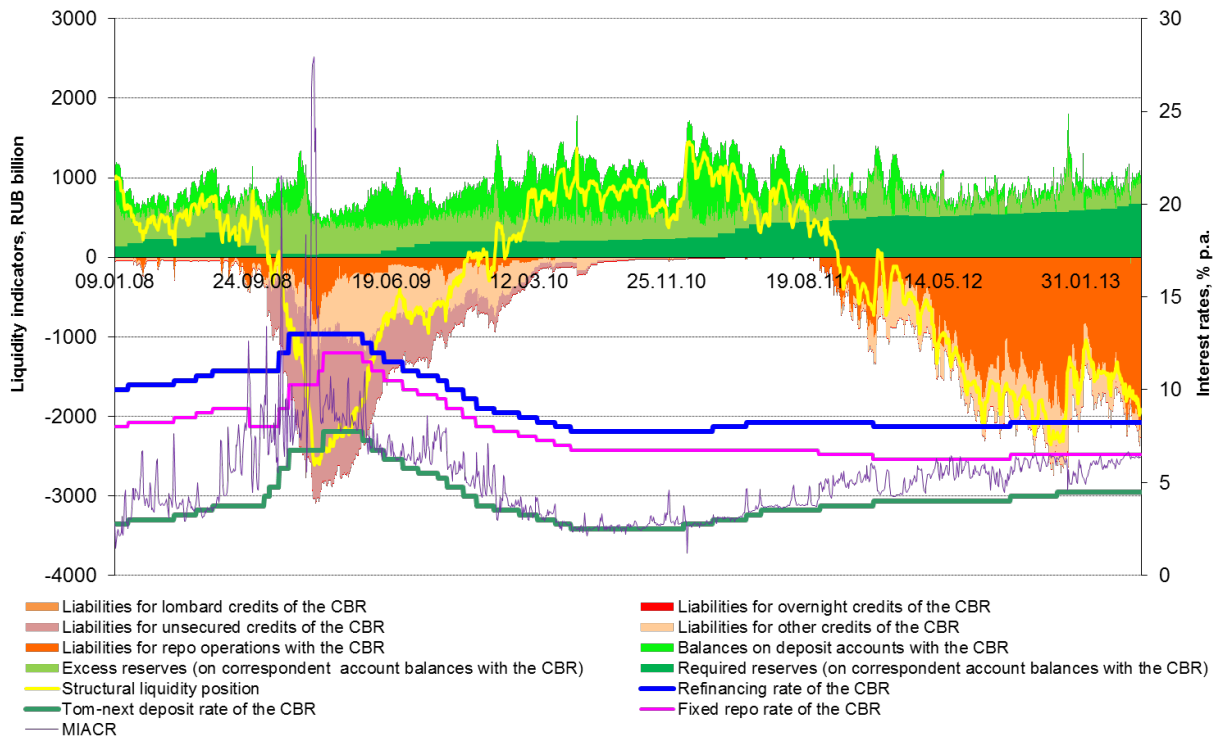


Figure 18 Bank liquidity and money market rates

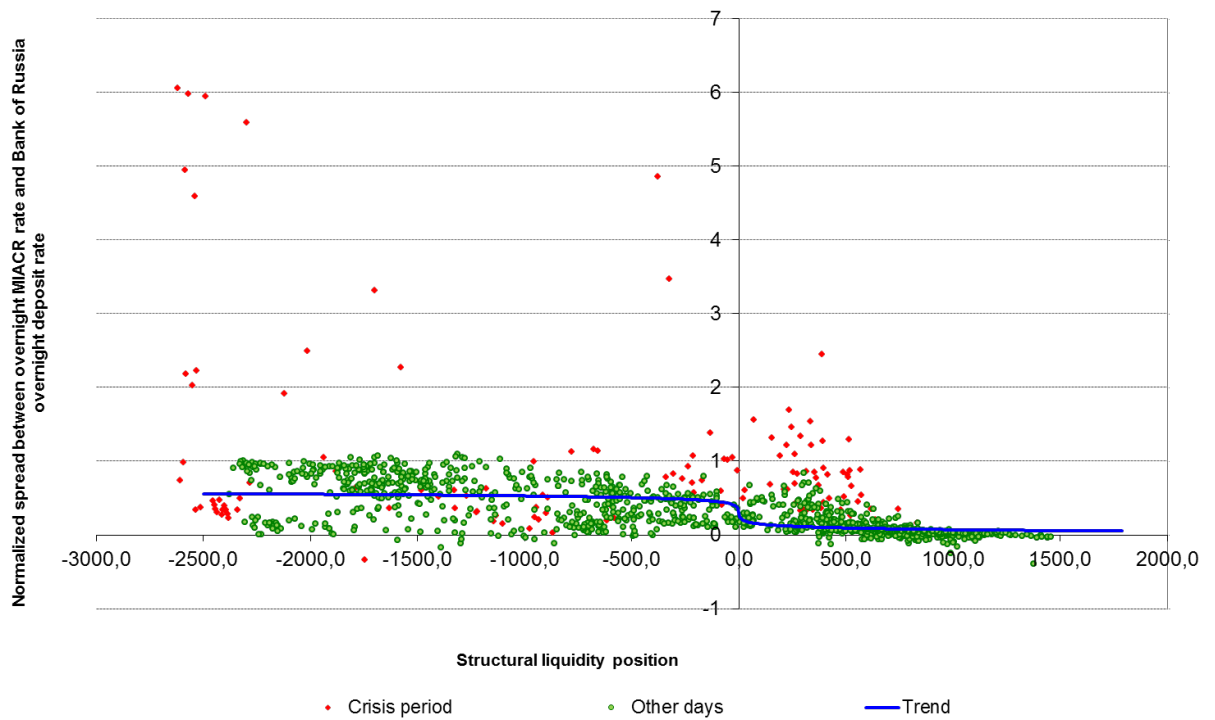
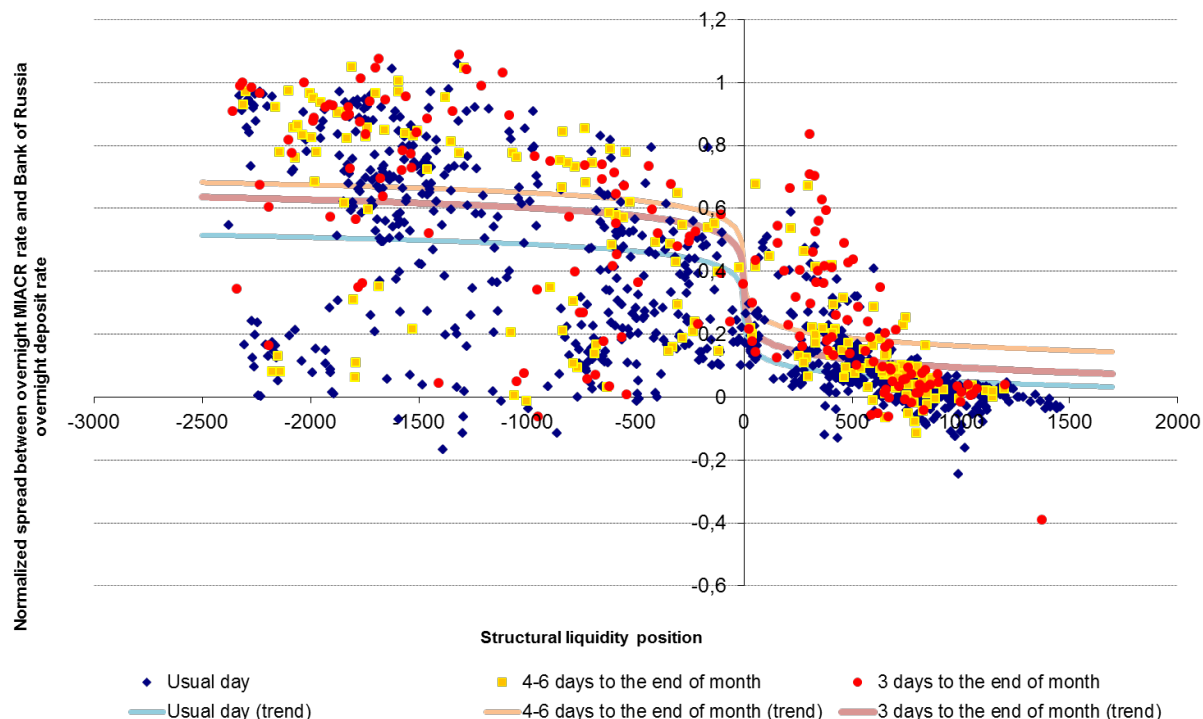


Figure 19 Bank liquidity and money market rates



### Econometric analysis: the basic model

We consider a large spectrum of functional forms that can be used for studying the relationship between money market rates and banking sector liquidity. To describe the relationship, we introduce a function  $slg_c$ <sup>11</sup> which gives a good approximation of relationship between the spread  $S$  and SLP:

$$slg_c(x) = \begin{cases} \lg_c(x), & \text{if } x > c \\ x/c, & \text{if } -c < x < c \\ -\lg_c(-x), & \text{if } x < -c \end{cases}, \quad (2)$$

where  $c$  is a base of the logarithm and  $x$  is a structural liquidity position.

<sup>11</sup> The functional form must satisfy two conditions. The first condition is that the sign of the function's first derivative is strictly positive while sign of the function's second derivative is opposite to the sign of the function's argument. The second condition is that the values of the first derivative decrease as the absolute values of the argument increase, asymptotically approaching the x-axis (e.g. logistic functions, root functions with odd indices). Note, however, the results of such functions generally lend themselves less to economic interpretation than the symmetric log-function.

The quantitative evaluation of the relationship between the level of banking sector liquidity and  $S$  is carried out by regression of the form:

$$S = a + b \times \text{slg}_{1,1}(L_{SLP}), \quad (3)$$

where  $L_{SLP}$  represents SLP for all days of the analyzed sample except for periods that correspond to the dramatic phase of the crisis, as well as some additional sub-samples illustrated in Figure 19. The values of estimated regression coefficients are provided in Table 2. For the coefficients estimation, we use the OLS method.

Table 2 Bank liquidity and interbank lending rates

Sample	a	b	R2	Observations*
All days of calendar month	0.300 (46.07; 0.00)**	-0.00315 (-33.54; 0.00)	0.48	1199
Last three days of calendar month	0.406 (21.13; 0.00)	-0.00336 (-12.00; 0.00)	0.46	174
4-6 days from end of the month	0.348 (19.47; 0.00)	-0.00350 (-13.58; 0.00)	0.52	174
Other days of calendar month	0.267 (37.56; 0.00)	-0.00301 (-29.30; 0.00)	0.50	851

\* Excluding 142 observations dated within the most dramatic phase of the crisis.

\*\* t-statistics and p-values shown in parentheses.

Thus, an increase in the SLP by 10 % leads to a decrease of the interbank lending rate by 0.336 % of the CBR's fixed repo rate-deposit rate spread on the last three days of calendar month, and by 0.350 % on the three days prior to that. For all other trading days, the estimates show this indicator equals 0.301 % of the corridor width. At the same time, the equilibrium level of interbank lending rate as captured by the constant  $a$  (i.e. the interest rate level that achieved when SLP equals zero) on the last day of calendar month is substantially higher than on regular days. Given this fact, the spread between money market interest rates at the end of the month, on one hand, and the spread on all other days of the



month, on the other, is lower under positive values of SLP than under negative values of SLP. This conclusion confirms our previous observations that the end-of-the-month effect is more pronounced during periods of liquidity shortage.

### Econometric analysis: model extension

Throughout the analyzed sample, the situation on the interbank market can be described by qualitative shifts caused by exogenous factors (e.g. the global financial crisis and the euro zone debt crisis), as well as endogenous factors (e.g. changes in CBR's monetary policy and behavior of market participants). To analyze these changes, we offer a simplified model of the price-setting mechanism on the interbank lending market, which takes the following form:

$$I = I_D + k_1 \times L + k_2 \times d_f + k_3 \times d_g, \quad (4)$$

where  $I$  is MIACR overnight ruble rate,  $I_D$  is CBR's tom-next deposit rate,  $L$  is a logistic function  $L = \frac{1}{1 + e^{z \times L_{SPL}}}$ ,  $d_f$  and  $d_g$  are dummy variables, equal to 1, if the current day corresponds to the last three working days of the calendar month ( $d_f$ ) or to 4–6 working days from the end of the calendar month ( $d_g$ ), and 0 otherwise. In the logistic function  $L$ , we set  $z$  equal to 0.0024756.

The model for the overnight interbank ruble lending rate was estimated on a rolling time interval of 250 working days starting from sub-sample Jan. 9, 2008 – Dec. 31, 2008, and up to sub-sample Jun. 1, 2012 – May 31, 2013. For estimation of model coefficients, we use OLS. The modeling results are presented in Figure 20.

Our estimates generally confirm our preliminary analysis. In times of crisis, price-setting mechanisms in the interbank lending market are characterized by extreme instability, reflected in the high volatility of model coefficients and their statistical properties.

Starting from March 2010, when the last calendar days of the sharpest phase of the crisis (around February 2009) were removed from the sample, the statistical properties of the models improve dramatically. Throughout the subsequent periods of the estimation sample, the model coefficients are less volatile. The estimate of the elasticity  $k_1$  approached 2, which corresponds to the actual spread between interest rates on CBR deposit operations and repo auctions.

The estimated models for the first half of 2011, when the excess liquidity of 2010 was replaced with a liquidity shortage (SLP became negative), show banks were ill-equipped to deal with their new circumstances. The correlation between money market rates and liquidity indicators decreases initially, but as banks gradually adapt to the liquidity shortage, the correlation rises. These changes, along with slow growth in  $k_1$  elasticity in 2011, are explained by both bank adaptation to the structural liquidity shortage and changes in CBR monetary policy. The CBR increased reserve requirements in the first half of 2011, thereby increasing the demand of banks for liquidity and causing changes in the modeling results.

Throughout most of the analyzed sample, the values of coefficients  $k_2$  and  $k_3$ , which characterize the end-of-the-month effect, fall in the range of 0.2 to 0.6, with the estimated value of  $k_2$  consistently exceeding the estimate for  $k_3$ . When the estimated values of structural liquidity position turn negative, the respective elasticity starts to increase, reflecting, in turn, the growing instability of the liquidity stance in the banking system. In mid-2012,  $k_2$  and  $k_3$  elasticities cease to increase, suggesting that Russian banks have gradually adapted to the structural liquidity shortage.

Changes in price-setting mechanisms in 2011 and 2012 reflect two shifts in CBR monetary policy.

First, the CBR has gradually been expanding the allowed fluctuation band of the ruble's exchange rate since 2008. The wider band permits greater ruble volatility, so currency risk in the forex segment of the money market increases. This curbs the appeal to Russian banks of short-term borrowing from foreign banks. Moreover, the scale of CBR interventions in the domestic foreign currency market decreases, so the significance of this autonomous liquidity factor is diminished and the influence of an external environment on the Russian interbank market weakens.

Second, in the post-crisis period the CBR begins to take a more systematic approach that involves paying greater attention to bank liquidity management, especially monitoring and forecasting. Faced with a worsening structural liquidity shortage in 2012, for example, the CBR expanded its list of securities allowed as collateral in refinancing operations with the CBR and raised repo auction limits. With the drop in foreign exchange swap rates in June 2012, this refinancing instrument availability widened. The CBR gradually narrowed the band of standing facilities rates. These measures by the CBR to improve the efficacy of its monetary policy toolbox have helped reduce money market rate volatil-

ity within the limits of the interest-rate corridor on CBR operations and have made refinancing instruments more accessible to credit institutions. All these factors have collectively smoothed price-setting in the interbank lending market during structural liquidity deficits that resulted in slight decrease in  $k_2$  and  $k_3$  and sharp fall in  $k_1$  volatility.

In 2010, the CBR added MIACR-IG (investment grade) and MIACR-B (speculative grade) rates to signal creditworthiness. The analysis of the dynamics of the MIACR rates reveals several behavioral features of different banking groups in the interbank lending market.

The results of modeling of these rates dynamics are depicted on Figures 21 and 22. Analyzing the results, we may conclude that price-setting mechanisms for loans to banks with speculative and investment credit ratings differ considerably. During the 2010–2011 liquidity surplus, rates on loans to highly reliable banks poorly reflected the actual liquidity positions of banks, and estimates of  $k_1$  did not exceed 0.6. At the same time, liquidity position was strongly related to rates for banks with speculative-grade credit ratings, with estimates of  $k_1$  approaching 2. We should note here that this high value for the  $k_1$  factor may reflect a premium for credit risk. It is also important to remember that values of  $L$  during the period of liquidity surplus are quite low. Thus, in the period of a structural liquidity deficit, the end-of-the-month effect for banks with an investment credit rating was expressed more strongly than for banks with a speculative credit rating (estimates of  $k_2$  and  $k_3$  in models for MIACR-IG exceeded similar estimates for MIACR-B models built for the same period).

The situation changes once we move from a structural liquidity surplus to a structural liquidity deficit. The short period of moderate growth of coefficient  $k_1$ , largely a reflection of how poorly prepared banks were for the liquidity shortage, was followed by a decrease in  $k_1$ . On top of that, estimates of  $k_2$  and  $k_3$  for the MIACR-B models start to exceed their respective coefficients for the MIACR-IG models.

These changes in coefficient estimates may be explained by the substantial differences in the liquidity management policy of top-tier and second-tier banks. Top-tier banks, with their high credit ratings, good reputations, and extensive branch networks, can borrow in the interbank market whenever they wish. Second-tier banks, in contrast, may have trouble borrowing under dodgy money market conditions. As a result, second-tier banks tend to hold larger portfolios of liquid assets (primarily, correspondent account balances

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with the CBR). When there is a liquidity surplus, top-tier banks, as usual, experience no difficulties in attracting funds. Changes in SLP have only a weak effect on interest rates.

During periods when all market participants increase their demand for liquidity (especially at the end of the month), borrowing rates across top-tier banks pick up. This growth is quite substantial due to the fact that these banks do have small liquidity cushions to smooth any spike in demand for funds. Second-tier banks, in contrast, are less vulnerable to the end-of-the-month effect and more susceptible to general liquidity conditions. During the period of liquidity shortage, top-tier banks and second-tier banks respond to changes in SLP. The significance of shocks, related to the end-of-the-month effect, rises as well, but the ability of a bank to access funds from the interbank lending market starts to play the major role in determining the level of interest rate, and not the availability of a liquidity cushion. This, in turn, boosts growth of estimates  $k_2$  and  $k_3$  in our MIACR-B models.

Regardless of their sketchiness and simplification, the interbank lending market price-setting models described above clearly confirm our thesis that the Russian interbank lending market is highly heterogeneous in general, and across various maturities and market participant groups in particular. This justifies the need for a specific model of interest rate determination for distinct segments of the interbank market.

Figure 20 Modeling results for MIACR on overnight ruble loans \*

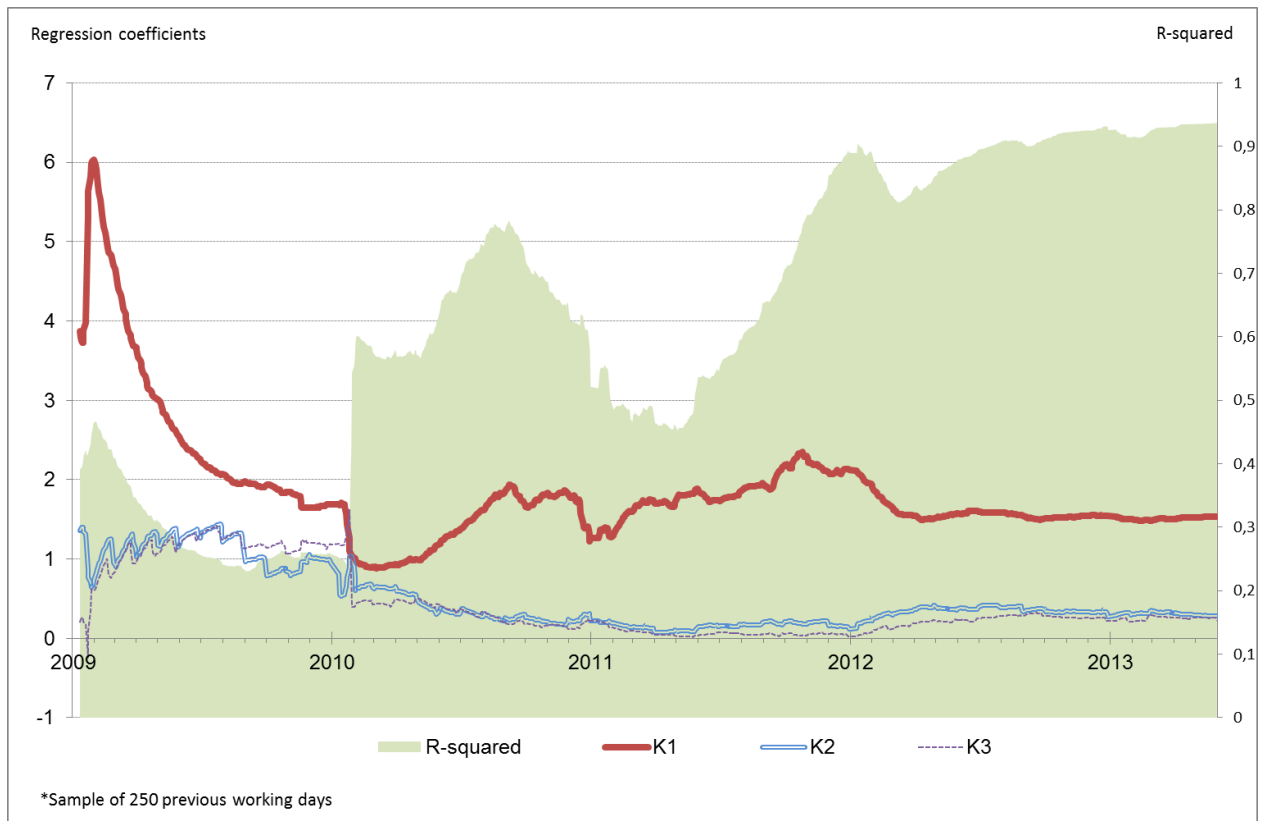


Figure 21 Modeling results for MIACR-IG on overnight ruble loans \*

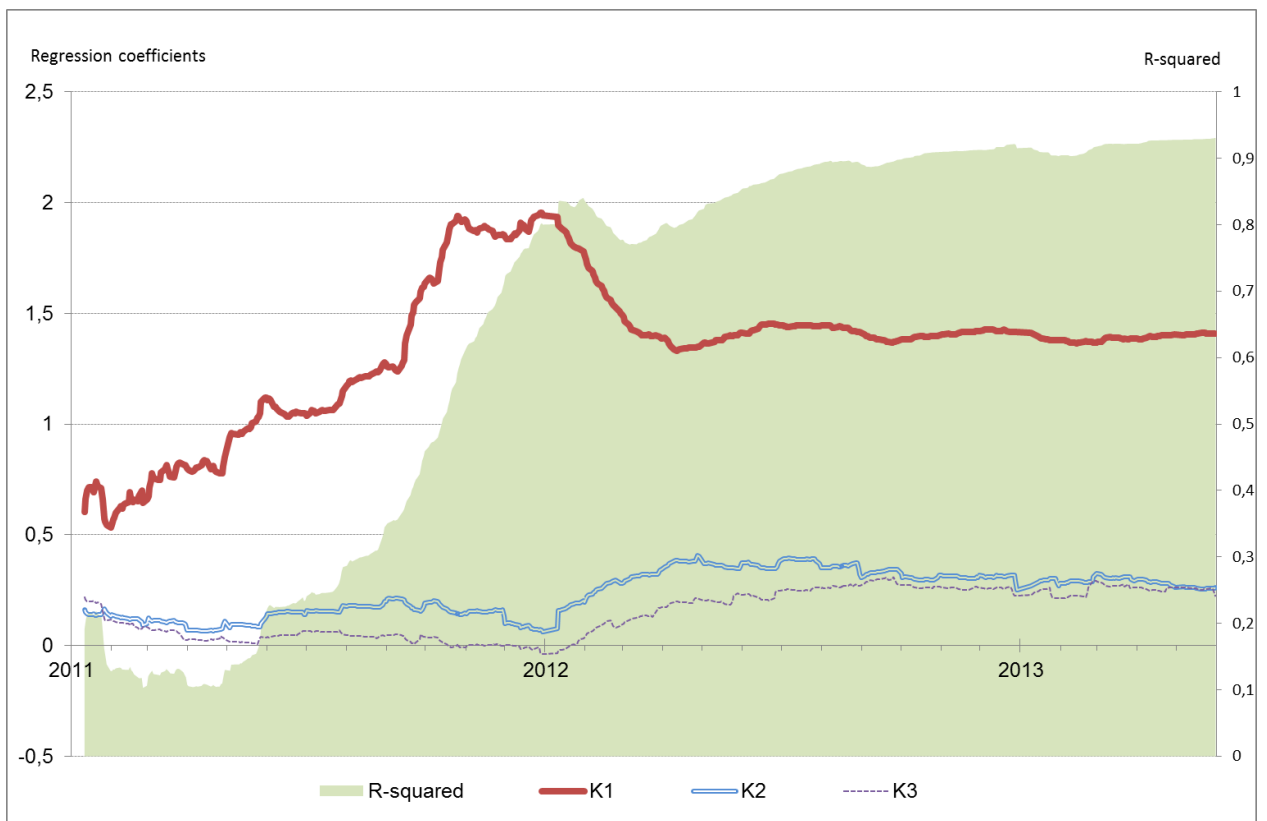
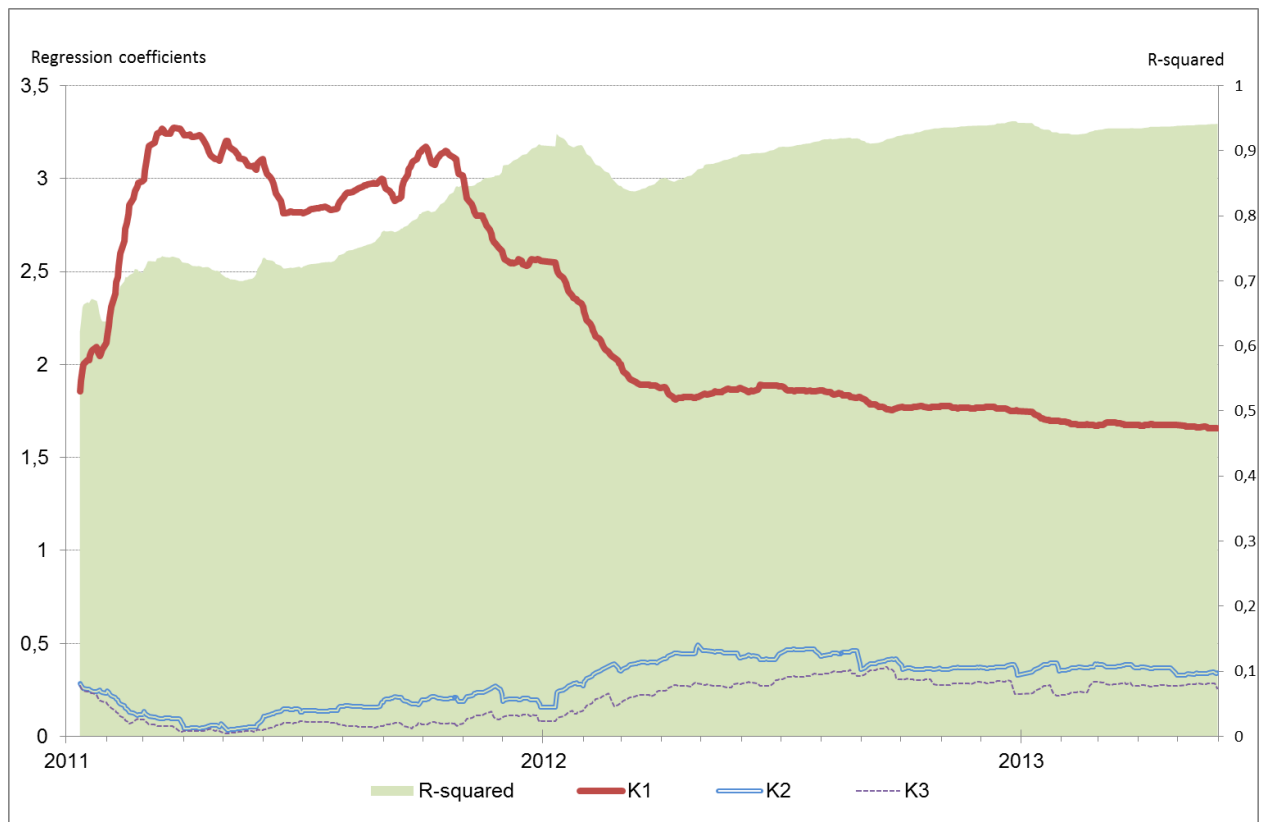


Figure 22 Modeling results for MIACR-B on overnight ruble loans \*



## 5 Conclusions

This paper examined the segmentation of the Russian interbank lending market with attention given to the structure of transactions and market instruments used by Russia's large banks, the main participants in this market. We performed a comparative analysis of price and volume dynamics for the largest segments of the interbank lending market and identified the main fundamentals affecting market interest rates. Our results permit the following general conclusions:

- Russian interbank lending market is segmented with most liquidity-absorbing and liquidity-provision operations conducted by the largest commercial banks. These banks typically have investment-grade credit ratings. While this reduces credit risk, it also restrains market development, thereby increasing vulnerability to internal shocks and building volatility into market interest rates. Banks with lower credit ratings or lacking a credit rating altogether par-

ticipate actively in the money market, but their operating strategies are distinct from large banks with higher credit ratings.

- Interbank lending rates dynamics are determined by the structure of liquidity supply and demand, which, in turn, depends on the amount of liquidity held by credit institutions, CBR operations in the money market and the foreign exchange market, budgetary revenues and expenditures, and behavior of other segments of the Russian financial market. In recent years, CBR monetary policy played a key role in price-setting in the short-term segment of the money market, affecting the level and the volatility of interbank lending rates. Many Russian commercial banks had an opportunity to borrow and place deposits with the CBR. For this reason, the process of money market interest-rate determination is affected by the CBR's monetary policy toolbox, especially interest rates on standing facilities and open market operations.
- The dynamics of interest rates on interbank loans in Russia can be effectively described with a linear regression model, where the level of the money market rate is a function of CBR interest rates, banking sector liquidity, and dummy variables for the last days of the month. The modeling results for different segments of the interbank lending market over the sample from 2008 to 2013 suggest a clear relationship between money market rates, on one hand, and the key parameters of CBR monetary policy and balance sheet indicators of Russian credit institutions on the other. We further note the main differences in the dynamics of interbank lending rates for banks with different credit ratings depending on shifts in the structural liquidity position.

The global financial crisis of 2007–2010 provided a sort of real-time stress-testing of the sustainability of Russia's interbank lending market. A comparison of the Russian interbank lending market structure pre-crisis and during recovery reveals tactical shifts of various bank groups. This says to us that development of the Russian interbank lending market should focus on eliminating segmentation. Increase in market completeness would likely reduce the dependence of domestic banks on foreign sources of financing and would diminish the exposure of the Russian banking sector to global economic shocks. In such conditions, money market rates volatility would decrease and thereby a tighter linkage of interbank lending rates and CBR guidance rates.

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## Appendix

Table 1 Structure of the Russian banking sector\*

Assets, RUB billion	Rating	Number of branches					Region			All banks
		Up to 10	10–99	100–199	200–499	500 and more	Moscow	St. Petersburg	Other regions	
Up to 10	BBB	2 (0.04%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	2 (0.04%)	0 (0.00%)	2 (0.04%)
	B	4 (0.06%)	2 (0.03%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	5 (0.07%)	0 (0.00%)	1 (0.02%)	6 (0.09%)
	N/A	496 (2.10%)	166 (1.51%)	1 (0.01%)	1 (0.01%)	0 (0.00%)	308 (1.81%)	23 (0.11%)	333 (1.71%)	664 (3.62%)
	Subtotal	502 (2.19%)	168 (1.54%)	1 (0.01%)	1 (0.01%)	0 (0.00%)	313 (1.88%)	25 (0.15%)	334 (1.73%)	672 (3.75%)
10–100	BBB	4 (0.37%)	2 (0.34%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	5 (0.61%)	1 (0.10%)	0 (0.00%)	6 (0.71%)
	BB	4 (0.31%)	5 (0.54%)	1 (0.13%)	0 (0.00%)	0 (0.00%)	7 (0.70%)	0 (0.00%)	3 (0.28%)	10 (0.98%)
	B	15 (1.15%)	42 (3.44%)	4 (0.52%)	2 (0.39%)	0 (0.00%)	36 (3.18%)	6 (0.67%)	21 (1.65%)	63 (5.50%)
	CCC	1 (0.07%)	3 (0.23%)	1 (0.19%)	0 (0.00%)	0 (0.00%)	5 (0.49%)	0 (0.00%)	0 (0.00%)	5 (0.49%)
	N/A	41 (1.64%)	78 (3.13%)	4 (0.34%)	3 (0.24%)	0 (0.00%)	69 (3.10%)	5 (0.17%)	52 (2.07%)	126 (5.34%)
	Subtotal	65 (3.55%)	130 (7.68%)	10 (1.17%)	5 (0.63%)	0 (0.00%)	122 (8.09%)	12 (0.94%)	76 (4.00%)	210 (13.02%)
100–1000	BBB	3 (1.08%)	2 (1.20%)	3 (3.28%)	1 (1.04%)	1 (1.41%)	9 (7.80%)	0 (0.00%)	1 (0.22%)	10 (8.02%)
	BB	0 (0.00%)	5 (2.78%)	6 (3.68%)	6 (4.82%)	1 (0.70%)	13 (8.47%)	2 (1.42%)	3 (2.08%)	18 (11.97%)
	B	1 (0.26%)	5 (1.47%)	5 (1.42%)	6 (1.65%)	1 (0.48%)	14 (4.00%)	0 (0.00%)	4 (1.29%)	18 (5.29%)
	N/A	2 (0.58%)	0 (0.00%)	0 (0.00%)	2 (0.75%)	0 (0.00%)	4 (1.33%)	0 (0.00%)	0 (0.00%)	4 (1.33%)
	Subtotal	6 (1.93%)	12 (5.45%)	14 (8.38%)	15 (8.25%)	3 (2.59%)	40 (21.59%)	2 (1.42%)	8 (3.59%)	50 (26.61%)
More than 1000	BBB	0 (0.00%)	0 (0.00%)	1 (8.96%)	2 (8.88%)	4 (38.21%)	6 (47.08%)	1 (8.96%)	0 (0.00%)	7 (56.04%)
Total		573 (7.67%)	310 (14.67%)	26 (18.53%)	23 (17.76%)	7 (40.80%)	481 (78.64%)	40 (11.47%)	418 (9.32%)	939 (99.43%)

Each cell shows the number of banks and their share in total assets of the Russian banking sector (in brackets). Table 1 was prepared using data of banks participating in the information disclosure program. These banks account for 99.4% of total assets of the Russian banking sector.

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