

The Assessment of the Monetary Market of Russia at the Present Stage of Development

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Abstract

This article can see the analysis of the monetary market of Russia at the present stage, its main segments. An assessment is given to the regulation of mechanism by liquidity, the transactions of the Bank of Russia on the provision of liquidity and on absorption of liquidity, the transaction of fixed action and the transaction in the public market are analyzed. To determine the tendency of development of the monetary market and its segments. In the work using the methods of multivariate statistics, the tools of financial mathematics. To be analyzed the amount of data from the 2015 -2016 year, the 2013 year. (daily data). Hypothesis 1. The dynamics of the money market of Russia at the present stage of development of domestic economy is rather stable. Hypothesis 2. The many transactions of regulation to decrease the liquidity of by monetary movement, the control function. Also in the article consider the contour of the financial transaction. This article reveals the theoretical bases of analysis of profitability of credit operations.

Keywords: Monetary Market, Regulation by Monetary Movement, Monetary Base.

1. Introduction

The efficiency of monetary regulation directly depends on the analysis results of the monetary market, its segments, the controlling mechanism liquidity. The management system of liquidity in Russia has the features. Let's consider the main tools of the Bank of Russia, having grouped them in the main transactions: provision of liquidity and absorption of liquidity (Table 1). Let's specify that in the course of the analysis of the monetary market taking the data for 2015 - 2016, 2013 were used (daily data) with account provided on the scheme of transaction. Determination of a tendency of development of the monetary market and its segments was performed using the applied software package of Statgraphics.

2. The results of the analysis

Let's carry the assessment to the monetary market of Russia in the 2016 y. on the basis of average monthly opened position (Table 2).

Table 1: The Transactions of the Bank of Russia on Regulation of Liquidity

The transactions	The kind of transactions	The instrument	The term	The frequency of carrying
The provision of liquidity	<i>the transaction of fixed action</i>	The credits "overnight"	1 day	daily
		The lombard credits		
		The transactions "currency swap"		
		The transactions of a repo		
		The credits provided with gold	from 1 to 549 days	
		The credits provided with non-market assets or guarantees	from 1 to 549 days	
	<i>the transaction in the public market</i>	The auctions for loan granting, provided with non-market assets	3 months	monthly
			from 1 week	irregularly
		The repo auctions	1 week	weekly (the repo auction or a deposit auction is held)
			from 1 to 6 days	irregularly
The auctions currency swap	from 1 to 2 days			
The absorption of liquidity	<i>the transaction in the public market</i>	The deposit auctions	from 1 to 6 days	weekly (the repo auction or a deposit auction is held)
			1 week	
	<i>the transaction of fixed action</i>	The deposit transactions	1 day, to poste restante	daily

2.1. The assessment of the monetary market, the liquidity at the present stage of development of Russian economy.

In September 2016 the monetary market of Russia constituted the 3983 billion rubles. Estimating the structure of the market, it is possible to note that the greatest specific weight is the share of currency swaps and the bursas repo – the 57,7%, the 24,49% (Fig. 1).

Table 2: The Monetary Market of Russia in the 2016 billion RUB

№	The segments of market	April	May	June	July	August	September
1.	The bursas repo	835	774	851	865	982	976
2.	The interbank credits	659	649	635	701	762	705
3.	The currency swaps	1707	2260	2076	2003	1964	2302
4.	The total monetary market	3201	3683	3562	3569	3707	3983
The assessment of structure of the money market, %							

1.	The bursas repo	26,09	21,02	23,89	24,24	26,48	24,49
2.	The interbank credits	20,59	17,62	17,83	19,64	20,54	17,7
3.	The currency swaps	53,33	61,36	58,28	56,11	52,98	57,7
4.	The total monetary market	100 %	100 %	100 %	100 %	100 %	100 %

The currency swaps are transactions of fixed action of Central Bank of Russian Federation (Fig. 2). Though, as a rule, the abroad, these transactions use as the additional tool in the regulation by banking liquidity.

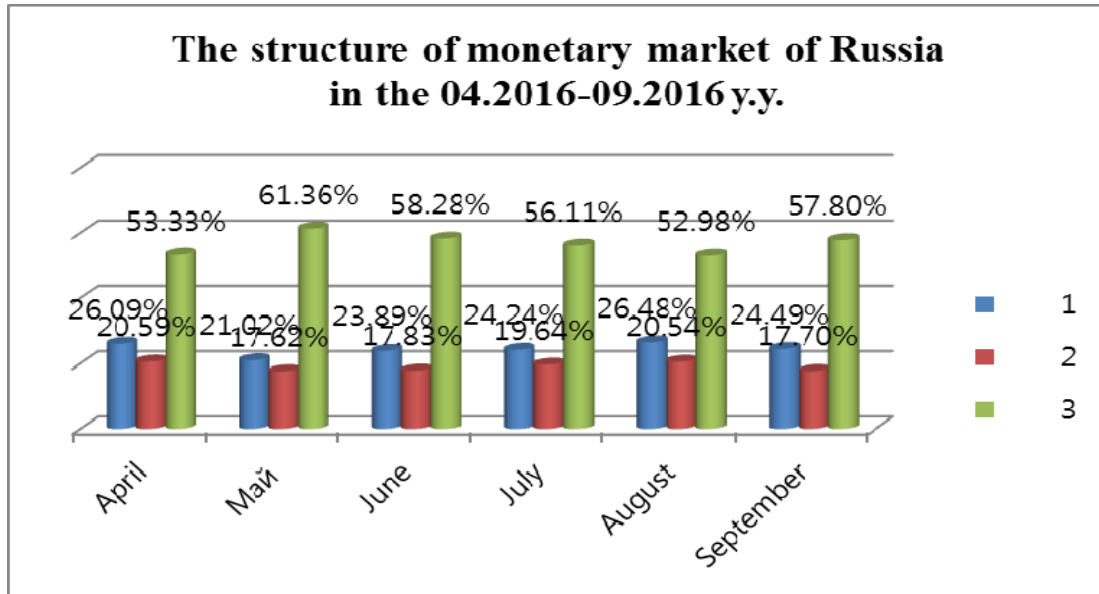
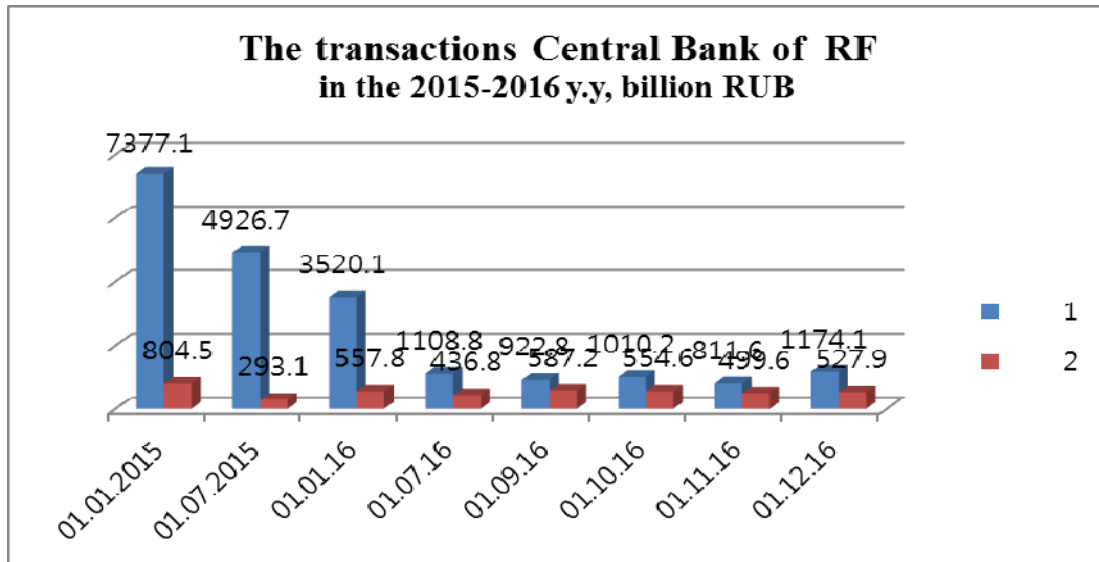


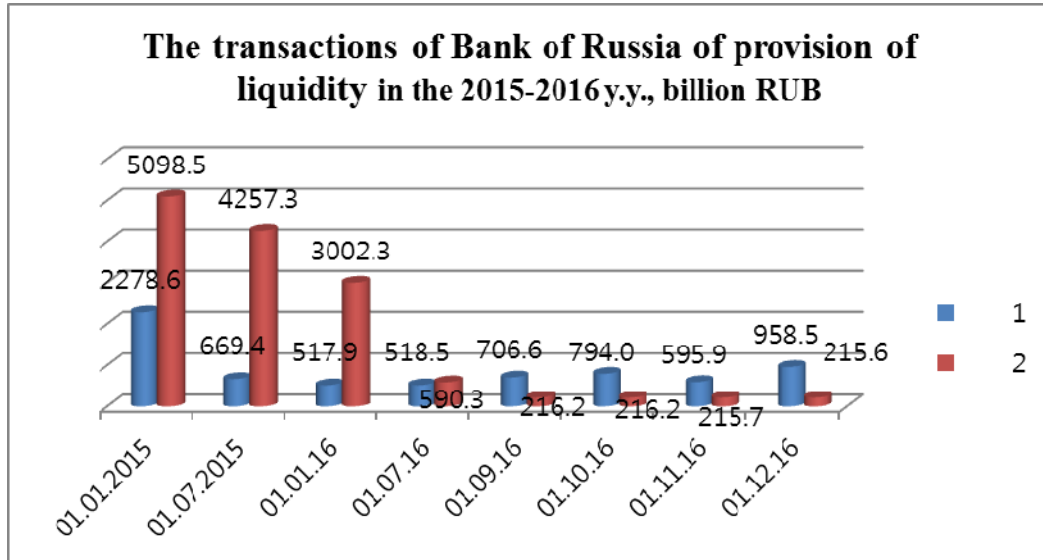
Figure 1: The Structure of Monetary Market of Russia in the 2016



Row 1 – the transactions on provision of liquidity,
 Row 2 – the transactions on absorption of liquidity.

Figure 2: The Transactions Central Bank of Russian Federation

Let's carry the operation analysis of Bank of Russia on regulation of the market of liquidity in the 2015-2016 y.y. (Table 3,4, Fig. 3,4,5).



Row 1 – the transactions of fixed action,
 Row 2 – the transactions in the public market.

Figure 3: The Transactions of Bank of Russia of Provision of Liquidity in the 2015-2016

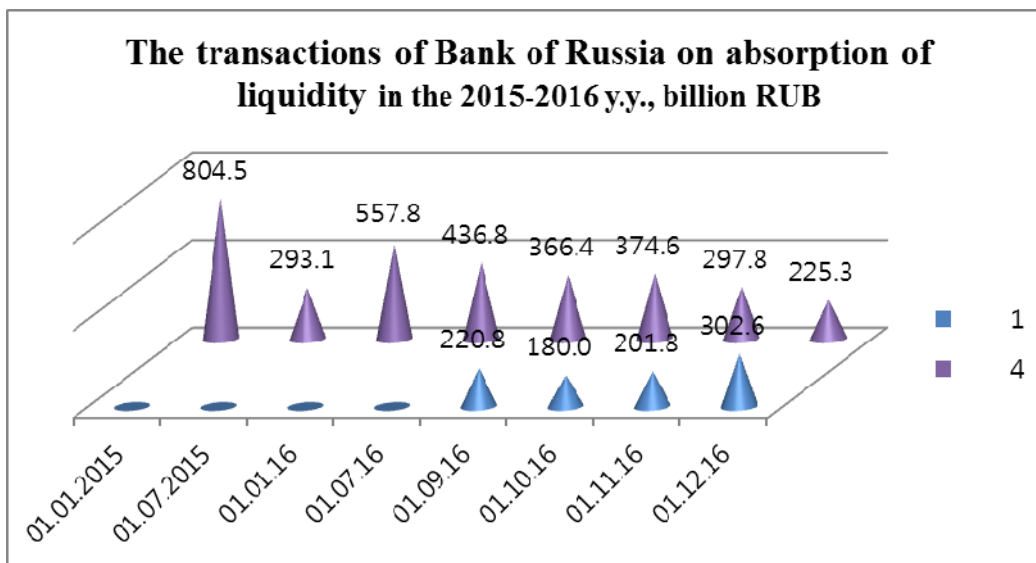
Estimating the structure of the mechanism of regulation by banking liquidity of Russia it is possible to note that the considerable amount from the transactions of fixed action for provision of liquidity in the 2016 y. is occupied by the credits and the transactions of repo. On the 01.12.2016 y. they constituted the 44,26% and the 37,3% respectively.

Table 3: The Transactions of Bank of Russia on the Regulation of Liquidity in the 2015-2016

№	The transactions	01.01.2015	01.07.2015	01.01.2016	01.07.2016	01.09.2016	01.10.2016	01.11.2016	01.12.2016	billion RUB
1.	The credits "overnight"		4		1,5	3,7	2,6			
2.	The 37ombard Lombard credits	3,7	4	2,9	1,2	1,3	1,2	1,3	1	
3.	The transactions "currency swap"	121,6	49,9	14,9			49,8			
4.	The transactions of a repo	96,2	275,9	264,9	273,7	362,5	408,7	291,3	437,9	
5.	The credits provided with gold	1,2	0,5	0,5						
6.	The credits provided with non-market assets or guarantees	2055,9	335,1	234,8	242,1	339,1	331,7	303,3	519,6	
7.	<i>Total the transaction of fixed action</i>	2278,6	669,4	517,9	518,5	706,6	794	595,9	958,5	
8.	The auctions for loan granting, provided with non-market assets	2370,9	2685	1553,8	219,6	216,2	216,2	215,7	215,6	
9.	The repo auctions	2727,6	1572,3	1448,5	370,7					
10.	<i>Total the transaction in the public market</i>	5098,5	4257,3	3002,3	590,3	216,2	216,2	215,7	215,6	
11.	Total the provision of liquidity	7377,1	4926,7	3520,1	1108,8	922,8	1010,2	811,6	1174,1	
12.	The deposit auctions					220,8	180	201,8	302,6	
13.	The deposit transactions	804,5	293,1	557,8	436,8	366,4	374,6	297,8	225,3	
14.	Total the absorption of liquidity	804,5	293,1	557,8	436,8	587,2	554,6	499,6	527,9	
15.	<i>Total the transaction of Bank of Russia</i>	8181,6	5219,8	4077,9	1545,6	1510	1564,8	1311,2	1702	

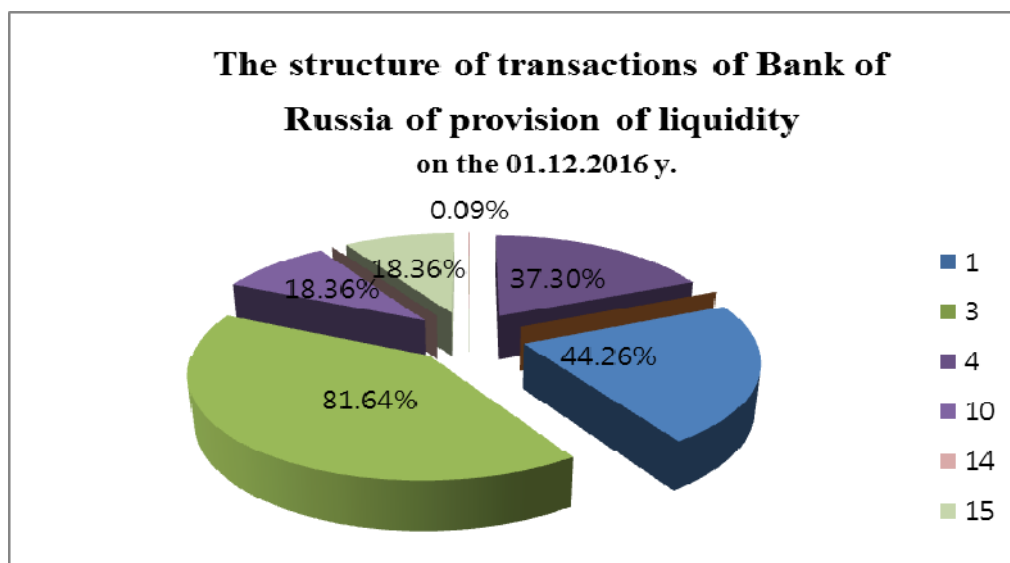
Table 4: The Assessment of Structure of Transactions of Bank of Russia on the Regulation of Liquidity in the 2015-2016 %

№	The transactions	01.01.2015	01.07.2015	01.01.2016	01.07.2016	01.09.2016	01.10.2016	01.11.2016	01.12.2016
1.	The credits "overnight"		0,08		0,14	0,4	0,26		
2.	The 38ombard Lombard credits	0,05	0,08	0,08	0,11	0,14	0,12	0,16	0,09
3.	The transactions "currency swap"	1,65	1,01	0,42			4,93		
4.	The transactions of repo	1,3	5,6	7,52	24,68	39,28	40,46	35,89	37,3
5.	The credits provided with gold	0,02	0,01	0,01					
6.	The credits provided with non-market assets or guarantees	27,87	6,8	6,67	21,83	36,75	32,84	37,37	44,26
7.	<i>Total the transaction of fixed action</i>	30,89	13,59	14,71	46,76	76,57	78,6	73,42	81,64
8.	The auctions for loan granting, provided with non-market assets	32,14	54,5	44,14	19,81	23,43	21,4	26,58	18,36
9.	The repo auctions	36,97	31,91	41,15	33,43				
10	<i>Total the transaction in the public market</i>	69,11	85,41	85,29	53,24	23,43	21,4	26,58	18,36
11	Total the provision of liquidity	100%	100%	100%	100%	100%	100%	100%	100%
12	The deposit auctions					37,6	32,46	40,39	57,32
13	The deposit transactions					62,4	67,54	59,61	42,68
14	Total the absorption of liquidity					100%	100%	100%	100%



Row 1 – the transactions of fixed action,
 Row 4 – the transactions in the public market.

Figure 4: The Transactions of Bank of Russia on Absorption of Liquidity in the 2015-2016



Row 1 - The credits provided with non-market assets or guarantees,
 Row 3 - the transactions of fixed action,
 Row 4 - the transactions of repo,
 Row 10 - the auctions for loan granting, provided with non-market assets,
 Row 14 - the Lombard credits,
 Row 15 - the transactions in the public market.

Figure 5: The Structure of Transactions of Bank of Russia of Provision of Liquidity on the 2016

2.2.The assessment of tendency of development of the monetary market of Russia.

Let's carry the assessment of dynamics of the monetary market of Russia on the basis of daily data for the 2013 y. (Fig. 6,7,8).

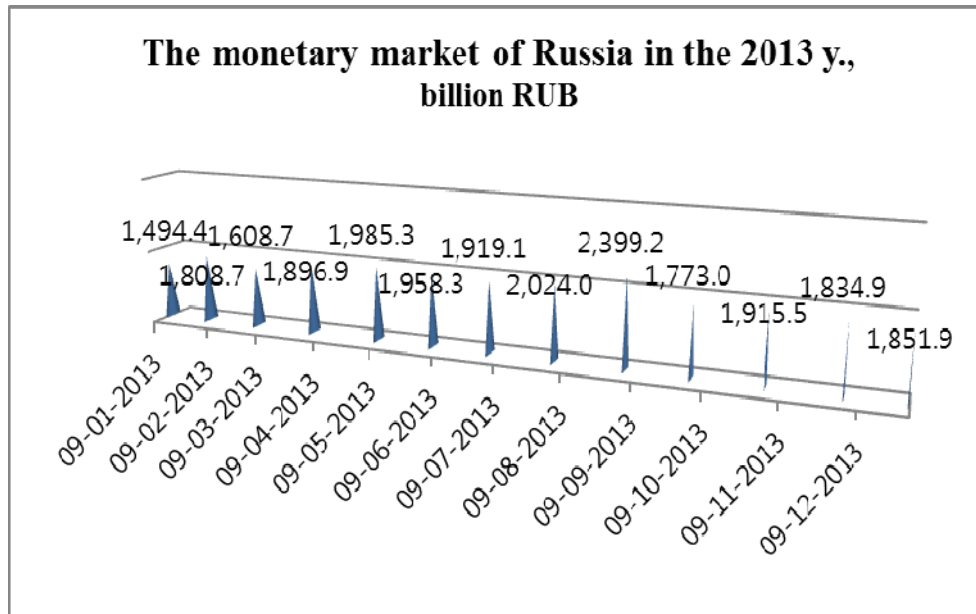
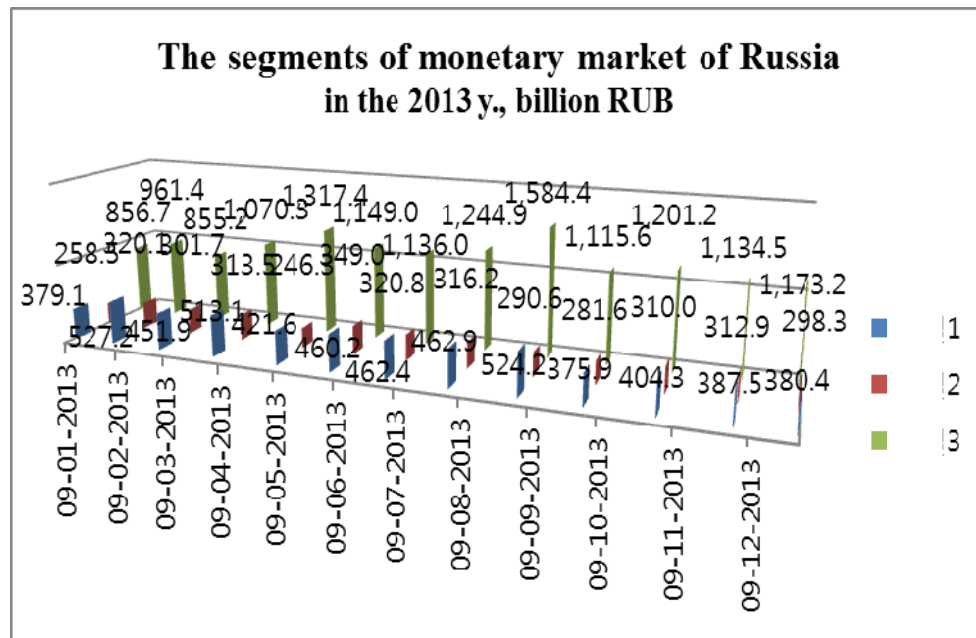
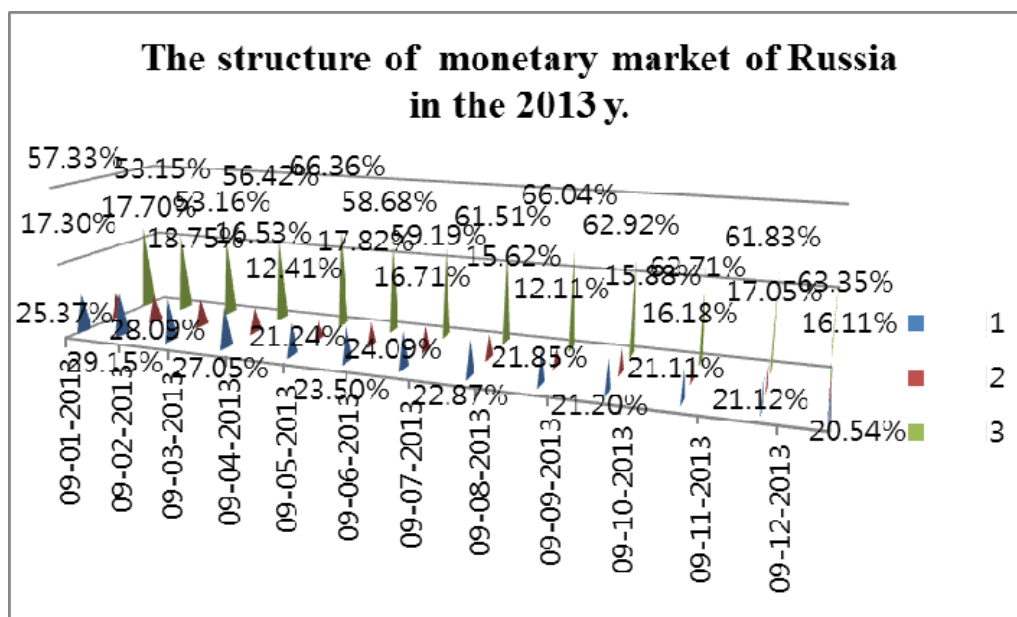


Figure 6: The Monetary Market of Russia in the 2013



Row 1 – the interbank credits,
 Row 2 – the transaction repo,
 Row 3 – the transaction swaps.

Figure 7: The Segments of Monetary Market of Russia in the 2013



Row 1 – the interbank credits,
 Row 2 – the transaction repo,
 Row 3 – the transaction swaps.

Figure 8: The Structure of Monetary Market of Russia in the 2013

The dynamics of amount of the monetary market of Russia can be described on the basis of a linear trend of type:

$$Y = 1715,07 + 0,73*t,$$

The importance of parameters of the equation it was checked by means of Student's criterion. The assessment of autocorrelation was determined by means of Darbin-Watson's statistics.

Also the dynamics of the monetary market can be described by means of the following the dependency of type (fig.10):

$$y = \exp(7,44 + 0,00043*t)$$

The forecast assessment of volume of monetary market on the 2014 y. representable in the appendix A.

The forecast assessment of the volume of transactions on the interbank credits can be described by means of the following the dependency of type:

$$y = \exp(6,007 + 0,127*t)$$

The forecast assessment of the volume of transactions repo can be described by means of the following the dependency of types:

$$y = 310,2 - 0,03*t \text{ or } y = \exp(5,74 - 0,0001*t), \text{ or } y = \exp(5,73 - 0,11/t)$$

The forecast assessment of the volume of transactions of swap can be described by means of the following the dependency of types:

$$y = 944,28 + 1,16*t \text{ or } y = \exp(6,83 + 0,0012*t)$$

2.3. The methodological aspects of analysis of financial and credit operations

The results of analysis and the forecast assessment depends from the rate on operation. Let's consider the main theoretical and methodological aspects. Assessment of profitability of financial and credit operations has its own

characteristics. In this article we consider some of the operations in the context of short-term and long-term period. Degree of financial efficiency (profitableness) of operations defined differently.

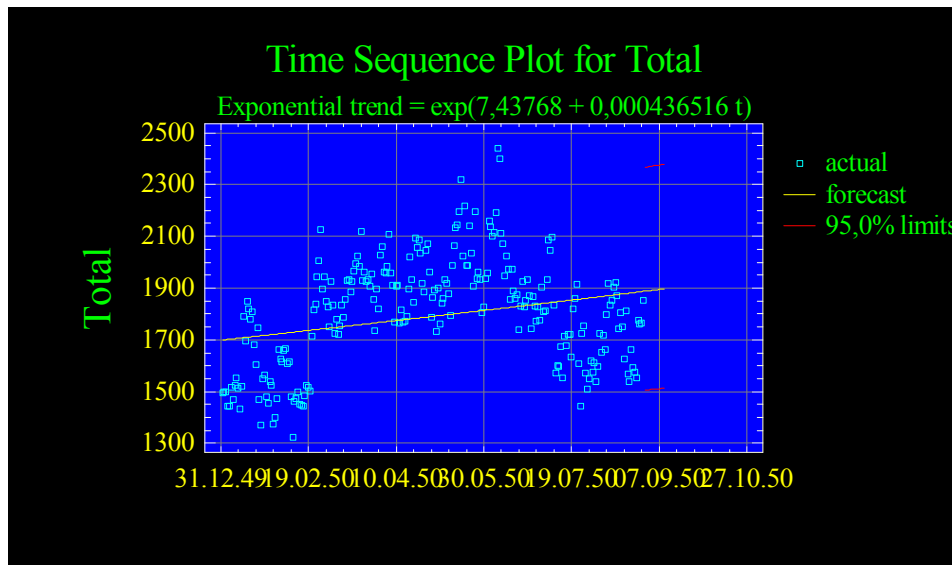


Figure 9: The Dynamic of Monetary Market of Russia

The principle consist in the following: all investments and incomes taking into account their concrete kind are conditionally equated at equivalent loan operation equivalent from the point of view of profitableness of operation. In depositary operations by a measuring instrument the effective rate acts. At an estimation of bonds – full profitableness or profitableness at the moment of repayment (yield to maturity). In operation with industrial investments - internal norm of profitableness or internal interest rate (internal rate of return, IRR).

By means of balance of financially-credit operation (fig.10)

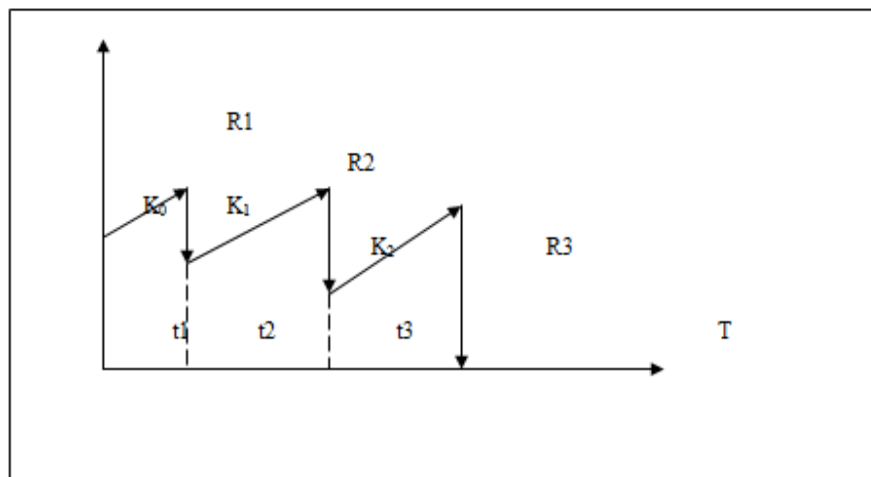


Figure 10: The Contour of Financial Operation

Equation of investments and return.

$$K_1 = K_0 * g^{t1} - R1 = K_0 * (1+i)^{t1} - R1$$

$$K_2 = K_1 * g^{t2} - R2 = K_1 * (1+i)^{t2} - R2$$

In this example full equation:

$$K_2 g^{t3} - R3 = 0$$

Full equation: balance of the credit and the extinctive payments. In our example when last payment closes a contour of financial operation.

Let's define K2 through K0 and we will substitute in the balance equation.

$$[(K_0 * g^{t1} - R1) g^{t2} - R2] g^{t3} - R3 = 0$$

If the number of time intervals is more 3 the balance equation looks like:

$$K_0 * g^T - (R1 * g^{t2+t3} - R2 * g^{t3} + R3) = 0$$

$$T = \sum t_j$$

The given financial operation is dismembered on two processes: the growth operation initial debts for all period and the growth the extinctive payments for term from the moment of payment and till the end of operation term. It «*the method of counter operations*».

By means of this method is achieved by:

1. Change of profitableness of operation.
2. Income distribution on sources and the periods (according to conditions of the contract or a calendar interval of time).

Consider the features of loan profitability analysis and accounting operations with deduction of commission.

Profitableness of loan and registration operations with deduction of commission

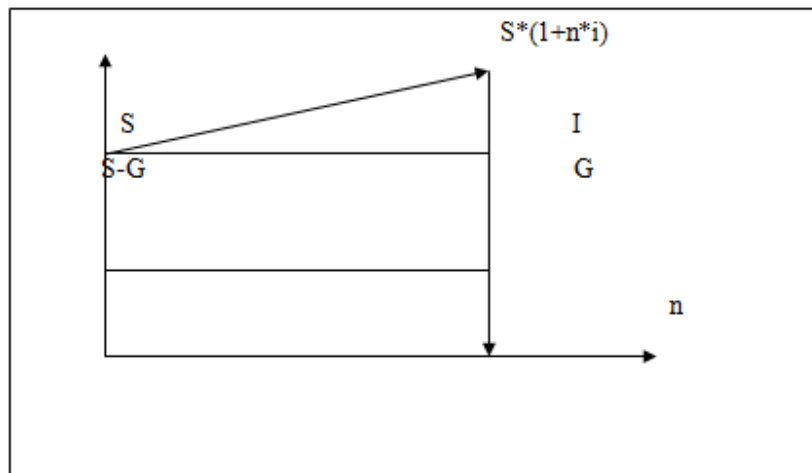


Figure 11: The Contour of Financial Operation

Legend (fig. 12):

S – the loan,

n – the term of operation,

G – the commission fee for operation,

S-G – the actually given out loan.

$$i_c = i_c \quad i = i_s$$

$$(S-G) * (1+i_c)^n = S * (1+n*i)$$

$$G = S * (1-g)$$

g – the commission to the sum of credit, %.

$$i_c = \sqrt[n]{\frac{1 + ni}{1 - g}} - 1 \quad \text{– the corrected price of the credit}$$

Short-term financial operations

The characteristic of profitability in the form of the rate of percent

$$i = \frac{1 + ni}{(1 - g) * n} - 1$$

Long-term financial operations

The loan stands out under the rate π . Percent.

$$(S - G) * (1 + i_c)^n = S * (1 + i)^n$$

$$i_c = \frac{1 + i}{\sqrt[n]{(1 - g)}} - 1$$

Registration operations

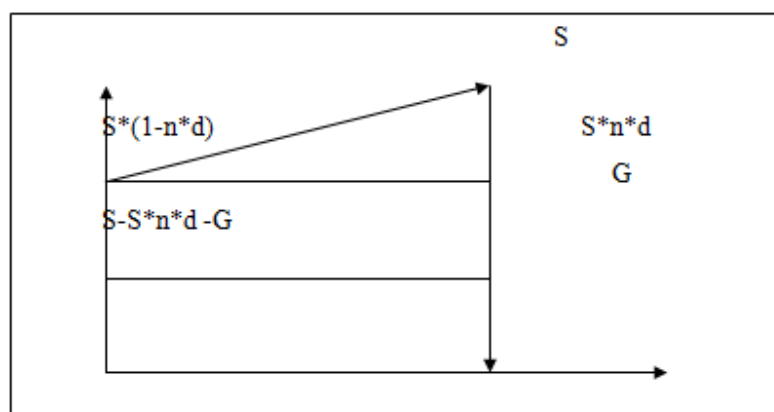


Figure 12: The Contour of Financial Operation

At deduction of commission fee and discount the borrower receives $(S - S * n * d - G)$.

If discount is defined at simple discount rate:

$$S * (1 - n * d - g)$$

The balance equation:

$$S * (1 - n * d - g) * (1 + i_c)^n = S$$

$$i_c = \sqrt[n]{\frac{1}{1 - nd - g}} - 1$$

n – the term defined at the account of the promissory note.

Full profitability determined:

$$i_{cf} = \frac{1}{(1 - n * d - g) * n} - 1$$

Maturity value definition and payment of percent in the consumer credit

Percent, as a rule, are charged for all sum of the credit and join the basic debt at the moment of credit opening (flat rate of interest, add-on interest) – a method of single charge of percent. Repayment of a debt with percent is made by parts (as a rule, the equal sums) throughout all term of the credit.

$$1. S = P * (1 + i * n)$$

R – the size single payment on account of debts repayment

$$2. R = \frac{S}{m * n}$$

Legend:

n – the term of the credit advanced in years,

m – the number of payments in a year.

Problem: splitting R into percent and the sums going on repayment of the basic debt.

The first case. Percent are charged on an initial amount of debt. Thus its actual size regularly decreases in time. In this connection the valid cost of the credit considerably exceeds the contractual interest rate.

Profitableness of purchase and sale of financial tools

Purchase and bill sale. Simple discount rates.

Financial productivity of operation is difference the price of purchase P1 and the price of sale P2.

$$P_1 = S * (1 - (\partial_1 / K) * d_1)$$

$$P_2 = S * (1 - (\partial_2 / K) * d_2)$$

Short-term financial operations (Simple percent)

$$P_1 * (1 + \frac{(\partial_1 - \partial_2)}{K} * i_{ef}) = P_2$$

$$i_{ef} = (P_2 - P_1) / P_1 * K / (\partial_1 - \partial_2) \quad \text{having substituted } P_1 \text{ and } P_2$$

$$i_{ef} = \left(\frac{1 - \partial_2 / K}{1 - (\partial_1 / K)} - 1 \right) * K / (\partial_1 - \partial_2)$$

That operation wasn't unprofitable, performance of following conditions is necessary:

$$\partial_2 d_2 < \partial_1 d_1$$

$$P_1 < P_2$$

Long-term financial operations

Duration of possession (holding period)

$$P_1 * (1 + i_e)^{(\partial_1 - \partial_2) / 365} = P_2$$

$$i_e = (P_2 / P_1)^{365 / (\partial_1 - \partial_2)} - 1$$

$$i_e = \left\{ \frac{K - \partial_2 d_2}{K - \partial_1 d_1} \right\}^{365 / (\partial_1 - \partial_2)} - 1$$

That operation wasn't unprofitable, performance of following conditions is necessary:

$$\partial_2 d_2 < \partial_1 d_1$$

$$P_1 < P_2$$

Profitableness is realized at:

$$i_e > 1$$

$$d_2 < (\partial_1 / \partial_2) * d_1$$

Purchase and sale of the financial tool (Simple percent)

The moment of release by the emitter – at par

Operations with the certificate

There are 3 variants:

1. It is bought face value, is on sale for d_2 days before repayment.
2. It is bought after release and it is repaid in the end of term.
3. Is bought and on sale within term.

The first variant.

$$P_1 * \left(1 + \frac{(\partial_1 - \partial_2)}{K} * i_{ef}\right) = P_2$$

P_1 – Face value,

P_2 – The price of sale,

$\left. \begin{matrix} \partial_1 \\ \partial_2 \end{matrix} \right\}$ – the repayment terms

i_1 – the declared rate of the certificate,

i_2 – the rate in the market at the moment of sale.

Short-term financial operations (Simple percent)

Profitableness determined:

$$i_{ef} = \left\{ \frac{1 + \partial_1/K * i_1}{1 + \partial_2/K * i_2} - 1 \right\} * \frac{K}{(\partial_1 - \partial_2)}$$

Long-term financial operations

Profitableness determined:

$$i_{ef} = \left\{ \frac{K + \partial_1 * i_1}{K + \partial_2 * i_2} \right\}^{365/(\partial_1 - \partial_2)} - 1$$

Profitableness of operation at: $\partial_1 * i_1 > \partial_2 * i_2$

Limiting value i_e at which the investor receives the income:

$$i_2 < (\partial_1 * i_1 / \partial_2)$$

The second variant (fig.13).

P_1 – the face value, P_2 – the price of acquisition, i – the declared profitableness (interest rate).

$$P_2 * \left(1 + \frac{\partial_2}{K} * i_{ef}\right) = P_1 * \left(1 + \frac{\partial_1}{K} * i\right)$$

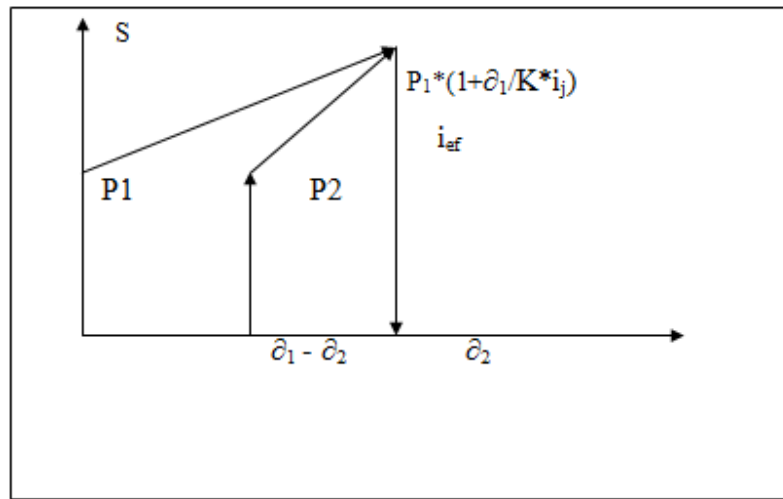


Figure 13: The contour of financial operation

At P₂ the set:

$$i_{ef} = \left(\frac{P_1 \cdot (1 + \partial_1 / K \cdot i_1)}{P_2} - 1 \right) \cdot K / \partial_2$$

Long-term financial operations

Profitableness determined:

$$i_{ef} = \left(\frac{P_1 \cdot (1 + \partial_1 / K \cdot i_1)}{P_2} \right)^{365 / \partial_2} - 1$$

The third case. Purchase of the certificate and after a while its sale is carried out.

P₁ – The acquisition price.

$$P_1 \cdot \left(1 + \frac{(\partial_1 - \partial_2)}{K} \cdot i_{ef} \right) = P_2$$

$$i_{ef} = (P_2 - P_1) / P_1 \cdot K / (\partial_1 - \partial_2) \text{ having substituted } P_1 \text{ and } P_2$$

$$i_{ef} = \left(\frac{1 - \partial_2 / K}{1 - (\partial_1 / K)} - 1 \right) \cdot K / (\partial_1 - \partial_2)$$

That operation wasn't unprofitable, performance of following conditions is necessary:

$$\partial_2 \cdot d_2 < \partial_1 \cdot d_1$$

$$P_1 < P_2$$

Long-term financial operations

Duration of possession (holding period)

$$P_1 \cdot (1 + i_0)^{(\partial_1 - \partial_2) / 365} = P_2$$

$$i_0 = (P_2 / P_1)^{365 / (\partial_1 - \partial_2)} - 1$$

There are the methodological instruments also use in the estimation of innovative processes (appendix B) on the each step.

3. Conclusions.

The dynamics of the monetary market of Russia at the present stage of development of domestic economy is rather stable. The concern causes the management of liquidity by means of a set of transactions which traditionally in the international practice use as the additional instruments of regulation. It brings: to excessive segmentation of the money market, lack of clearness in the forming of the database. Is a consequence to decrease the control function from the state in the movement of cash flows, the currency issue, the liquidity.

The principle consist in the following: all investments and incomes taking into account their concrete kind are conditionally equated at equivalent loan operation equivalent from the point of view of profitableness of operation. In depositary operations by a measuring instrument the effective rate acts.

At an estimation of bonds – full profitableness or profitableness at the moment of repayment (yield to maturity).

In operation with industrial investments - internal norm of profitableness or internal interest rate (internal rate of return, IRR).

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Appendix A

Table 1: The forecast assessment of monetary market of Russia billion RUB

data	The 1 variant	The 2 variant
09.01.2014	1891,31	1888,08
10.01.2014	1892,04	1888,91
11.01.2014	1892,77	1889,73
12.01.2014	1893,5	1890,56
13.01.2014	1894,22	1891,38
14.01.2014	1894,95	1892,21
15.01.2014	1895,68	1893,04
16.01.2014	1896,41	1893,86
17.01.2014	1897,14	1894,69
18.01.2014	1897,86	1895,52
19.01.2014	1898,59	1896,34
20.01.2014	1899,32	1897,17

Appendix B

Innovation is closely interfaced with a variety of credit and financial transactions at each stage of their implementation (fig.1). Assessment of profitability of financial and credit operations has its own characteristics. In this article we consider some of the operations in the context of short-term and long-term period. Degree of financial efficiency (profitableness) of operations defined differently.

Figure 1: The innovation process

