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25 February 1915

Online at <https://mpra.ub.uni-muenchen.de/112263/>  
MPRA Paper No. 112263, posted 11 Mar 2022 13:59 UTC

# An Analysis of the Impact of Monetary Policy on Bank Lending in Russia

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## Abstract

This article examines the role of the banking channel in transmitting Russia's monetary policy. As the financial market is forming and data samples are increasing, there are emerging new conditions for getting a deeper insight into various aspects of monetary policy conducted by the Bank of Russia. The article explores the dependence of bank lending on monetary policy. The author tries to establish whether there are causal statistically significant instruments of monetary policy for the volumes of corporate lending. As independent variables, the author investigates the impact of the monetary base, the money supply, the refinancing rate, and the interbank lending rate. The assessment was conducted using the generalized method of moments. Based on a quarterly sample of data from 2002 to 2013, the author establishes the statistically significant impact of the money supply, the monetary base, the interbank lending rate, and the refinancing rate. The resulting empirical findings substantiate the hypothesis about the existence of a bank lending channel in Russia.

**Keywords:** monetary policy, bank lending, Russia

JEL: C23, E44, E52, G21

## 1. Introduction

Monetary policy is one of the key instruments used by the state to regulate the economy. Therefore, knowledge of patterns in the area is a topical objective in economic research. At the same time, in developing economies, Russia being one of them, the findings of research studies are oftentimes contradictory. As the financial market is forming and scholars are conceptualizing the problematic, extending datasets, and applying more sophisticated research methods, there are emerging new conditions for more in-depth exploration of various aspects of monetary policy conducted by the Bank of Russia.

When it comes to theoretical research, there is an entrenched opinion about the action of several channels through which monetary policy can be translated to the real economy.

Changes in interest rates affect investment decisions and, consequently, real economic activity. Thus, the first channel of the impact of monetary policy is the traditional interest rate channel.

Considering the fact that in the total volume of financial assets and liabilities the share of bank loans and deposits is relatively large, the action of the bank interest rate is a key interest rate channel.

There are researchers who assert that the impact of the interest rate channel can vary depending on a number of factors. Such factors include the magnitude of change and the speed at which bank interest rates on loans and deposits change, as well as the degree of competition among banks, the financial market's development level, and banks' balance situation.

The most traditional explanation for the link between monetary policy and the real sector of the economy is the interest rate channel, which has been developed in present-day textbooks (IS-LM models). However, research has shown (Coricelli et al., 2006) that the interest rate channel cannot provide a thorough explanation for fluctuations in results, which has triggered the consideration of the lending channel (bank loans, making the channels of bank capital widely available, and the role of trade credit).

Of importance is the imperfect substitutability of banks compared with non-bank assets and liabilities. The

significance of the action of a bank loan on the transmission of monetary policy mainly depends on whether bank loans and deposits are special, i.e. how difficult it is to do the substitution. In this regard, some researchers (Bernanke & Blinder, 1988; Bernanke & Gertler, 1995) note that the existence of the credit channel depends, on the one hand, on the degree to which banks can easily substitute other sources of financing for deposits and, on the other, the degree to which borrowers are able to find alternative sources of funding.

The bank lending channel also works through the impact of changes in monetary policy on bank balance liabilities, which can cause the adjustment of bank assets, including loans (Angeloni et al., 2003).

A part of the bank lending channel is associated with the position of bank capital, meaning that monetary policy can urge banks to adjust their credit supply, affecting the positions of capital which are subject to minimal normative requirements (Kishan & Opiela, 2006; Gambacorta & Mistrulli, 2003).

The balance credit channel (a broad credit channel) refers to the balance position of bank borrowers. Monetary policy can, through impact on actual interest rates which affect the disposable income and cash flows of firms and through the channel of the price of assets, alter borrowers' equity and, consequently, affect banks' preparedness to supply loans. This can thus change the external finance premium.

It is apparent that changes in the volumes of bank loan supply in response to changes in monetary policy manifest the action of the mechanism of the bank lending channel. Through operations in open markets, the central bank affects the nominal interest rate. By affecting changes in the volumes of refinancing credit-linked securities, the central bank affects changes in loan supply by commercial banks, due to which the credit rate changes.

Many researchers have analyzed the issue of identifying the special aspects of banking which are crucial to the transmission of monetary policy. In this regard, it is important to note which special aspects and factors can lead to weakening the bank channel.

A study by Kashyap and Stein (2000) has shown that banks with relatively large and liquid assets possess great potential to support the growth of the credit portfolio during the period of difficult monetary policy. A similar phenomenon has been illustrated in an article by Kishan and Opiela (2000) in respect of banks with relatively high equity ratios, as well as in an article by Cetorelli and Goldberg (2012) in respect of banks that can attract funds from international operations.

The findings of a study by Bluedorn (2013), as well as one by Ashcraft (2006), point to a substantial weakening of lending responses to monetary contractions, which are accompanied by the hedging of lending associated with the acquisition of a bank holding company.

A study by Altunbas et al. (2007), as well as one by Loutskina (2011), demonstrates that when banks become able to securitize the credit portfolio (a source of liquidity for commercial banks), the dependence of banks on the actions of the regulator decreases, and, as a consequence, there decreases the effectiveness of the bank lending channel and the effectiveness of monetary policy.

However, the securitization of assets, as a factor, does not affect the effectiveness of monetary policy in Russia, since their volumes are not large.

It is known that the effectiveness of monetary policy is affected by a clearly expressed goal adopted by the central bank.

Over several last years, the Bank of Russia has had a double goal in the form of a stable exchange rate and low inflation. As of 1998, the actual goal had been the exchange rate, while as of 2010-2011 the Bank of Russia had been keen on a gradual shift to an inflation targeting regime and free-floating the ruble. In its annual monetary policy indicators, the Bank of Russia fine-tunes target inflation indicators and its range forecast for growth in the ruble supply (M2).

Some Russian researchers (Drobyshevsky et al., 2009; Yudaeva et al., 2010; Leontieva, 2013) believe that over 2000-2008 the Bank of Russia had aimed at a steady exchange rate for the ruble, while as of 2009-2010 it had been interested more in managing inflation. This indicates that the efficiency of the interest channel increases with time.

## **2. Methods**

### *2.1 The Credit Channel Defined*

The main argument for the credit channel of monetary policy, according to Bernanke and Blinder (1988), is that changes in monetary policy affect the number of deposits (monies) available to banks. The credit channel

emerges because some banks have hard time compensating for changes in the level of deposits.

The theoretical model presupposes that in an equilibrium demand for money is equal to the money supply and demand for money depends on monetary policy. Demand for loans depends on the real GDP, the level of prices, and the credit interest rate. Supply for credits directly depends on the number of available loan assets (deposits or monetary), the credit interest rate, and monetary policy.

Monetary policy is normally approximated by the Bank of Russia's interest rate policy and is a part of the credit supply functions directly and indirectly. Firstly, it is manifested in the form of opportunity cost for the bank which uses interbank markets for financing loans. Secondly, the volume of available deposits (or monies) negatively depends on the policy interest rate.

Today, there are several empirical studies into Russia's monetary policy in different years, which have used different variables and produced discrepant results.

Assessing monetary policy, Vdovichenko and Voronina (2006) take as variables the monetary base, inflation, the index of production of basic industries, and the real ruble-dollar exchange rate. The method employed by the authors is the generalized method of moments. The findings of the authors show that the Bank of Russia tightened monetary policy in response to an upturn in inflation and emission and the weakening of the real exchange rate of the ruble past the target level.

Vymyatnina (2006) analyzes the mechanisms of transmission of monetary policy in Russia over 1995-2004 through the VEC model and the error correction vector as a special case of the vector auto-regression (VAR) approach. The author finds implicit evidence of the interest rate channel in Russia's monetary policy in 1995-2004 by analyzing the money supply.

An analysis of transmission mechanisms in Russia (1999-2007) has been presented in a work by Drobyshevsky et al. (2008). The study was conducted both using vector auto-regressions and micro-economic data from the balances of RF commercial banks. The authors obtained negative results in testing all the channels of monetary transmission based on impulse response function graphs, which, in their view, was a consequence of an insufficient number of observations. At the same time, an assessment of the statistical qualities of the emission equation in models under assessment helped mark out three transmission channels: the channel of unforeseen growth in prices, the bank lending channel, and the household wealth channel. Since one of the possible working monetary transmission channels in 1999-2007 was the bank lending channel, the authors conducted an additional check of its operation using panel analysis of data from the balances of RF commercial banks. The authors established that an increase in interest rates in the interbank credit market leads to a decline in non-financial sector lending gains.

The impact of the central bank's monetary policy on banks' lending behavior has been explored in a work by Juurikkala et al. (2009). Based on a quarterly sample of data from Russian banks from 2002 to 2013, using the generalized method of moments (GMM), the researchers found evidence in favor of the existence of the credit channel in Russia.

Leontieva (2013), using the Granger causality test, established that the refinancing rate, the bank deposit rate in the Bank of Russia, and repo transaction rates do not affect the volumes of bank lending, and the monetary base is the Granger cause for the volumes of lending to juridical persons.

## *2.2 Research Design*

The choice of indicators for establishing the impact of the banking channel is substantiated by each researcher based on an analysis of the credit market explored. This choice of indicators differs in developed and developing countries, which is associated with the development level of financial instruments and the financial market as a whole. In the Russian financial market, a number of normally adopted instruments do not make an impact. These include reserve requirements normally used in analysis, the deposit interest rate, the volume of central bank bonds, and the refinancing rate. As a rule, changes in reserve requirements are used rarely. The deposit interest rate starts working only when interest rates are equated to the lower limit of their range. The size of the volume of Bank of Russia bonds on the balances of commercial banks is not large. The refinancing rate, in the view of some researchers (Leontieva, 2013), carries more fiscal and regulating functions than monetary ones. Nevertheless, the fact of its statistical impact or the absence thereof must be established.

For the purposes of econometric exploration of the existence of the banking transmission channel, based on the findings of previous studies, let us examine the impact of the following instruments on the volume of corporate lending (LL): the refinancing rate (RR), the monetary base (MO), and the money supply (M2). As the market interest rate, we shall examine the interbank lending rate (RL).

A preliminary analysis was conducted on the empirical model (with lagged variables) of the form (1), which is of a dynamic nature. All the indicators, except for interest rates, will be expressed in natural logarithms (1).

$$\ln(LL_t) = a_0 + \sum_{j=1}^l b_j \ln(LL_{t-j}) + \sum_{j=0}^l c_j \ln(MO_{t-j}) + \sum_{j=0}^l d_j \ln(MM_{t-j}) + \sum_{j=0}^l s_j RR_{s,t-j} + \sum_{j=0}^l g_j RL_{t-j} + \varepsilon_t \quad (1)$$

where LL is the volume of corporate lending, in billion dollars, at the moment of time t; T is the total number of time periods (t are quarters); list he number of lags; MO is the monetary aggregate, billion rubles; MM is the money supply, billion rubles; RR is the refinancing rate, %; RL is the interbank lending rate, %.

As the database, we used quarterly data from the Bank of Russia (Bank of Russia statistics, 2014, July) accumulated during the period from the 1<sup>st</sup> quarter of 2002 to the 4<sup>th</sup> quarter of 2013 (Figure 1).

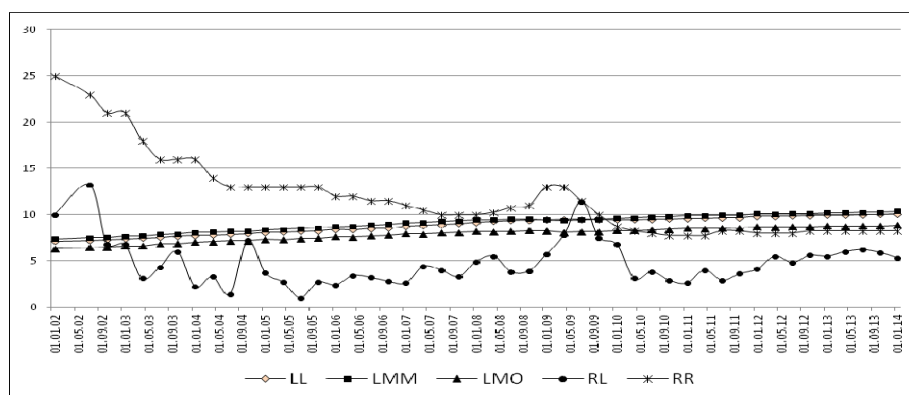


Figure 1. The dynamics of monetary indicators and interest rates

For the purposes of empirical assessment of the credit channel, we need to pick a method for assessing the model (1). Since the model is of a dynamic nature, one of the best assessment methods in this case is the generalized method of moments - GMM (Hansen, 1982, 2000).

The correlation matrix of variables specified in the equation (1) is provided in Table 1.

Table 1. The correlation matrix of variables under study

	LL	LMN	LMO	RL	RR	TQR
Volume of corporate lending (LnLL)	1					
Money supply (LnMM)	0.998	1				
Monetary base (LnMO)	0.991	0.988	1			
Interest rate in the interbank lending market (RL)	-0.216	-0.202	-0.313	1		
Refinancing rate (RR)	-0.857	-0.848	-0.899	0.576	1	
The pace of growth in the effective exchange rate of the ruble (TQR)	-0.605	-0.607	-0.617	0.416	0.706	1

### 3. Empirical Results

The conducted test analysis of the assessment of the equation (1) helped establish that the refinancing rate and the interbank lending rate do not have statistically significant coefficients in a common specification. The money supply and the monetary base, having a high degree of correlation between themselves and the volumes of corporate lending, are not specified in one equation with the interbank lending rate. Therefore, two specifications were subjected to further assessment. The first one is the dependence of the volumes of corporate lending (LL) on the money supply (LMM) and the interbank lending rate (RL). In the second specification, we shall establish the link between the volumes of lending and the money supply, the monetary base and the refinancing rate. The existence of statistically significant coefficients in these regressions will speak of a significant causal factor for the volumes of corporate lending.

The estimation was conducted using the generalized method of moments. In addition to logarithmizing the variables, we employed seasonal smoothing. In order to make allowance for serial correlation of errors and heteroskedasticity, we used the Newey-West procedure for estimating the standard errors. The results of the first specification using the generalized method of moments are provided in Table 2.

Table 2. The results of estimating the first specification (from the money supply and the interbank lending rate) using the generalized method of moments

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Dependent Variable: LL  
Method: Generalized Method of Moments  
Sample (adjusted): 2002Q2 2013Q4  
Included observations: 47 after adjustments  
Linear estimation & iterate weights  
Estimation weighting matrix: HAC (Bartlett kernel, Newey-West fixed)  
Bandwidth = 4.0000)  
Standard errors & covariance computed using estimation weighting matrix  
Convergence achieved after 3 weigh iterations  
Instrument specification: LL(-1) LMM(-1) RL(-1)  
Constant added to instrument list

---

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LMM	1.002636	0.001631	614.5780	0.0000
RL	-0.005800	0.002295	-2.526799	0.0151
R-squared	0.996812	Mean dependent var	8.916578	
Adjusted R-squared	0.996741	S.D. dependent var	0.892293	
S.E. of regression	0.050935	Sum squared resid	0.116748	
Durbin-Watson stat	1.838195	J-statistic	0.729089	
Instrument rank	4	Prob(J-statistic)	0.694513	

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Table 3. The results of estimating the second specification (from the money supply, the monetary base, and the refinancing rate)

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Dependent Variable: LL  
Method: Generalized Method of Moments  
Sample (adjusted): 2002Q2 2013Q4  
Included observations: 47 after adjustments  
Linear estimation & iterate weights  
Estimation weighting matrix: HAC (Bartlett kernel, Newey-West fixed)  
Bandwidth = 4.0000)  
Standard errors & covariance computed using estimation weighting matrix  
Convergence achieved after 3 weigh iterations  
Instrument specification: LL(-1) LMM(-1) RL(-1)  
Constant added to instrument list

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Variable	Coefficient	Std. Error	t-Statistic	Prob.
LMM	0.864329	0.037481	23.06063	0.0000
LMO	0.156580	0.042640	3.672172	0.0006
RR	-0.003139	0.000871	-3.602061	0.0008
R-squared	0.997645	Mean dependent var	8.916578	
Adjusted R-squared	0.997537	S.D. dependent var	0.892293	
S.E. of regression	0.044279	Sum squared resid	0.086267	
Durbin-Watson stat	2.028300	J-statistic	0.380126	
Instrument rank	5	Prob(J-statistic)	0.826907	

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The lower part of the table provides standard estimates of coefficients, standard errors, t-statistics, and conjoint values for its probability. Below this information, we provide summary statistics. In addition to standard statistical data shown in the equation, the rank instrument (the number of linearly independent instruments used in estimation), we also provide the J-statistic and p-values of probability related to them. The Hansen J-statistic shows the correctness of the specification of the equation. T-statistic values and their probabilities show the statistically significant coefficients of the variables.

Thus, it has been established that the interbank lending rate has statistical significance in combination with the money supply LMM (i.e., M2). This means that by increasing the money supply and decreasing the interbank lending rate we can increase supply for bank lending.

The results of the second specification using the generalized method of moments are provided in Table 3.

From the results of the estimation, which are provided in Table 2, we can draw an inference about the statistically significant coefficients of the money supply, the monetary base, and the refinancing rate.

Changes in monetary aggregates help explain changes in the volumes of bank lending. An increase in the monetary base, as well as an increase in the money supply, is reflected in an increase in bank lending. At the same time, changes in the interbank lending rate and the refinancing rate have a more humble impact on bank lending. This resonates with the findings of works by Leontieva (2013) and Juurikkala et al. (2009). The impact of these variables in time has been explored. It has been established that the money supply and the monetary base have high significance in dynamics as well. And the impact of the interbank lending interest rate is changeable, which can be associated with different changes in the volumes of bank refinancing. It is apparent that the regulator in particular non-crisis years in substantial measure shapes money supply through the interest instruments and refinancing of credit organizations.

Discussing the results, it should be noted that there is a number of factors established by researchers in recent years, which point to complex conditions for the operation of the bank lending channel. A number of factors cause the weakening of the bank lending channel. Thus, some studies we have already mentioned have established the impact of large liquidity (Kashyap & Stein, 2000), the impact of a high equity ratio coefficient (Kishan & Opiela, 2000), and the impact of engaging funds from international operations (Cetorelli & Goldberg, 2012).

A work by Iskhakov (2011) notes that in Russia the credit interest rate does not depend in any way on prices and economic growth due to a lack of resources. Besides, the volume of loans granted is not determined by refinancing by the central bank. On the other hand, the credit market demonstrating gradual saturation (mainly, through external lending) causes a downward trend in the credit rate. Also, the central authorities are trying to affect decreases in interest rates, including by lowering the refinancing rate.

Analyzing factors that can weaken the lending channel, Coricelli and Egert (2006) note that, firstly, a high concentration of banking sectors, trouble having foreigners participate, the high degree of liquidity, and the more than sufficient levels of bank capitalization make banks less responsive to the internal impulses of monetary policy. Secondly, despite the lack of well-operating markets of capital, firms can get away from internal credit markets either by lending in foreign currencies or relying on trade credit.

Among bank characteristics affecting the efficiency of the bank lending channel, Juurikkala et al. (2009) name the level of bank capitalization. The higher the level of bank capitalization, the less they depend on policy conducted by the central bank, and vice versa. The strength of the lending channel depends on bank capitalization.

On the other hand, such factors as the size of the bank and liquidity are usually not crucial to the way the bank reacts to changes in monetary policy. The cause, according to Juurikkala et al. (2009) is in the peculiarities of the banking sector. The poor operation of interbank markets makes all Russian banks keep substantial buffers of liquidity.

It is apparent that in order to boost the effectiveness of the bank lending channel, one, first and foremost, needs to increase the volumes of refinancing by credit organizations and ensure the future development of the market of financial instruments.

Drawing a general inference, we can say that empirical results substantiate the existence of the bank lending channel in Russia. The existence of the banking credit channel has potentially crucial consequences to conducting monetary policy. In a climate of curtailment of the money supply, banks will reduce lending. An increase in interest rates in the market of interbank lending leads to a decline in the pace of gains in corporate lending.

#### 4. Conclusions

The article explores the banking channel within the mechanism of monetary transmission in Russia. A long-term goal of the Bank of Russia is to implement a shift to targeting inflation, and, consequently, getting an understanding of through which instruments and in what measure the banking sector reacts to changes in monetary policy is of utmost importance.

We are using a data sample covering 2002-2013 and employing the generalized method of moments for the assessment. Our empirical findings substantiate the hypothesis about the existence of a credit banking channel in Russia. It has been established that statistically significant instruments of the banking channel are the money supply, the monetary base, the interest rate in the interbank lending market, and the refinancing rate. Banks will reduce lending if the money supply decreases. Banks will increase lending if the interbank lending interest rate decreases. However, the significance of this instrument is much lower. It is apparent that the refinancing rate plays more of a regulating role than a monetary one. Nevertheless, its impact is statistically significant. The existence of the banking credit channel has crucial consequences to conducting monetary policy. We have discussed the factors causing the weakening of the action of the credit channel in Russia. In order to boost the effectiveness of the bank lending channel, one, first and foremost, has to increase the volumes of refinancing by credit organizations and ensure the future development of the market of financial instruments.

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