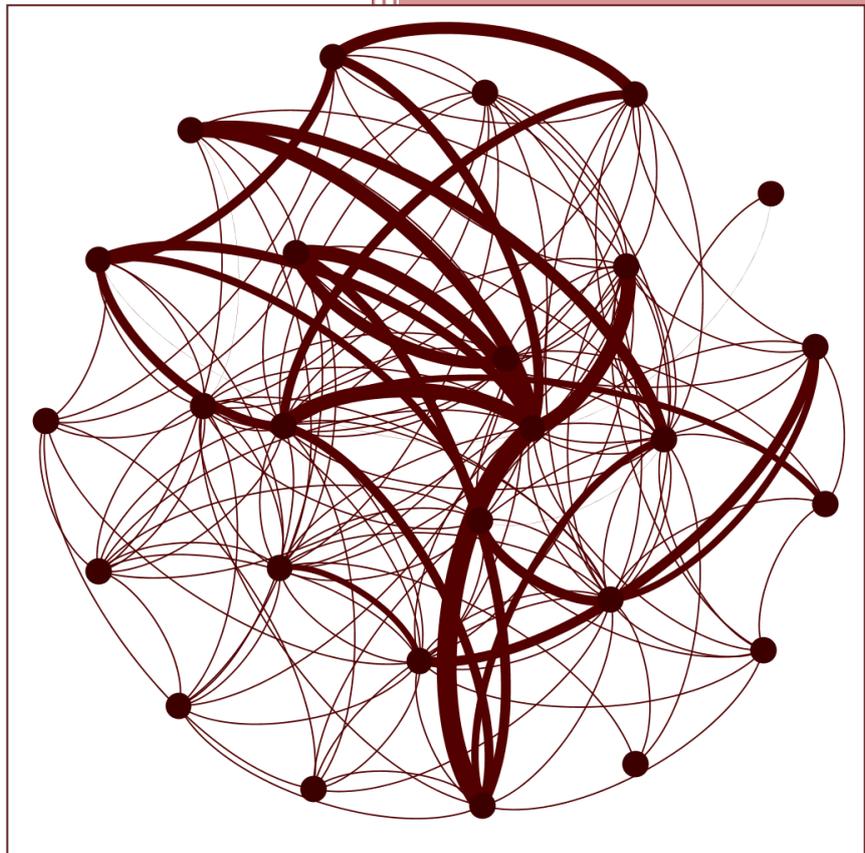


Quarter 2, 2013

# Money Market Review



The Central Bank of the  
Russian Federation (Bank  
of Russia)

This Review is prepared by the Bank of Russia Financial Stability Department in cooperation with the Research and Information Department and the General Economic Department

The statistics used in the Review and methodological comments are published on the Bank of Russia website in the Financial Stability section

[http://www.cbr.ru/analytics/?Prtid=fin\\_stab](http://www.cbr.ru/analytics/?Prtid=fin_stab)

Comments and suggestions on the Review's structure and contents are welcome at: [reports@cbr.ru](mailto:reports@cbr.ru).



*In using the materials of this publication, the reference to the Central Bank of the Russian Federation is mandatory*

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## Purpose of the Money Market Review

In this Review, the money market includes the interbank lending market, the FX swap market, and the interdealer repo market. The focus is somewhat more on the repo market due to its cross-sectoral nature and the bulk of Bank of Russia liquidity provision operations concentrated in this market. The Bank of Russia is committed to promoting money market development to achieve the following:

- A stable environment for liquidity redistribution, i.e. with acceptable volatility of short-term interest rates and smoother changes in transaction values;
- Equal access to liquidity for market participants;
- Counterparty default risks minimised through sound collateral management;
- A balanced development of various market segments, specifically, a full-fledged segment beyond overnight maturity;
- A favourable environment for the development of the CCP-cleared market.

### The importance of money market monitoring comes from the following:

- The money market plays a key role in banking intermediation, which provides for on-going conversion of short-term borrowings into long-term loans to the economy; its uninterrupted functioning enables banks to refinance their liabilities continuously and efficiently use their capital to provide funding to the economy;
- The money market is the first to come under pressure in case of a financial turmoil, therefore, its parameters may serve as early warning indicators;
- The money market is crucial in intragroup operations of financial groups and conglomerates, which require close attention under consolidated supervision;
- The money market, in its interdealer repo and swap segments, may concentrate financial sector systemic risks, because its players include not only banks but also non-bank professional securities market participants;
- Money market trends are a good indication of liquidity conditions in the banking system;
- Potential disruption of the money market and panic sales of collateral would significantly push up the cost of market funding and make it more difficult for non-financial entities to access it;
- The state of the money market affects the central bank's ability to manage banking sector liquidity and short-term interest rates.

In view of the money market's importance for financial stability, the Bank of Russia Financial Stability Department (FSD) publishes **regular quarterly reviews** of its developments and the level of systemic risks.

**The ultimate purpose of this publication** is to facilitate financial stability by minimising systemic liquidity risks via enhancing money market transparency. A better awareness of the market structure and trends will allow market participants to improve their perception and assessment of their own risks. Moreover, the Bank of Russia seeks to communicate to market participants potential collective implications of their individual investment decisions in case of domino effects that are not quite fully treated in market risk assessments.

**The Review, rather than being a Bank of Russia official publication**, is a research paper focused on the analysis of market developments in the period under review. The latest reported data are given as of the last business day of the quarter, while potential material events after the reporting date are excluded from the analysis. The Review is available in Russian and English on the Bank of Russia official website.

## Summary

### *Money market structure*

- In the second quarter of 2013, the share of FX swaps in the total money market trade grew, increasing from 54% to 62%. Participants' increased interest in swaps may be explained by a gradual contraction of available repo collateral in their portfolios.
- The average spread between the MIACR-B (loans to speculative grade banks) and MIACR-IG (loans to investment grade banks) for rouble overnight interbank loans stood at 18 basis points in the second quarter of 2013 versus 17 basis points in the previous quarter. The low spread maintained from the previous quarter suggests that market participants perceived interbank credit risk as low.
- In the second quarter of 2013, the bulk of interdealer repo collateral was taken up by corporate, regional and municipal bonds, however, this share was declining throughout the quarter, with the share of equities increased from 30% at the beginning of the quarter to 40% at the end.
- Money market conditions were developing in an environment of increased structural shortages of liquidity in the second quarter of 2013. This year and the second quarter specifically were characterised by a significantly lower role of the budget channel, leading to largely moderate liquidity absorption compared with the same periods in earlier years.
- The share of transactions settled by the CCP increased from 20.5% in the first quarter of 2013 to 25.5% in the second quarter. Meanwhile, CCP repo business more than quadrupled in the same period, from 3.5 billion roubles to 15 billion roubles. A further increase in this segment may be expected in the future due to the extended list of traded instruments.

### *Money market systemic risks*

- The network analysis has revealed that core participants (systemically important participants) show smaller deviations of their actual ratios from the regulatory minimum requirements. Moreover, these participants have on average higher utilisation ratios, suggesting the need for a regular monitoring of their marketable asset encumbrance and looking for other potential funding sources.
- In May-July 2013, the interdealer repo market experienced several defaults, caused by the failure to return securities by two non-bank financial institutions – IC Financial System and IC Almaz Brokerage. In this context, the Bank of Russia does not expect any systemic risk to materialise or any domino effect to occur in the interdealer repo market.
- Bank of Russia repos remained the principal refinancing tool for credit institutions in the second quarter of 2013, with the outstanding repo debt varying from 1.2 trillion roubles to 2.2 trillion roubles, and the marketable asset utilisation ratio largely in the range of 45% to 55%, slightly above the levels in the first quarter of 2013.
- Interdealer repo discounts in the second quarter were largely unchanged from the averages observable in the previous quarter, with the only exception of OFZ discounts, which tended to decline throughout the second quarter.

### *Pricing in the interbank market*

- The growth in the structural shortage of liquidity drove up the average short-term money market rate. MIACR was near the upper border of the Bank of Russia interest rate band in the second quarter, increasing by 57 basis points from the previous quarter.
- In the second quarter of 2013, international rating agencies downgraded their credit ratings of a number of major Russian banks. Following an analysis of the influence of credit ratings on interbank

price formation, the FSD concludes that this influence is immaterial, though such ratings do have a certain impact on borrowing costs.

### ***Money market infrastructure development***

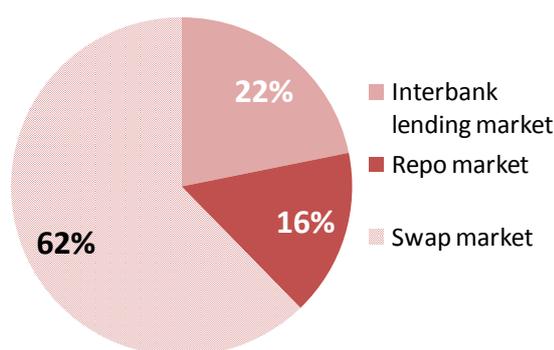
- A NSMA Pricing Centre (the Centre) was launched on 1 April 2013. This is a joint project of the National Stock Market Association (NSMA) and the National Settlement Depository (NSD) to provide information services. In this project, the NSMA is responsible for the methodology, while the NSD provides technologies. During the first stage, the key objective of the Centre is fair valuation of bonds both when market quotations are available, and when they are absent. The use of the Centre's products will allow to produce more accurate fair valuations of securities while using them as collateral and to revalue bonds for accounting purposes.

## 1. MONEY MARKET STRUCTURE

### 1.1. Money market structure and conditions: swaps, repos, and interbank loans<sup>1</sup>

Money market participants comprise banks, non-bank financial institutions, and their customers, including non-residents. The Bank of Russia plays a prominent role in the money market, using it to manage banking sector liquidity. As the market is dominated by short-term trade, the Review will focus on overnight to one-week maturities, unless otherwise specified.

**Chart 1. Money market structure  
(quarterly average), %**



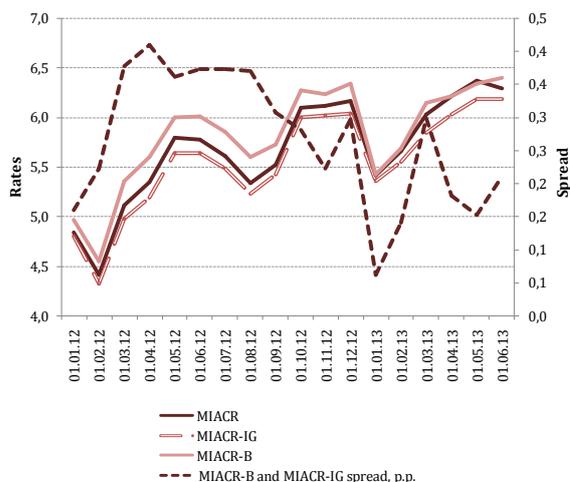
Total average daily turnover of money market operations increased from 1.24 trillion roubles in the first quarter to 1.57 trillion roubles in the second quarter of 2013, largely on the back of increased swap business. This segment expanded its share in the money market from 54% to 62% (Chart 1). The heightened interest of market participants in swaps can be explained by the gradual contraction of collateral available for repo trade.

Interbank market turnover dynamics were patchy during the quarter. April saw continued growth in the interbank lending market activity from the first quarter. Like in the previous period, banks without an investment-grade credit rating were the most aggressive borrowers, which resulted in the average market MIACR coming close to the MIACR-B on loans to banks with a speculative-grade credit rating (Chart 2). Then, in May, the market activity got on a declining trend, to accelerate sharply in June. In May, the decline in borrowings was led by banks having investment-grade ratings, and, therefore, able to get funding at lower rates, resulting in MIACR rising faster compared with rates for individual borrower classes. In June, banks without an investment-grade rating were contracting their borrowings faster than the others. The share of highly rated banks increased in the market turnover, resulting in a moderate decline of the average market MIACR against the backdrop of persistent rise in the cost of borrowing for banks with certain credit ratings (MIACR-IG and MIACR-B).

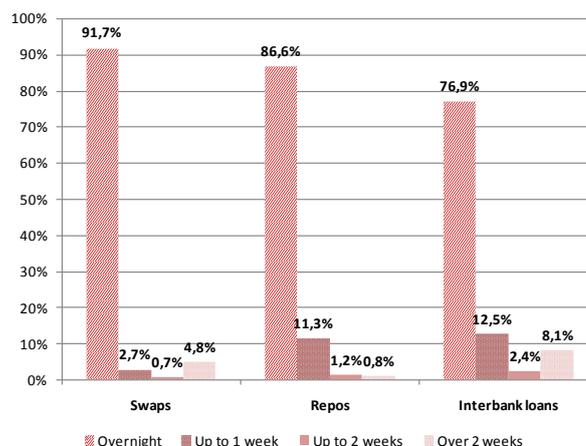
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<sup>1</sup> This study is based on repo trade data provided by the Moscow Exchange and on data from the reporting form 0409701 Statement of Foreign Exchange and Money Market Operations.

**Chart 2. Monthly average rouble overnight interbank rates (% p.a.)**



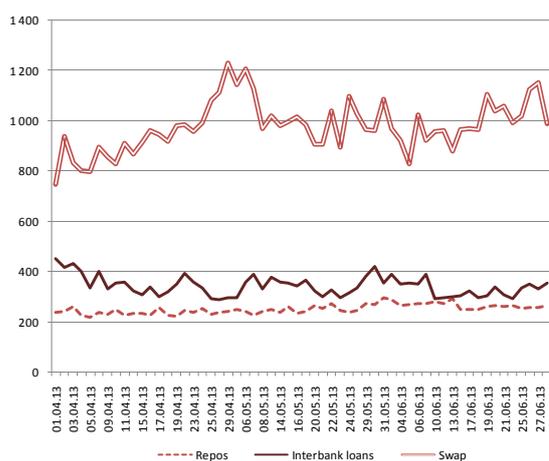
**Chart 3. Maturity breakdown for money market segments, %**



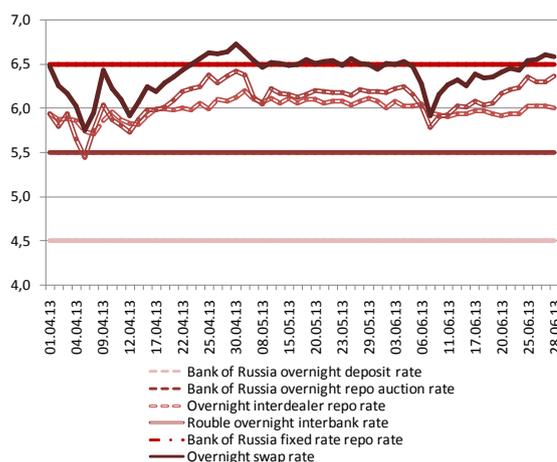
In the second quarter, the share of overnight trade contracted in all the market segments - from 96.8% to 91.7% in swaps; from 89.8% to 86.6% in the repo market; and from 83.5% to 76.9% in the interbank lending market (Chart 3), while the one-week and over one-week business expanded. Overall, money market operations were largely short-term.

During the second quarter of 2013, money market volumes and rates stayed virtually unchanged on average (Chart 4 and Chart 5). Any noticeable growth in volumes was observable only in the swap market. It should be noted that despite heightened demand for liquidity, the situation in the money markets remained broadly stable, with money market rates staying within the Bank of Russia interest rate band.

**Chart 4. Money market trade volumes, billions of roubles**



**Chart 5. Money market overnight rates, %**



Banks' increased demand for liquidity in the last week of each month resulted in rising money market rates, especially observable in the swap market. In some periods, imputed swap rates marginally overshot the upper border of the Bank of Russia's interest rate band, which can be partially attributed to

the way the FX component of the FX swap difference was calculated. Specifically, it was calculated using LIBOR, which is not always consistent with rates at which banks provide their FX funds.

In the second quarter, interbank market rates for banks with various credit ratings grew more or less homogenously. An average spread between MIACR-B (lending to banks rated speculative grade) and MIACR-IG (lending to banks rated investment grade) for overnight interbank loans in roubles was 18 basis points in the second quarter of 2013 versus 17 basis points in the previous quarter (Chart 5). This persistently low spread indicates low perceived interbank credit risk.

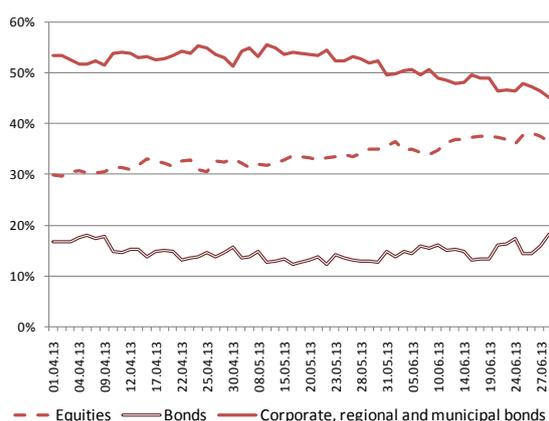
Interest rates in the interdealer repo market were moderately volatile throughout the second quarter, demonstrating the highest stability compared with rates in other money market segments.

In the second quarter of 2013, the largest asset class deposited as collateral in the interdealer repo market was corporate, regional and municipal bonds (Chart 6). However, throughout the quarter, their share was contracting, while the share of equities increased from 30% at the beginning of the quarter to 40% at the end.

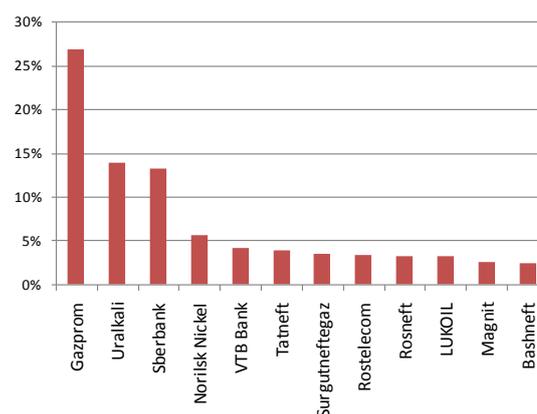
The key issuers of equities posted as collateral in the interdealer repo market included the largest Russian corporations, i.e. Gazprom, Uralkali, Sberbank, Norilsk Nickel and others (Chart 7).

By contrast, repos with the Bank of Russia relied on federal bonds as the principal collateral, with about 50% of banks' outstanding debt to the regulator backed by them. The share of equities edged up compared with the previous quarter – from 1.3% to 1.8%.

**Chart 6. Collateral breakdown for interdealer repos, %**

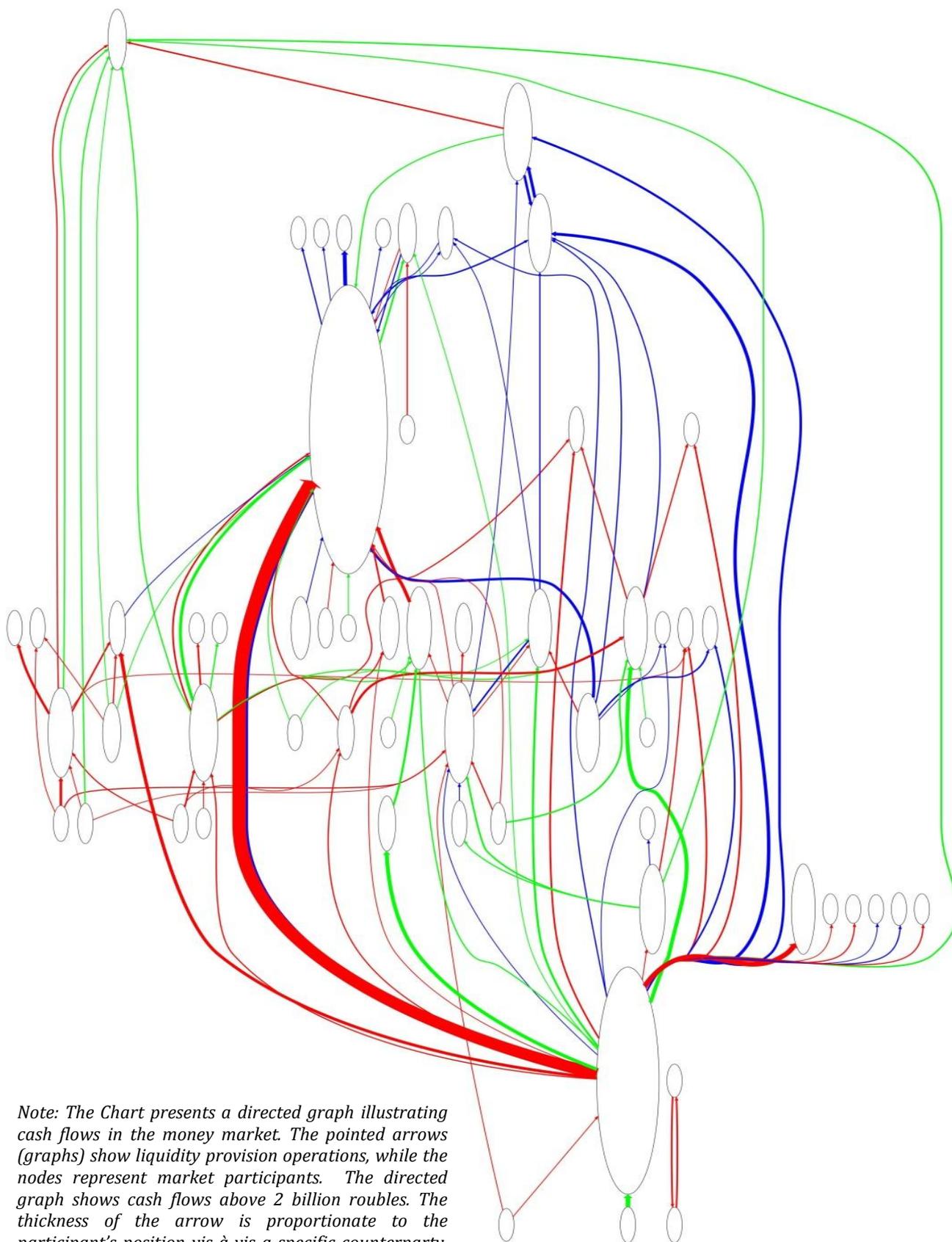


**Chart 7. Major issuers of equity collateral for interdealer repos, %**



Similarly to the previous quarter, the money market featured a fairly large number of active participants (Chart 8). At the same time, the market was heterogeneous, including, above all, several large participants with high volumes of transactions and quite a few smaller participants (for more details, please see Section 2.3 Money market network topology).

Chart 8. Money market participants' positions

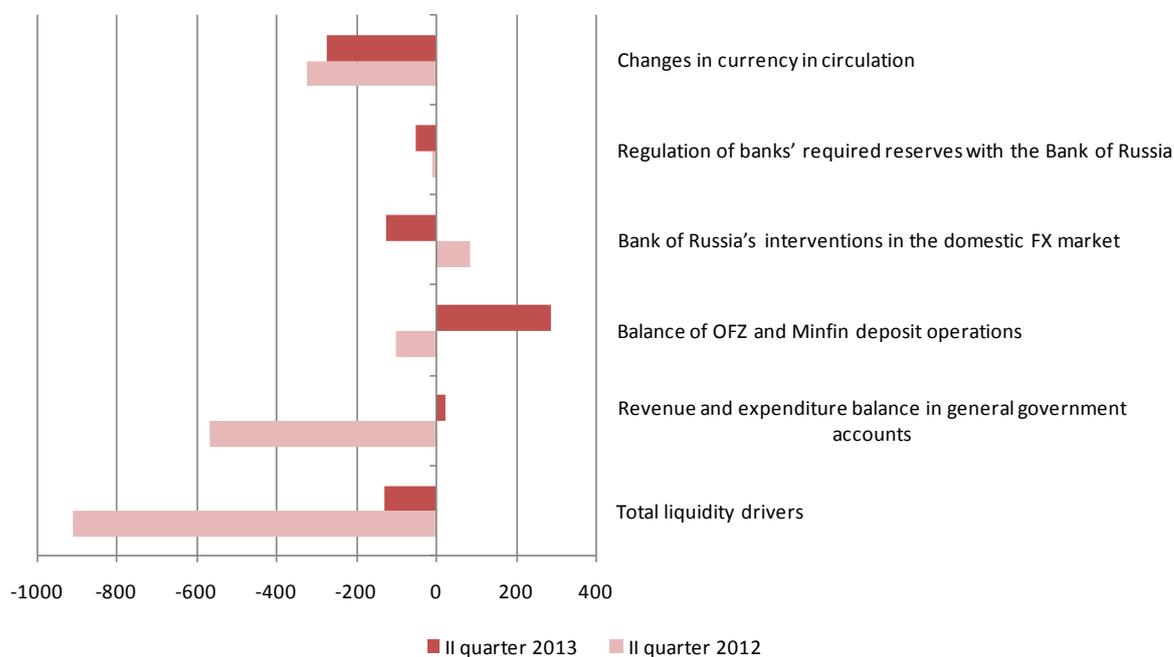


*Note: The Chart presents a directed graph illustrating cash flows in the money market. The pointed arrows (graphs) show liquidity provision operations, while the nodes represent market participants. The directed graph shows cash flows above 2 billion roubles. The thickness of the arrow is proportionate to the participant's position vis-à-vis a specific counterparty, while the font size is commensurate with the participant's volume of trade in the money market. The red color designates swaps, the blue color – repos, and the green color – interbank loans.*

## 1.2. Banking sector liquidity

In the second quarter of 2013, money market conditions were driven by increased structural liquidity shortages. This period was special because the liquidity drivers were largely differently directed, resulting in moderate liquidity absorption compared with the same periods in previous years.

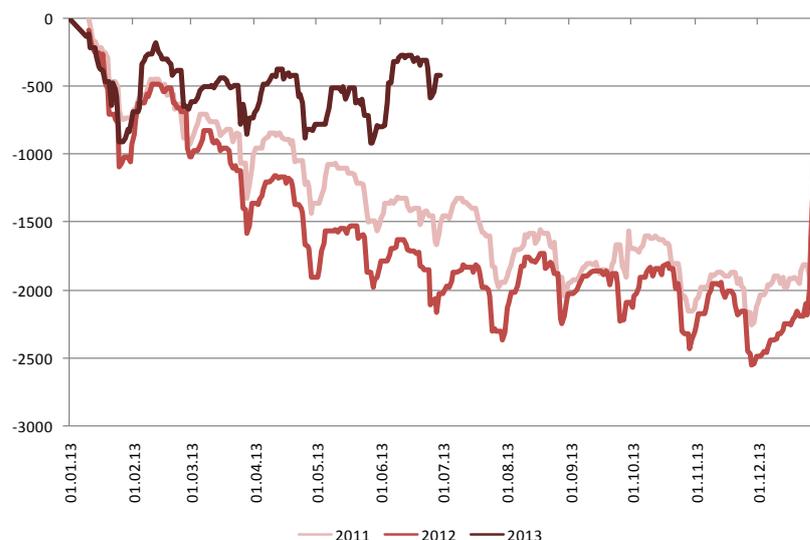
**Chart 9. Liquidity drivers, billions of roubles**  
(+ and - reflect the impact on liquidity)



The key source of liquidity provision in the second quarter of 2013 were the government accounts, which injected 315.6 billion roubles, including 26.1 billion roubles due to the general government expenditure exceeding revenue (versus absorption of 665.2 and 566.8 billion roubles respectively in the second quarter of 2012). The declining impact of the government channel on banking sector liquidity observable since early this year is a specific feature of the second quarter of 2013, which makes it stand apart from respective periods in previous years.

Against the backdrop of a pronounced structural liquidity shortage (and, consequently, a high market collateral utilisation ratio for collateral eligible for Bank of Russia repos), the second quarter saw continued high demand for government cash balances deposited by the Federal Treasury with credit institutions, bringing 438.9 billion roubles of cash to the banking sector. Given a generally unfavorable environment in the domestic debt market in the second half of May and in June 2013, both the Russian Ministry of Finance reduced its primary offering of OFZs, and credit institutions weakened their demand for them. In this context, OFZ transactions contributed to reducing the banking sector liquidity by 149.4 billion roubles.

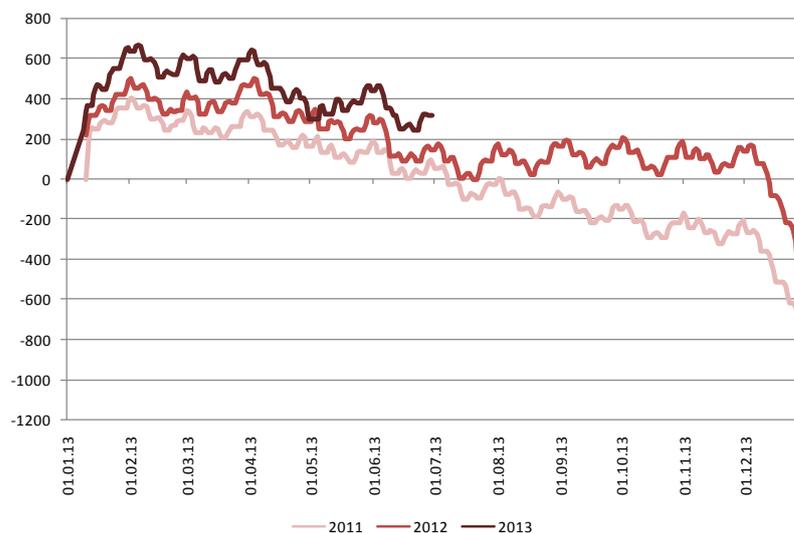
**Chart 10. Changes in general government cash balances with the Bank of Russia, YtD, billions of roubles (+ and - reflect the impact on liquidity)**



The inflow of government funds into the banking sector was largely offset by the seasonal changes in currency in circulation in the period under review. Overall, the expansion in currency in circulation in the second quarter caused banks' liquidity contraction by 274.3 billion roubles (versus 321.9 billion roubles in the second quarter of 2012).

An important additional factor notably affecting liquidity in the banking sector was regulation of the required reserves, as the Bank of Russia established a uniform required reserve ratio at 4.5% across all the liabilities classes, and required reserves expanded. In the period under review, a contraction of 48.1 billion roubles in the banking sector liquidity can be attributed to this factor.

**Chart 11. Changes in currency in circulation, YtD, billions of roubles (+ and - reflect the impact on liquidity)**



The weakening of the rouble in June 2013, as well as other emerging market currencies, against the backdrop of the Federal Reserve chairman's statement about preparing a QE exit strategy, was followed by Bank of Russia sales of foreign currency. Overall during the quarter, Bank of Russia interventions in the domestic FX market absorbed 122.8 billion roubles.

The total effect of the above autonomous factors on banking sector liquidity was negative. In this context, the net credit of the Bank of Russia to banks increased by 130.3 billion roubles in the second quarter of 2013, to stand at 1.7 trillion roubles.

As short-term money market rates were rising, credit institutions were trying to maintain large precautionary balances in their correspondent accounts with the Bank of Russia, thus further contributing to increased demand for Bank of Russia funding.

Short-term repos with the Bank of Russia remained the key instrument for covering the gap between liquidity demand and supply, albeit with some changes in the structure of outstanding debt under these operations. The average value of overnight auctions increased from 97.2 to 317.2 billion roubles in the second quarter, while the average one-week repo debt increased from 1.1 trillion roubles to 1.4 trillion roubles. Therefore, the share of overnight auction-based liquidity provision operations in the total overnight and one-week repo debt increased from 8% to 18% in the second quarter.

In the environment of rising structural shortage of liquidity and money market rates nearing the upper border of the interest rate band, banks increased FX swaps with the Bank of Russia, with the highest volumes falling on tax periods. In the second quarter of 2013, the value of these transactions averaged 97.6 billion roubles on the days when the deals were made.

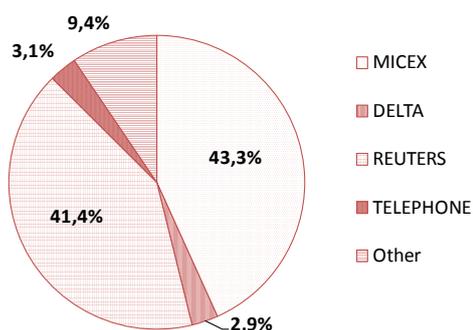
Still another factor changing the composition of outstanding debt under the Bank of Russia funding operations, was continuation of the first quarter trend towards banks' declining demand for loans secured by non-marketable assets and guarantees. The average debt under these loans contracted by 299.1 billion roubles in the second quarter compared with the first quarter, to stand at 169.9 billion roubles.

### **1.3. Money market trading and information systems**

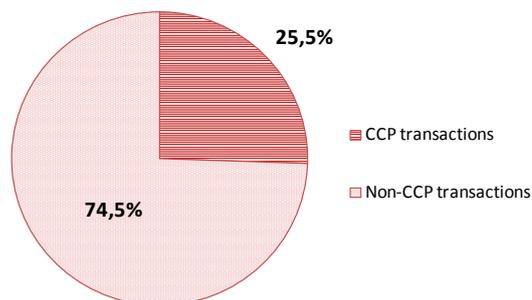
Similarly to the first quarter, the bulk of money market transactions were conducted in the OTC segment in the second quarter of 2013 (Chart 12). Moreover, its share increased during the quarter. This fact is attributed to the increased share of interbank loans and OTC swaps in the total money market trade. The exchange-traded segment is largely represented by the Moscow Exchange, accounting for over 94% of repo trade and about 44% of swaps. The interbank lending market features the DELTA system among systems of organised trading.

The share of CCP transactions in the total market also increased from 20.5% in the first quarter to 25.5% in the second quarter (Chart 13). Most CCP transactions were swaps. In the repo market, CCP-cleared trade more than quadrupled during the quarter, from 3.5 billion roubles to 15 billion roubles. A further increase of this segment may be expected in the future due to the extended list of traded instruments.

**Chart 12. Trading systems in the money market, %**



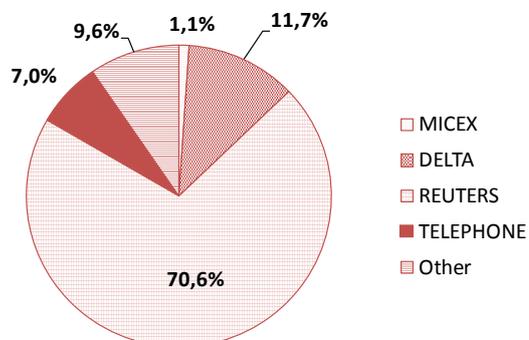
**Chart 13. CCP participation in money market operations, %**



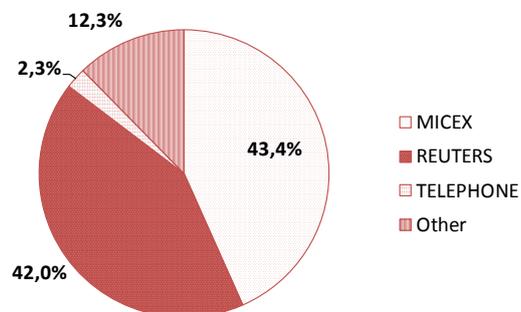
In the interbank lending market, participants continued to use mostly Reuters Dealing (over 70%). Transition to organised trading platforms is very slow, specifically, the share of DELTA – the largest interbank system – increased by a mere 2% in the second quarter, from 10% to 12% (Chart 14). Meanwhile, over 70 banks were using this platform for their trade, including both smaller regional banks and top 30 banks.

The swap market was dominated by the Moscow Exchange and Reuters Dealing (Chart 15). Most of the market growth observed in the second quarter fell on the exchange-traded segment, as the share Moscow Exchange trade increased from 37% to 43.4%.

**Chart 14. Trading systems in the interbank lending market, %**



**Chart 15. Trading systems in the swap market, %**

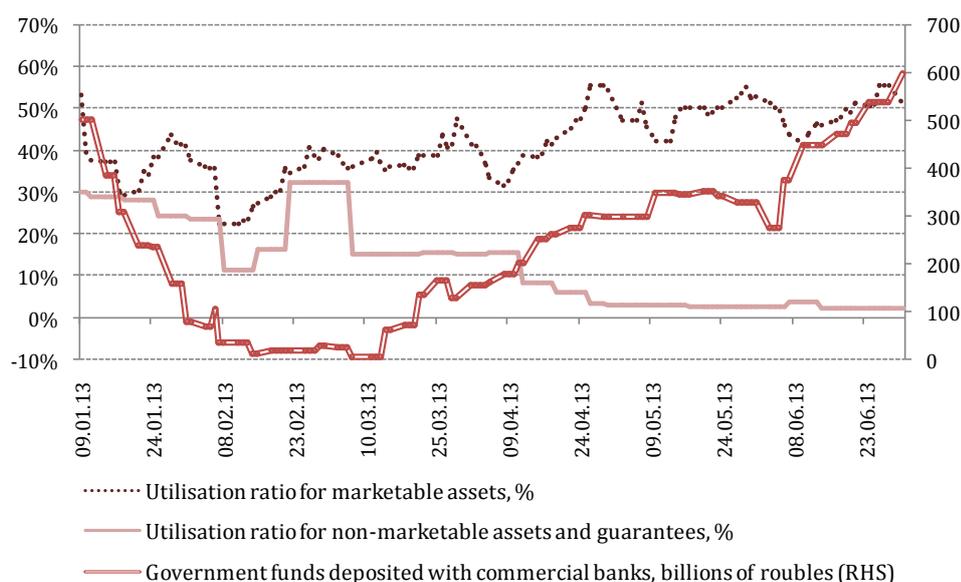


## 2. MONEY MARKET SYSTEMIC RISKS

### 2.1. Bank collateral adequacy

The Bank of Russia closely monitors refinancing capacity amid persistently high levels of credit institutions' debt to it. For this purpose, it uses the so-called "collateral utilisation ratios", reflecting the ratio of credit institutions' debt to the Bank of Russia under a certain refinancing instrument to the total collateral available to credit institutions eligible for refinancing using this instrument. At present, the FSD calculates two types of utilisation ratios: the utilisation ratio for marketable assets (used for refinancing via repos with the Bank of Russia)<sup>2</sup> and the utilisation ratio for non-marketable assets and guarantees (used for refinancing via Bank of Russia secured loans)<sup>3</sup>.

**Chart 16. Utilisation ratios and government deposits with banks in I-II quarters of 2013**



The rise in the utilisation ratios indicates that the share of collateral not utilised in refinancing operations is shrinking in the total pool of available collateral. A high reading of the utilisation ratio suggests limited availability of collateral in the banking sector.

In the second quarter of 2013, repos with the Bank of Russia remained the principal instrument to provide refinancing to credit institutions, with their debt incurred in these operations varying from 1.2 trillion roubles to 2.2 trillion roubles, and the utilisation ratio for marketable assets broadly in the range of 45-55%, which is somewhat higher than in the first quarter of 2013. In contrast, the utilisation ratio for non-marketable assets and guarantees for the largest banks declined from the previous quarter to stand at 2% at the end of the second quarter amid increased federal government deposits with banks (Chart 16).

<sup>2</sup> The utilisation ratio for marketable assets was calculated on the basis of banking reporting data on securities holdings by banks participating in Bank of Russia repos.

<sup>3</sup> The utilisation ratio for non-marketable assets and guarantees was calculated on the basis of a regular survey of the largest credit institutions. Therefore, the value of this ratio is an approximate estimate for collateral utilisation in the overall banking sector.

It should be noted that some participants may find it difficult to secure funding from the Bank of Russia even when the utilisation ratio for the whole banking sector is far less than one due to uneven allocation of collateral. However, most credit institutions holding large amounts of collateral still have ample opportunities to get funding against marketable assets.

At present, there is limited room for further extending the repo eligible collateral list by existing issues, as it already includes about three-fourths of bond issues traded on the Moscow Exchange, and virtually three-fourths of securities held by banks. Securities not included in the list are dominated by bonds issued by non-residents and equities issued by residents (Table 1).

**Table 1. Portfolio of securities held by Russian banks, %**

	Portfolio	Share in total portfolio	
		01.03.2013	01.06.2013
Included in the repo list	Russian Ministry of Finance	30.2%	29.4%
	Banks	11.7%	11.9%
	Bonds by Russian regions and municipalities	3.8%	3.7%
	Other residents	20.5%	21.7%
	Non-residents	3.5%	4.2%
	Equities by Residents	4.9%	4.7%
	Non-residents	0.0%	0.0%
	<b>TOTAL included in the repo list</b>	<b>74.7%</b>	<b>75.7%</b>
Excluded from the repo list	Banks	1.2%	0.8%
	Bonds by Russian regions and municipalities	0.1%	0.2%
	Other residents	5.3%	4.0%
	Non-residents	11.1%	12.7%
	Equities by Residents	6.5%	5.6%
	Non-residents	1.2%	1.0%
	<b>TOTAL excluded from the repo list</b>	<b>25.3%</b>	<b>24.3%</b>
<b>Total</b>		<b>100.0%</b>	<b>100.0%</b>

*Note: calculated on the basis of custodian accounting data from reporting form 0409711 Securities Report.*

Estimates based on June 2013 data suggest that the value of marketable collateral held by credit institutions (adjusted by Bank of Russia repo discounts) stayed broadly unchanged compared with the first quarter of 2013. Some expansion in bond holdings was offset by a reduction in equity holdings. Therefore, by the end of the second quarter, banks' potential refinancing against eligible repo collateral stood at 3.9 trillion roubles.

**Table 2. Collateral held by banks as of June 2013, trillions of roubles**

Collateral	Outstanding value	On bank balance sheets	On bank balance sheets (conservative estimate)
<b>Debt securities</b>	7.5	4.0	3.8
<b>Equities</b>	3.8	0.1	0.1
<b>TOTAL</b>	<b>11.3</b>	<b>4.1</b>	<b>3.9</b>

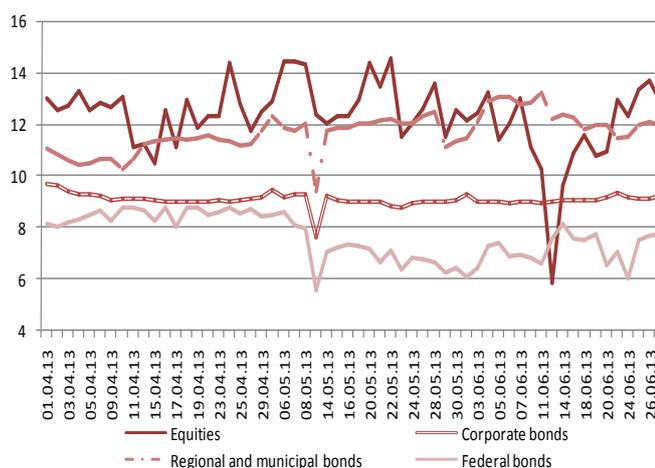
*Note: the figures are adjusted for Bank of Russia repo discounts; outstanding debt securities do not include Russian Eurobonds; the conservative estimate adjusts for collateral held by banks, which do not participate in repos with the Bank of Russia.*

## 2.2. Analysis of interdealer repo discounts' adequacy

In the second quarter of 2013, the discounts in the interdealer repo market were largely consistent with the average rates observable in the previous quarter, with the only exception of OFZ discounts, which tended to decline throughout the second quarter. While before mid-May they stayed above 8%, subsequently they hovered around 7% (Chart 17).

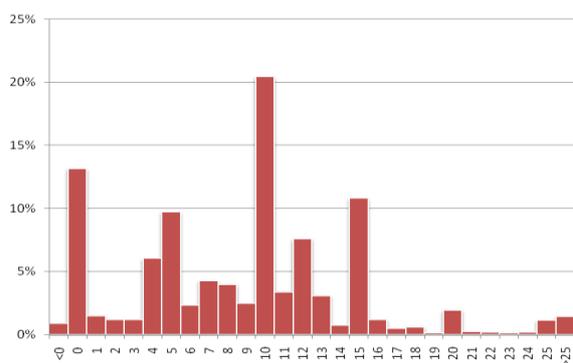
Bond discounts averaged 6-12%, which seems adequate to cover market risk given that during the crisis of 2008 most bonds were losing 1-5% in their value in one business day. Equity discounts were relatively lower vis-a-vis the drop in their value during the crisis. Specifically, while daily falls in stock prices depending on their liquidity were in the range of 10-20% during the 2008 crisis, the average equity discount in the interdealer repo market in the second quarter was 10-14%. The sharp drops in average equity discounts observed on 13 May and 13 June 2013 were attributable to a number of major deals with a premium (negative discount).

**Chart 17. Discounts by type of collateral, %**

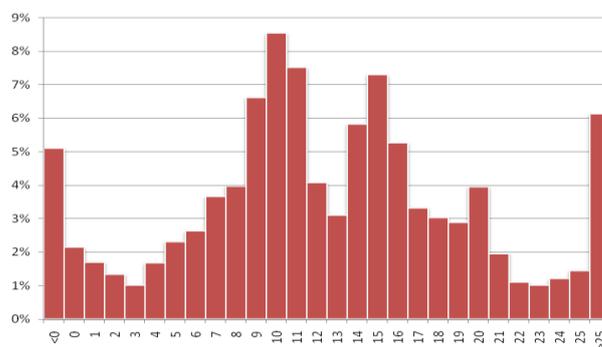


Discounts vary notably across deals. For example, in just under 15% of transactions backed by bonds discounts are close to zero (Chart 18). In case of a stock market shock, the value of the collateral in these deals may drop below the amount payable under the transaction, which, in its turn, will aggravate the risk of default by the borrower. For equities, this share is lower; however, it is also quite sizeable for discounts under 2% (Chart 19).

**Chart 18. Distribution of discounts in bond repos, %**



**Chart 19. Distribution of discounts in equity repos, %**



### 2.3. Money market network topology

Money market turbulence may be triggered by two types of shocks. The first one is a systemic shock that may be induced by unfavorable development of overall market conditions. Systemic shocks that normally affect all money market participants include, for example, declining stock indices, sliding yield curve, depreciation of national currencies, etc. A systemic shock would result in revaluation of outstanding positions of a wide group of money market participants most susceptible to this type of risk.

The other type of shock is idiosyncratic, i.e. a default by one participant (or by several participants) on its (their) obligations under earlier made deals. While this type of shock is originally non-systemic and limited, subsequently it may spread to a wide group of participants, or to the whole market in some cases, as a result of chain defaults. Therefore, an analysis of this type of shock should focus on contagion channels, market participants most susceptible to it and its potential amplification effects.

These issues may be explored by the network analysis approach, i.e. methods to study the linkages between money market participants and how this connectivity may transform individual risks of participants into a systemic risk. If the connectivity is full, i.e. if each market participant is connected to every other participant, the amplification effect will be the highest possible, as any participant's default will directly affect all the other participants. In this situation, any material individual shock may instantly transform into a systemic shock. This is why regulators closely monitor such fully connected networks.

If the money market has a group of participants with a dense network of significant linkages (material volumes of trade between most core participants), this group is conventionally called the core of the money market, while all the other participants are referred to as the periphery. At present, there are mathematical models available for identification of the core and the periphery, and our further analysis will be based on one of such models<sup>4</sup>.

The money market core shows the following distinctive features:

- Core participants have multiple interconnections;
- Core participants are active in the money market both as lenders and as borrowers;
- The bulk of money market cash flows pass through the core.

Peripheral money market participants are mostly interconnected via core participants rather than directly.

In the second quarter of 2013, 26 stable core participants were identified, with 3 non-banks, 15 banks from the top 30 list (according to Bank of Russia methodology, as of 1 July 2013), and 20 RUONIA list banks.

An analysis of how the identified core participants may affect money market stability reveals two effects. First, most core participants, quite predictably, are large. Therefore, these banks may not only suffer losses themselves (as a result of bank-specific shocks), but also make a significant adverse impact on other participants given their size and core position. Moreover, the identified core participants' actual capital adequacy and liquidity ratios are closer to the minimum regulatory ratios (Table 3).

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<sup>4</sup> Borgatti S. P. and Everett M. G. Models of core/periphery structures // *Social Networks*, 2000. - № 21. – pp. 375-395.

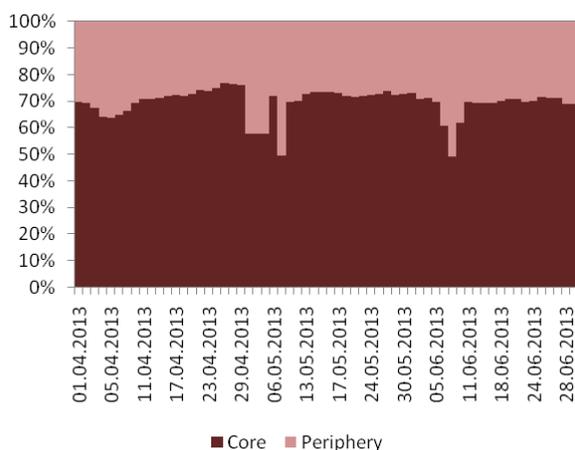
**Table 3. Regulatory ratios for core and periphery participants**

Ratio	Ratio for the core sample	Ratio for the periphery sample	Required ratio
Capital adequacy N1	13.0%	14.2%	10%
Instant liquidity N2	50.1%	63.0%	15%
Current liquidity N3	68.9%	85.2%	50%

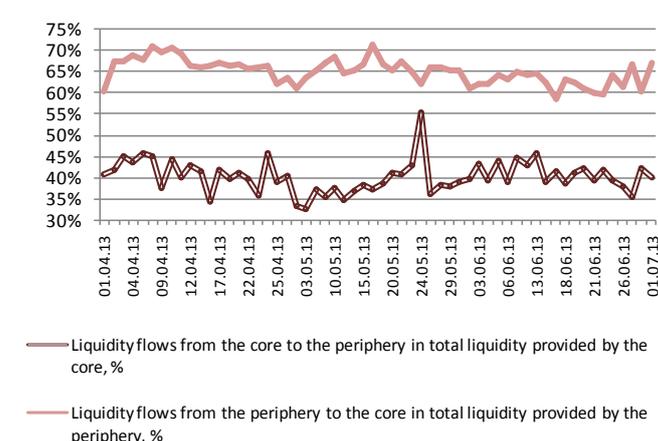
Second, core participants, as their average liquidity ratios are relatively smaller, tend to use Bank of Russia funding more than other participants, therefore, the former are the primary conductors of the Bank of Russia's interest rate policy. Specifically, the following patterns are discernible in the money market in the second quarter of 2013:

- The bulk of liquidity flows from the Bank of Russia was directed to the core of the money market (Chart 20): core participants accounted for 69.4% of borrowings from the regulator on average.

**Chart 20. Borrowings by money market core and periphery participants from the Bank of Russia**

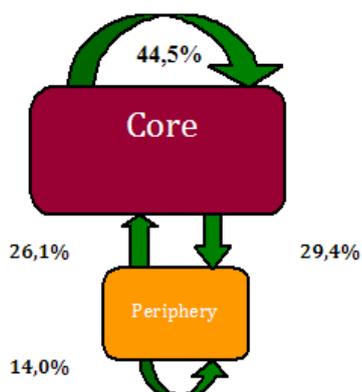


**Chart 21. Borrowings by core and periphery participants in total money market liquidity**

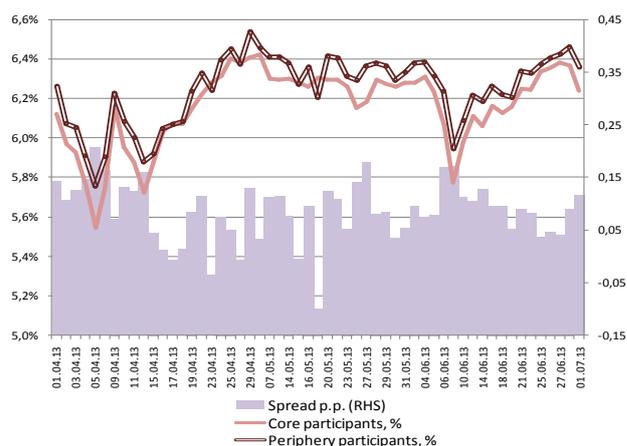


- Received liquidity was also distributed mostly among core participants, with the liquidity flow from the core to the periphery at about 40.2% of the total money market liquidity provided by core players, and the opposite liquidity flow at 64.9% of total liquidity provided by periphery participants (Chart 21). Moreover, liquidity provided by periphery participants to core participants accounted for 26.1% of the total money market liquidity (excluding the Bank of Russia), while the opposite took up 29.4% (Chart 22).
- Moreover, in the second quarter of 2013, the weighted average overnight borrowing cost for money market core participants was by 0.09 percentage points lower on average than the same indicator for periphery banks (Chart 23).

**Chart 22. Money market liquidity flows in II quarter of 2013 (cumulative)**



**Chart 23. Weighted average overnight borrowing cost in the money market**



However, in view of financial soundness, it may be noteworthy that core participants show a higher utilisation ratio for their securities portfolios on average, suggesting the need for regular monitoring of their marketable assets' encumbrance and looking for other sources of liquidity.

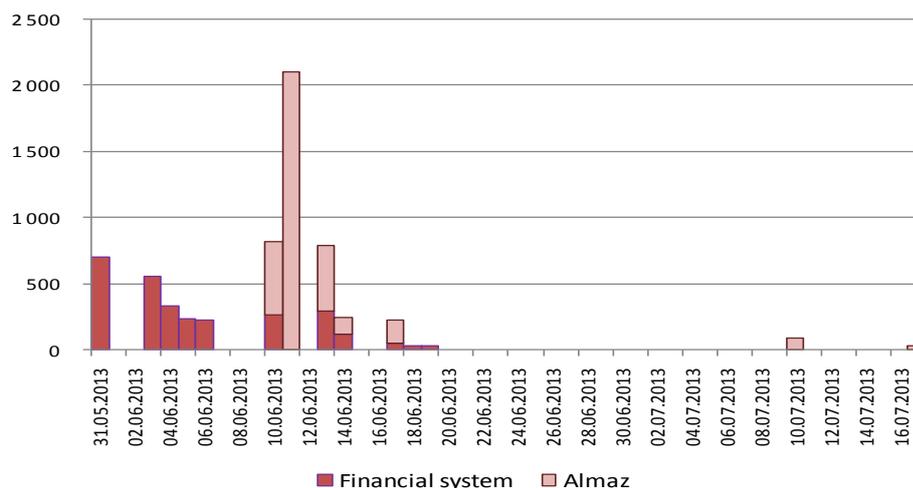
## 2.4. Defaults in the repo market

In the second quarter of 2013, the interdealer repo market experienced an episode of default risk materialising. The shocks originated in two non-bank financial institutions – IC Financial System and IC ALMAZ Brokerage<sup>5</sup>. The FFMS revoked the licence from the first company on 30 May 2013 (24 hours before the first default). The other company claimed inability to meet its obligations. The Moscow Exchange advised the counterparties, the FFMS and the Bank of Russia about the defaults on obligations. The Moscow Exchange is an organiser of trade in the repo market, providing technological support to transactions. However, as regards bilateral transactions, the Moscow Exchange does not act as a CCP and does not guarantee performance on obligations.

The FSD has not discovered any direct financial connections between the two companies. In other words, the default of the second company was not provoked by the first company's default. Execution of the second leg of the repo transactions is protracted in time due to maturity mismatches. The ultimate value of defaulted obligations amounted to 2.822 billion roubles for the Financial System, and to 3.572 billion roubles for the Almaz Brokerage (Chart 24). Affected counterparties included 20 participants, including 9 banks, for the Financial System, and 21 participants, including 5 banks, for the Almaz Brokerage.

<sup>5</sup> For more details see the Moscow Exchange's press release of 11 June 2013.

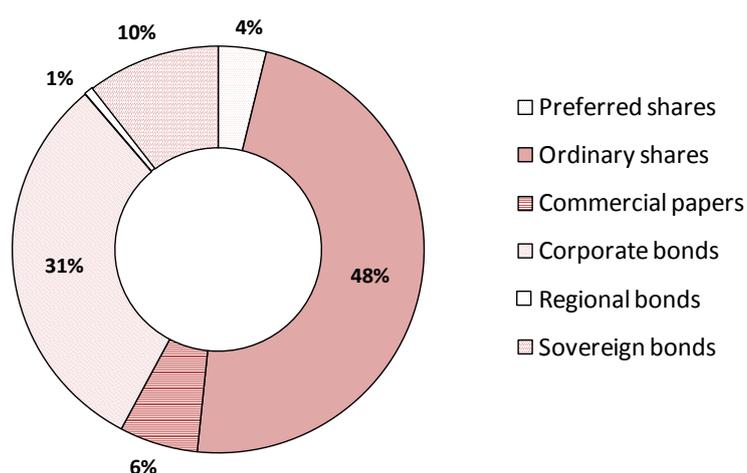
**Chart 24. Defaults in the interdealer repo market, millions of roubles**



An assessment of default implications on the basis of money market network analysis suggests that the FSD should not expect systemic risks or a domino effect to materialise in the interdealer repo market. This conclusion is supported by the following evidence:

- The total value of defaulted transactions does not exceed 6.4 billion roubles (which is a small amount compared with the total value of interdealer repo trade);
- Counterparty net losses (or defaulters’ gains) are estimated at 960 million roubles, which is too little to materially affect financial sector stability;
- The encumbered securities portfolio was adequately diversified, resulting in low instrument or issuer concentration risks (Chart 25);
- Defaulters had many counterparties, resulting in low participant concentration risks: individual positions of the Financial System’s counterparties were in the range of 90 million roubles to 141 million roubles, and of the Almaz Brokerage’s counterparties – between 116 million roubles and 170 million roubles.

**Chart 25. Portfolio composition for reverse repos of Financial System and Almaz Brokerage**



Therefore, the defaults were distributed across a wide range of counterparties and instruments, resulting in low domino risks. The testing of repo portfolios (by applying the Shapley Value approach) revealed that the contagion is limited to one round of defaults and aggregate losses of market participants beyond direct counterparties cannot exceed 50 million roubles. Further developments confirmed this estimate. There was no propagation of the shocks – subsequent defaults by the defaulters’ counterparties did not follow. Key indicators, including risk premium in the non-bank segment and the value of non-banks’ positions in the market, remained unchanged. Selected participants lowered their activity in the interdealer repo market, but the market’s aggregate turnover stayed flat.

To address the situation, the National Securities Market Association (NSMA) established a Creditor Club in the interdealer repo market<sup>6</sup>. The key objective of the Creditor Club is to coordinate the actions and to represent the interests of market participants affected by defaulted obligations of mala fide counterparties. The Creditor Club is expected to resolve the issue of reciprocal disclosure to restore mutual trust of market participants.

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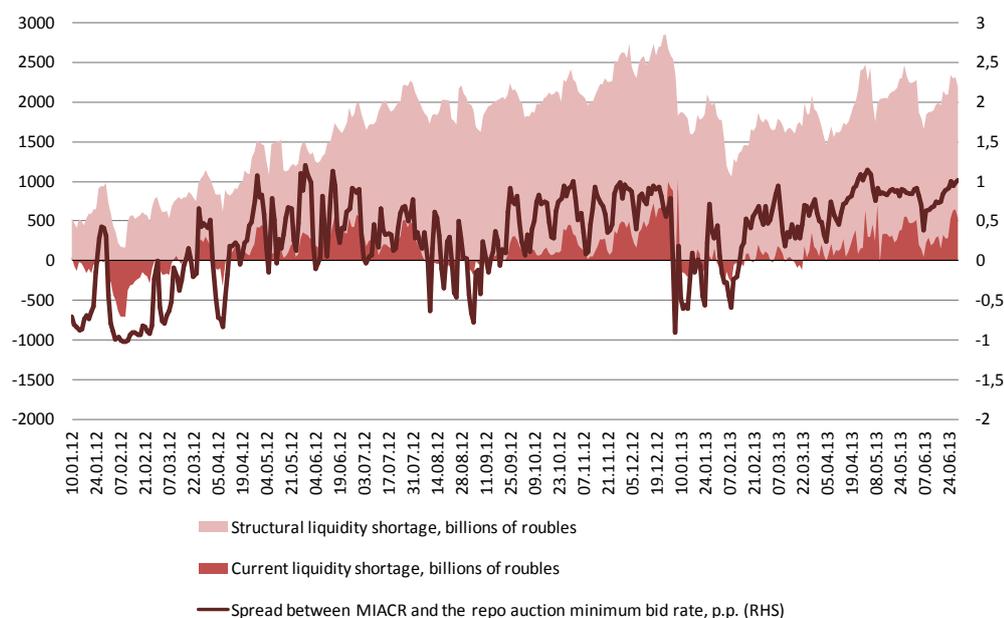
<sup>6</sup> For further details see the National Securities Market Association’s press release of 20 June 2013.

### 3. PRICING IN THE INTERBANK LENDING MARKET

#### 3.1. Interbank interest rate behaviour

Short-term interest rates in the interbank lending market averaged 6.29% p.a. in the second quarter of 2013, increasing by 57 basis points from the previous quarter. The volatility of the interbank interest rate measured as a mean square deviation decreased to 19 b.p. in the period under review from 43 b.p. in the first quarter of 2013, as it approached the upper bound of the interest rate band.

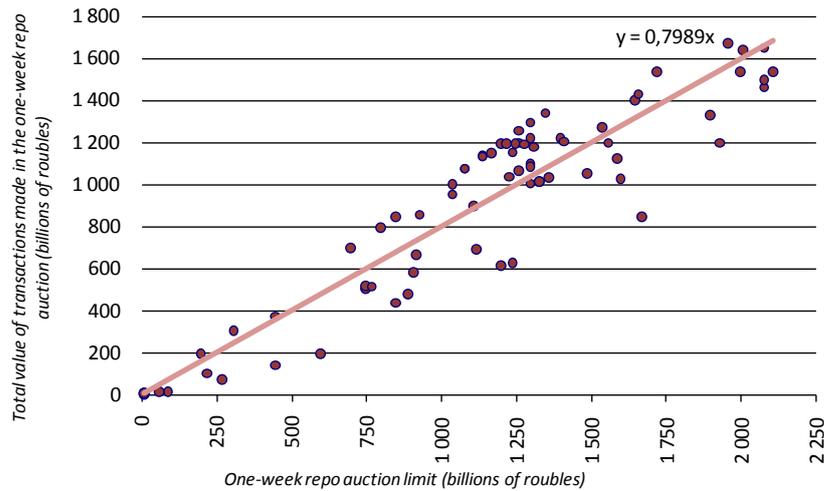
**Chart 26. Impact of structural and current liquidity shortages on interbank rates**



As liquidity was absorbed by autonomous factors, the structural liquidity shortage increased (Chart 26), averaging 0.3 trillion roubles for the quarter, to stand at 2 trillion roubles (largely due to seasonal growth of currency in circulation<sup>7</sup>). In this context, the Bank of Russia proportionately increased its one-week repo limits, reflecting an average liquidity gap on a one-week horizon. This factor, combined with a strong positive correlation between the size of the one-week liquidity gap and its uncovered part covered via daily repo auctions, drove the current liquidity shortage up to 278.9 billion roubles on average in the second quarter of 2013 (Chart 28) from 10.3 billion roubles in the previous quarter, with a subsequent rise in money market rates.

<sup>7</sup> For further details see Section 1.2 'Banking sector liquidity'.

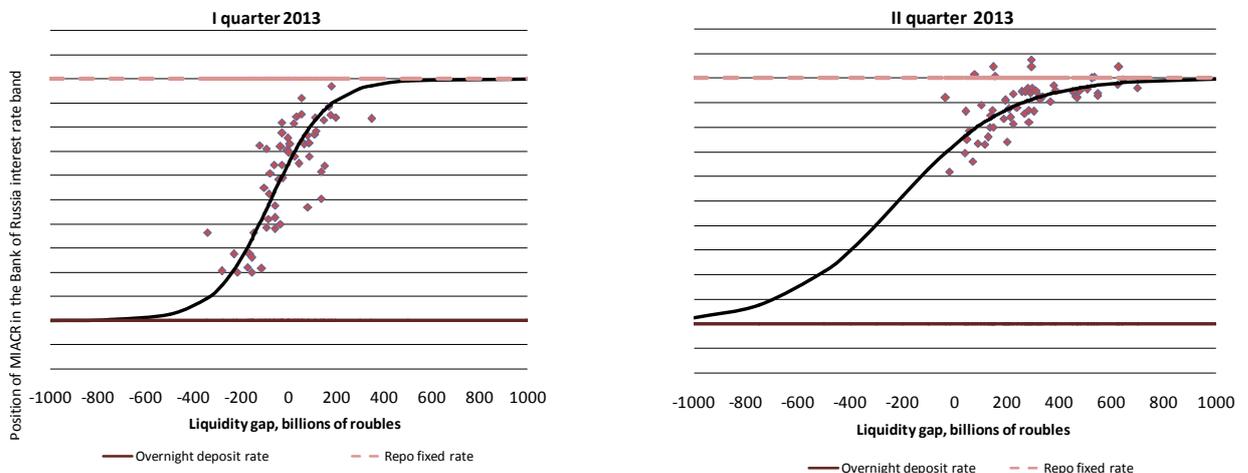
**Chart 27. Correlation between the total value of one-week repos and the limit set for the auction**



Still another factor driving the rate up in the second quarter of 2013 was the weakening of the rouble<sup>8</sup> amid an unfavorable investment environment. This factor is estimated<sup>9</sup> to have increased the average short-term money market rate in the second quarter by about 3 b.p.

Changes in other factors' contributions to the spread between the interbank interest rate and the overnight and one-week repo auction minimum bid rate (Chart 29) during the period under review was largely<sup>10</sup> caused by increased current liquidity deficit.

**Chart 28. Impact of current liquidity shortage on the interbank rate position in the Bank of Russia interest rate band**



<sup>8</sup> The rouble value of the EUR/US\$ basket increased by over 3% QoQ.

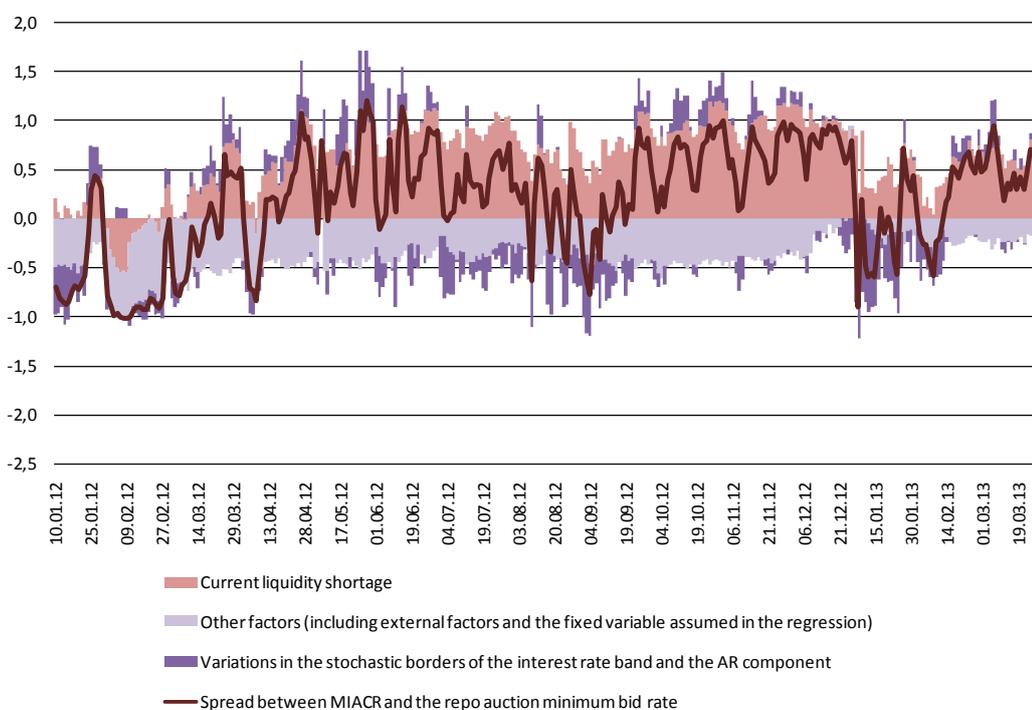
<sup>9</sup> These estimates are based on the model used, which describes the influence of various factors on the position of the short-term interest rate in the interest-rate band for Bank of Russia standing facilities.

<sup>10</sup> Another reason behind the increased contribution of other factors to the spread between the interbank rate and the overnight and one-week repo auction minimum bid rate is the situation in the FX market observable in the second quarter, which was described above.

An increase in the current liquidity deficit means a growing gap between liquidity demand and supply, covered by daily Bank of Russia liquidity provision operations, primarily, via overnight repo auctions. Therefore, a rise in the current liquidity deficit entails a rise in central bank liquidity provision limits for market operations. This, in its turn, increases the load on the overnight segment of the money market in terms of redistribution of liquidity received by the banking sector from the Bank of Russia in overnight repo auctions. The limits for this maturity are normally systematically fully taken (as evidenced by the ratio of the actual value of transactions to the limit – see Table 4), while interbank turnovers increase<sup>11</sup>.

The analysis of sensitivity of the interbank interest rate to changes in certain determinants of its position in the Bank of Russia rate band, made on the basis of second quarter data, showed that daily volatility of the interbank interest rate was largely caused by changes in the current liquidity deficit. It is of note that as the money market rate approached the upper border of the interest rate band in the second quarter of 2013, the volatility of the interbank rate moderated significantly compared with the previous quarter, while the volatility of current liquidity shortages showed similar readings in these two periods.

**Chart 29. Decomposition of the spread between the interbank rate and the short-term repo auction minimum bid rate, p.p.**



<sup>11</sup> In an environment of prevailing current liquidity shortages in the second quarter, the average interbank turnover was 220.8 billion roubles versus 195.1 billion roubles in the previous quarter, when the current liquidity deficit/surplus was largely neutral. A simple econometric model describing a linear dependence of the money market turnover log on its first two lags and the current liquidity deficit, may show that increasing the current deficit by 100 billion roubles would result in a long-term increase in the interbank turnover by 13% (period of estimations was from 11 January 2010 to 30 June 2013,  $R^2 = 0.8$ ,  $DW = 2.1$ ).

The structural liquidity deficit, like in the previous quarter, was the second important determinant significantly affecting money market rates. A further contributor to noticeable interbank rate variations in the period under review was, as noted earlier, pronounced exchange rate volatility. The impact of other factors in the second quarter of 2013 is generally assessed as immaterial.

**Table 4. Money market rate sensitivity analysis with regard to changes in respective regressors**

Indicator	Mean	Mean square deviation	Range of money market rate variation*		
Liquidity gap, billions of roubles	278.9	177.2	6.26	+/-	10 b.p.
Structural liquidity deficit, billions of roubles	2,007.8	267.5	6.27	+/-	5 b.p.
Market expectations of the rate, %	5.7	0.2	6.27	+/-	1 b.p.
Interbank market turnovers, billions of roubles	220.8	30.1	6.27	+/-	1 b.p.
Funds provided in overnight repo auction to the limit	0.93	0.13	6.28	+/-	1 b.p.
LIBOR o/n, weighted to the EUR/US\$ basket	0.090	0.005	6.28	+/-	0 b.p.
Rouble value of the EUR/US\$ basket	35.97	0.74	6.27	+/-	2 b.p.

\* Equals one mean square deviation of a respective regressor from its mean value.

### 3.2. Intraday patterns of the interbank lending market

Over-the-counter trading platforms facilitating money market trade for banks are now widely used internationally. Central banks have access to electronic platforms' data that they use to examine the market microstructure and monitor its intraday dynamics. This, in its turn, helps assess on-line the impact of central bank liquidity provision operations on market conditions, analyse market liquidity reallocation patterns, get a better understanding of interest rate drivers, etc. In Russia, data on intraday behaviour of the interbank market is provided by the DELTA<sup>12</sup> system. Alongside the St Petersburg Currency Exchange Interbank Section, DELTA is a centralised platform for executing transactions between banks. However, unlike a currency exchange, the volumes of trade executed through the electronic platform are big enough to be considered a reliable basis for money market monitoring

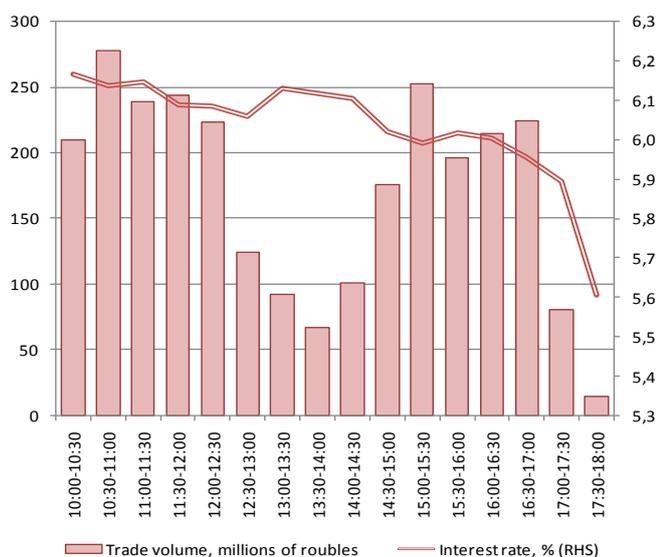
<sup>12</sup> The DELTA system (operated by LLC DELTA) belongs to the Moscow International Currency Association (MICA) established by a group of banks in 1999. As of 2013, MICA has 107 members, with 89 of them registered in Moscow. DELTA's technological approach is to provide an opportunity to trade participants to form individual order books for all the counterparties with whom banks have reciprocal counterparty limits so that the values of counterparty orders do not exceed the limits set specifically for this counterparty. The system operates continuously in an automatic regime of an order-driven market. Having entered into a deal in DELTA, banks confirm it and settle it bilaterally, i.e. DELTA is an indicative system and does not provide settlement and clearing services. DELTA provides for O/N (RUB and USD) and 1W (RUB) interbank trade. However, the total turnover in the System is taken up by overnight loans in Russian roubles. DELTA trading is broadcast on-line by Interfax and Bloomberg. For more details see <http://www.mmva.ru/>.

(overnight turnovers in DELTA can be as large as a third of the overall trade used as a basis to calculate the RUONIA rate; with the interest rate correlation above 96%).

DELTA is an electronic brokerage system the counterparties use for offering overnight interbank loans and bidding for them. DELTA uses RIBOR (Rouble Interbank Overnight Rate) indicators as its key indicators. RIBOR indices are calculated as a weighted average of interest rates on all the rouble overnight trades in DELTA. There are RIBOR-G (borrower bid rates) and RIBOR-T (lender offer rates). Given the increasing importance of the money market for the Bank of Russia's interest rate policy, in the second quarter of 2013 the FSD arranged for access to and processing of individual DELTA transactions' data on conditions of anonymity. As a result, now it is possible to undertake early surveillance of interbank developments even before the official statistics of interest rates (RUONIA and MIACR) are released.

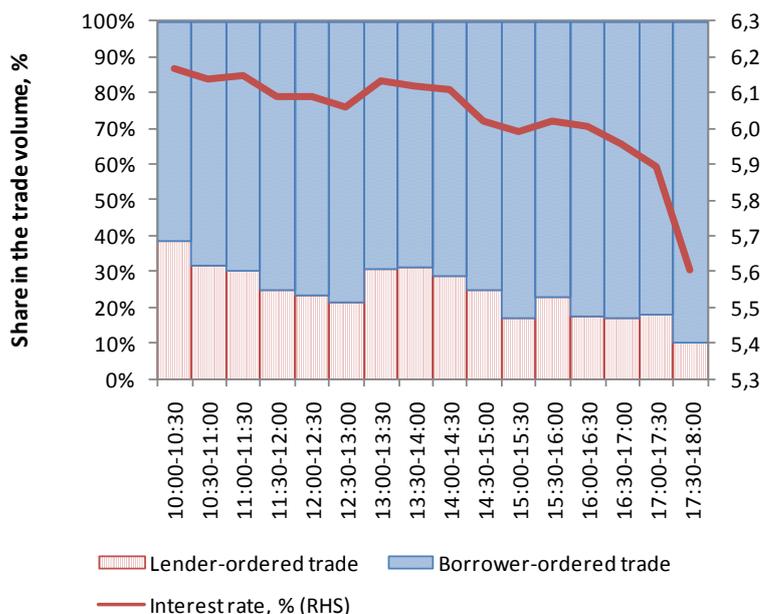
**The interbank market features intraday cyclicity.** It is driven by both client payments' patterns and the schedule of runs of the Bank of Russia payment system. The bulk of interbank payments falls on the first (9:00 to 11:00) and the third (14:15 to 16:00) runs. Therefore, about half an hour or an hour before the Bank of Russia stops receiving payment orders, credit institutions tend to demonstrate heightened demand for liquidity. This, in its turn, leads to increased interbank turnovers in the morning and in the afternoon. And, the other way round, lunch hours and the end of the business day are marked by lower banks' demand for liquidity (Chart 30).

**Chart 30. Intraday dynamics of the interbank lending market**



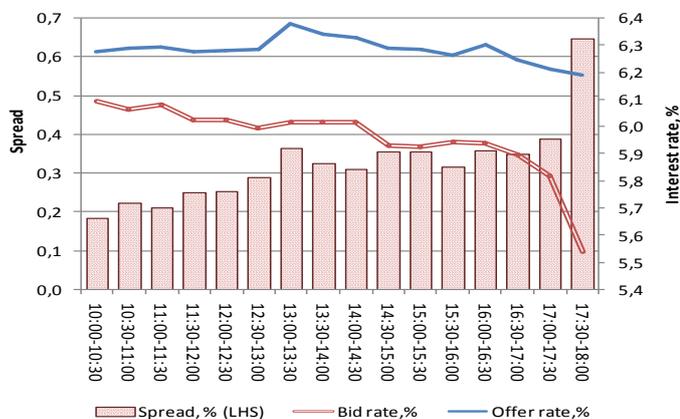
**Liquidity providers have a strong impact on interbank market conditions.** In an environment of structural liquidity deficit, most transactions – both in numbers and volumes – are lender-ordered, reflecting banks' heightened demand for liquidity. On average, the interbank loan demand is three times larger than the supply (Chart 31). The imbalance between demand and supply shifted towards lenders is a regular situation in any banking system, given that it emerges as a net borrower in the national financial system. However, at the same time, the size of the imbalance is a measure of the structural liquidity shortage.

**Chart 31. Correlation between demand and supply in the interbank lending market**



**The interbank market spread as an indicator of efficiency and uncertainty.** The RIBOR-G and RIBOR-T indices calculated by DELTA are used as a basis to determine the difference between offer and bid rates in the interbank market (Chart 32). This spread averages 45 b.p., which is almost twice as narrow as the spread between the MIBOR and MIBID indicative rates. In other words, the organised market seems more effective from the perspective of liquidity redistribution costs, than the overall interbank market. Increasing spread may reflect both a growing imbalance between liquidity demand and supply (normally, at the end of the business day, when liquidity demand weakens) and uncertainty about future behaviour of interest rates.

**Chart 32. Interest rate difference between RIBOR-G and RIBOR-T**



The above key features of intraday conditions, i.e. movements in volumes and interest rates, demand and supply balance, bid and offer spread, are used for operational monitoring of price effects of central bank liquidity provision operations, and also for assessing the adequacy of funding. The typical intraday dynamics of the second quarter, given in the charts, suggest that following Bank of Russia repo auctions (held in morning hours) the rate tends to decline, while the average value of transactions tends to drop. Meanwhile, the spread remains stable. All this suggests that intraday liquidity provision by the Bank of Russia is adequately efficient.

## 4. MONEY MARKET INFRASTRUCTURE DEVELOPMENT: NSMA PRICING CENTRE LAUNCHED

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Since 1 April 2013, an NSMA Pricing Centre (hereinafter – Centre) is fully operational. The Centre is a joint project of the NSMA and the National Settlement Depository (NSD) to provide information services. In this project, the NSMA is responsible for methodologies, while the NSD provides the technologies. The Centre was initiated by the Bank of Russia to harmonise fair value measurement of financial instruments.

The beginnings of the Centre date back to 2009, when the NSMA started developing a methodology for fair value measurement of bonds (hereinafter – Methodology). In June 2011, the NSD started the project's technical implementation. Now that the Centre is operational, market participants have an opportunity to outsource a part of routine, time-consuming and labor-intensive valuation work.

The Methodology incorporates the most valuable improvements by market participants suggested during the testing stage, and also reflects the latest amendments to financial accounting regulations, specifically, Appendix No. 7 to Ministry of Finance Order No. 106n, dated 18 July 2012, 'International Financial Reporting Standard 13 Fair Value Measurement', effective since 1 January 2013. In line with this document, fair value should be considered as the price that would be received from selling bonds in an orderly transaction between well-informed market participants, independent from each other and willing to enter into this transaction.

The Methodology gives priority to market data: if a bond has an active market, it is necessary to use market quotations to measure its fair value. Estimates may be used only in the absence of an active market. The presence of an active market is indicated by the bond liquidity ratio, which is a function of three factors: a monthly volume of trades, a monthly number of trades and the number of days this bond was traded.

When liquidity is high (the reading of the liquidity ratio no lower than the threshold), only the market price will be used to compute the fair value. Since normally it is more volatile than the fair value, its readings are smoothed to eliminate the influence of immaterial pricing factors. Fair value estimation also makes use of the term structure of interest rates as a composition of an OFZ zero-coupon yield curve and the NDF (non-deliverable forwards) curve.

When liquidity is not high enough (the liquidity ratio lower than the threshold), alongside market prices, three other estimates will be used that may be produced even in the absence of trade. The first such estimate is received by averaging of indicative (expert) assessments of the bond's price. The second estimate is based on domestically traded bonds similar to the target security in their credit quality. A group-wide zero-coupon yield curve is constructed for the selected traded bonds, which is used to estimate the price of the bond by discounting its cash flows. And, finally, the third estimate is similar to the previous approach with the only difference that foreign traded bonds are used.

The final fair value is calculated as a weighted average of these four estimates. The weights should be adjusted during each step (period) with regard to how precise the previous estimate is: the more precise the estimation method proves in retrospect, the higher weight it should get.

The use of the Centre's products shall allow: extending the collateral list for repo transactions to include bonds with no market quotations; revalue bonds for accounting purposes in the absence of market quotations; get a criterion for identifying non-marketable trades; and provide guidance on new issues.

Calculations make use of the NSD data base, which contains information about all the issuers and bonds in custody. Further on, the Moscow Exchange provides information about the trade and yield curve, while Bloomberg informs about securities traded in foreign markets.

An important advantage of the fair value measurement approach implemented by the Centre is that it minimises subjective judgment and room for price manipulation. At the same time, to adapt to the changing market conditions, the Centre uses 15 parameters subject to periodic revisions by the Expert Board of the NSMA for Prices.

Looking ahead, the Centre plans to extend its range of services. It currently analyses the needs of the market for information about spreads, liquidity indicators, and issuers' credit quality (in the form of a NSMA rating). It has also undertaken valuation of derivatives.

## 5. APPENDIX. MONEY MARKET STABILITY INDICATOR AND RISK MEASURES

The money market stability indicator (hereinafter – the Indicator) is designed to measure the money market capacity to ensure sound and uninterrupted performance of its functions of short-term liquidity redistribution among market participants. Its value ranges from 0 to 100, increasing as the risks of money market disruption decrease (Chart 33).

**Chart 33. Money market stability indicator**



The Indicator aggregates the specific indicators listed below, i.e. money market risk measures (Chart 34). It is calculated as the first primary component of these measures.

*Average money market rate* is a weighted average rate of the interdealer repo market, the interbank lending market and the swap market.

*Marketable asset utilisation ratio* is a ratio of the present value of securities used as collateral to back transactions with the Bank of Russia to the present value of securities held by credit institutions.

*Bank of Russia fixed rate swap and repo volumes* mean the volumes of liquidity injections at higher rates than the auction-based repo rates.

*Share of securities excluded from the Lombard List* is calculated as a ratio of the present value of securities utilised in interdealer repos and excluded from the Lombard List, to the present value of securities utilised in interdealer repos.

*Money market borrower concentration* is a measure of market monopolisation on the borrower side (modified Herfindahl-Hirschman Index).

*Money market lender concentration* is a measure of market monopolisation on the lender side (modified Herfindahl-Hirschman Index).

*Money market centralisation index* is a measure reflecting the degree of similarity to a market where liquidity is provided via the same “central” participants.

*Money market intermediation degree* reflects the share of operations by an intermediary to transfer liquidity from the donor to the recipient in the total volume of trade.

The most important determinants of the Indicator include: average money market rate, Bank of Russia fixed-rate swap and repo volumes, lender concentration, and money market centralisation.

**Chart 34. Money market risk measures**

