Estimating the Existence of the Bank Lending Channel in the Russian Federation*

Ocena istnienia i roli kanału kredytów bankowych jako kanału transmisji polityki pieniężnej w Federacji Rosyjskiej

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Abstract

A panel of annual balance sheet data on 323 Russian banks is used to test for the first time whether lending responses to a change in monetary policy differs, depending on the balance sheet strength of a bank. Only weak signs of that are found for Russian banks. This result implies that the bank lending channel has some, albeit limited, degree of effectiveness in Russia, which may increase in time, with the continued development of the Russian banking system.

Keywords: monetary transmission mechanism, bank lending channel, Russia, GMM

JEL: E52, G21, G28, G23

Streszczenie

Korzystając z danych panelowych dotyczących rocznych danych bilansowych 323 rosyjskich banków, po raz pierwszy w literaturze testowana jest dla rosyjskiej gospodarki hipoteza, że różnice w jakości bilansów banków tłumaczą odmienność zmian ich akcji kredytowej w reakcji na impulsy polityki pieniężnej. Uzyskano jedynie słabe przesłanki istnienia takiej zależności dla rosyjskich banków. Oznacza to, że kanał kredytów bankowych odgrywa ograniczoną rolę w mechanizmie transmisji impulsów polityki pieniężnej w Rosji. Rola ta może jednak zwiększać się wraz z rozwojem rosyjskiego systemu bankowego.

Słowa kluczowe: mechanizm transmisji impulsów polityki pieniężnej, kanał kredytów bankowych, uogólniona metoda momentów (GMM)

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1. Introduction

For an effective monetary policy to be formulated, it is necessary to understand how monetary policy actions are transmitted into the economy and the role that the financial sector plays in this process. Studies about the transmission of monetary policy in Russia – and in other Commonwealth of Independent States (CIS) countries - are extremely scarce. This paper attempts to start to fill this gap, by estimating for the first time the effectiveness of the bank lending channel in Russia.

The basic theoretical explanation of monetary policy transmission, the so called interest rate channel (IRC), suggests that monetary policy shocks propagate through the economy in the following way: an expansionary monetary policy leads to a fall in the real interest rate thus lowering the cost of capital; this reduced cost of capital causes an increase in investment spending, which increases aggregate demand, and, ultimately, output (and vice-versa, for monetary contractions). The functioning of this channel rests on the assumption that there are two assets in the economy – money and interest bearing bonds.

More recently, a substantial research on alternative monetary transmission mechanisms (MTM) has been undertaken, aiming at explaining how changes in the short-term *nominal* interest rates can induce changes in the level of investment, which should be affected only by the *real* long-term interest rate. Mishkin (1997) lists nine such mechanisms, which can be broadly divided into two categories: those operating through asset prices and those operating through credit markets. The bank lending channel is the one of the channels that operate through the credit markets.

The concept of the bank lending channel rests on the assumption that there are three assets available for businesses and households in an economy – money, bonds and bank deposits: adding deposits creates a role for banks in the transmission of monetary policy. The bank lending channel operates as follows: a contraction in the money supply by the central bank decreases bank deposits and forces the commercial banks to cut on lending. The decrease in loans makes loan-dependent business and consumers reduce aggregate demand. As a result, output is affected.

Hence, the economic significance of the bank lending channel depends on: a) the existence of bank-dependent borrowers and b) the quantitative impact of a central bank's monetary policy on the supply of bank loans. Since the first condition usually holds for most economies, empirical studies have concentrated on testing whether a central bank can affect the supply of bank loans. They typically study individual bank data,[1] testing the assumption that banks with different size, liquidity or level of capitalization should respond differently to policy shocks (see Kashyap and Stein 2000). Lending responses, if they emanate from loan supply changes, should be larger for banks with – for example - "weaker" balance sheets, which are more likely to have difficulties substituting lost deposits with external forms of finance.

We use a panel of annual balance sheet data on 323 Russian banks from 1995 to 2003 and test whether lending responses to a change in monetary policy differs, depending on the balance sheet strength of a bank. Our results indeed suggest that banks (especially *private* ones) with lower than average assets are more affected by monetary policy actions than average banks, which is consistent with bank lending channel hypothesis.

We first present a brief overview of theoretical work on the bank lending channel and describe some empirical studies that test the existence of the channel for European economies. Then we present the model to be used here. Afterwards, the Russian monetary policy and the structure of the banking sector in Russia are discussed, which is followed by the presentation of results of our estimations and by the conclusions.

2. A brief overview of the recent literature on the lending channel

According to the bank lending channel theory, monetary policy affects the supply of bank loans through an imperfect market for bank debt. A restrictive monetary policy leads to a drop in bank deposits. Only banks that have a larger share of liquid assets or that are bigger are able to shield their lending relationships from the monetary policy shock (see Mishkin 1996). Smaller banks have to draw on their liquid assets, whereas larger banks have better access to external finance due to their size. Hence, they do not have to reduce their lending as strongly as smaller or less liquid banks (see Bernanke and Gertler 1995). The same may be true for banks with a bigger capital-to-assets ratio, as market participants may perceive highly capitalized banks as being less risky. Consequently, it should be more expensive for less capitalized banks to access external finance. Further, if debtors do not have perfect substitutes for loans, banks' restrictive lending behaviour results in added costs to them. As

[1] Firm data has the added advantage of dealing with the "identification" problem in an estimation (namely, with the fact that a downturn would endogenously generate a reduction in the demand for loans, of the monetary policy shock).

Table 1. *The IRC in the euro area*

	Data lacking to determine relevance of IRC	Financial factors important for investment and potentially important for consumption	Some evidence against IRC. Financial factors potentially important for consumption only	Financial factors important for investment but not necessarily consumption	No evidence against IRC. No Financial factors expected
Loan supply reacts	Netherlands, Portugal	Greece, France (?)	Germany	Italy, France (?)	
Loan supply insensitive				Austria	Finland, Spain
Loan supply assessment not possible	Ireland	Belgium (?)		Belgium (?)	Luxembourg

Source: Angeloni et al. (2003).

a consequence, the bank lending channel would be an *additional* real economic effect to the conventional channels, which would not exist under a perfect market for debt.

Kashyap and Stein (1993) list three conditions (based on Bernanke and Blinder 1988) for a distinct bank lending channel to exist:

1. Firms should not be able to completely compensate a reduced supply of commercial bank loans from other sources;

2. The central bank must be able to affect the supply of credit;

3. There must be imperfections in the adjustment of the aggregate price level.

The third condition is an overall requirement for the effectiveness of monetary policy, and is usually met. So, to test the existence of the lending channel, one has to verify that conditions 1 and 2 are satisfied for a given economy.

With respect to the first condition, Kashyap and Stein conclude that if a contractionary monetary policy reduces the supply of loans, loan-dependent firms will be affected adversely. The second condition requires an empirical examination in each particular economy.

There are institutional arrangements that weaken the power of the bank lending channel. Three of the most important ones are the existence of capital adequacy requirements, the existence of reserve requirements and the participation of non-banking financial institutions in the supply of loans. Capital adequacy and reserve requirements restrict the supply of loans that a bank can make, thereby leaving less room for loan responses to monetary policy actions. The central bank also cannot control loans issued by non-banking financial institutions, which implies a lower overall capacity to affect the loans' supply to the economy.[2] Kashyap and Stein conclude that an *average* bank should respond by cutting back on loans, as only well-capitalised banks can raise external finance and thus their lending would be less affected by policy changes.

3. A brief overview of the empirical literature in Europe

The evidence for the European Union concerning the IRC and the banking channel is presented in Table 1 below: for most of the countries, a role for the IRC is found. Concerning the *banking* channel, only Finland (and here the fact that estimations only deal with the period after Finland's banking crisis in the mid 1990s may affect the outcome), Luxembourg (a former "tax heaven", with its small and internationally oriented banking system) and Spain do not show any role for a banking channel.[3]

More recently, Engler et al. (2005) also find some signs that the bank lending channel is at work in Austria via capitalization levels, while Merkl and Stolz (2006), in a similar work, find that the bank capital channel is present in Germany.

Studies for the CIS are extremely scarce. In the work that most closely relates to this paper, Golodniuk (2006) analyses the existence of the bank lending channel in Ukraine. Her results suggest that the bank lending channel operates in the Ukrainian economy.

4. The model

We follow the Peek and Rosegren (1996) and Golodniuk (2006) model, in which "strong" and "weak" banks react differently to a change in monetary policy. In particular, we want to test the effect of bank capitalization and assets on the response of loans to changes in monetary policy. The

[2] Other institutional elements are also important: the still large share of the state-owned banks in many countries, the existence of bank networks and of deposit insurance.

[3] Most of these studies were directly or indirectly linked to the European Central Bank (ECB) *Monetary Transmission Network*, the first of the ECB's Research Networks. See Angeloni, Kashyap and Mojon (2003).

theory predicts that better capitalized banks should be less sensitive to changes in policy, while the impact of asset size is ambiguous. The explanatory variable of primary interest is i_t, an exogenous indicator variable describing monetary policy shocks. Most of the recent studies of European economies use a short-term interest rate under control of the central bank (Engler et al. 2005, is an exception, as it uses the "unexpected" component of monetary policy). Following those, we will use the Russian short-run money market rate as the policy indicator.

The effect of monetary policy on bank loans depends, as explained above, on the balance sheet strength of a bank. We include a second set of explanatory variables that is the interaction between the change in i_t and a measure of balance sheet strength of a bank. As indicated above, the theory suggests capital and asset size as measures of bank strength. Empirical papers typically use asset size (A_{it}), liquidity (LIQ_{it}), or capitalization (CA_{it}). We include all three of them into our specification.

We also have to isolate changes in total loans caused by movements in loan demand, since we are testing if actions by the Central Bank of Russia (CBR) can affect the supply of loans. To account for loan demand movements, variables like GDP or CPI have traditionally been added to this type of model. However, macroeconomic aggregates fail to capture demand changes for an individual bank. To better control for cross-sectional differences in loan demand, measures like real certificates of deposits and bank securities holdings (Kashyap and Stein 1995, Kishan and Opiela 2000) were suggested. Here, we will use total deposits (TDE) and total borrowed funds (TBF) to proxy movements in demand for loans of a particular bank, as these aggregates reflect better the specific features of the Russian banking system. We also have to include lags of both dependent and explanatory variables to allow for dynamic effects. The model specification is as follows in equation (1) below:

$$\Delta LN_{it} = \alpha_i + \gamma_i \Delta LN_{it(-1)} + \sum_{j=o}^{1} \beta_j \Delta i_{t-j} + \sum_{j=o}^{1} \delta_j \Delta i_{t-j} BS_{it-1} + \theta_j BS_{it-1} + \sum_{j=o}^{1} \psi_j \Delta TDE_{it-j} + \sum_{j=o}^{1} \phi_j \Delta TBF_{it-j} + u_{it} \quad (1)$$

where ΔLN is the growth rate of loans of bank i in year t. The data on loans and all other balance sheet items is taken directly from the balance sheet of banks.

Δi_t – change in the annualised Russian money market rate.

BS_{it} – vector of the three variables capturing the balance sheet strength of a bank – Asset size (LIQ_{it}), Liquidity (A_{it}) and Capitalization (CA_{it}). Asset size is total assets (in USD), while liquidity and capitalization are calculated as ratios of bank liquid assets and equity capital to total assets, respectively. ΔTDE_{it} is the growth rate of total deposits and ΔTBF_{it} is the growth rate of a bank's total borrowed funds.

The coefficients on the Δi_{t-j} terms capture the response of an average bank to a monetary shock, while the coefficients on BS_{it} cross terms describe how the response differs for differently capitalized banks. For an operational lending channel to exist it is sufficient that all coefficients on Δi_{t-j} are negative (and significant) and the coefficients on the BS_{it} and Δi_{t-j} cross products are positive (and significant).

Before showing the results of our estimations, we will briefly describe both the monetary policy followed by the CBR and the structure of the Russian banking system.

5. The Russian monetary and exchange rate policy, 1993-2004

The dissolution of the Soviet Union at the end of 1991 did not immediately lead to the establishment of a truly Russian monetary authority capable of conducting an independent and effective monetary policy. It is only after 1993 that the CBR has been able to conduct its own independent monetary policy, although its scope was limited by the policy choice to finance a large budget deficit, mainly caused by a substantial initial decline in output.

This loose monetary stance continued until mid-1995, when the Russian economy started showing signs of stabilization and a new law on the CBR was passed, providing it with some degree of legal independence in conducting monetary policy. These positive developments allowed the CBR to adopt a tighter monetary policy and to introduce a pegged exchange rate regime with a crawling band against the US dollar (USD), from July 1995 onwards, replacing the previous "dirty float". As a result of these measures inflation slowed down from almost 200% in 1995 to 48% in 1996 and to 15% in 1997 (see Table 2). Furthermore, credit to the government fell significantly[4] and the CBR started to conduct monetary policy via indirect instruments, such as reserve requirements.

However, the Asian crisis of 1997 decreased investment confidence in Russia and caused capital outflows, forcing the CBR to defend the band. Although during the exchange market interventions in November 1997 the CBR lost over USD 6 billion of its liquid reserves, or two thirds of total reserves at

4 The financing of the fiscal deficit was mainly secured through the issuance of domestic debt, which was made possible by the initial development of the Russian securities market.

Table 2. *Basic monetary indicators for Russia*

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Inflation (CPI), 12-month % change (eoy)	307.6	197.5	47.74	14.77	84.4	36.5	20.2	18.6	15.1	12.0	11.7	10.9
M2 growth rate	216.5	112.6	29.56	28.85	37.6	56.7	58.0	36.3	33.8	38.5	33.7	36.3
Nominal exchange rate to USD (eoy)	3.6	4.6	5.6	6.0	20.7	27.0	28.2	30.1	31.8	29.5	27.7	28.8
Nominal exchange rate to EUR (eoy)	–	–	–	–	–	27.2	26.1	26.5	33.1	36.8	37.8	33.9
REER, period average (2000=100)	103	112.9	137.6	145.2	128.5	90.5	100.0	118.7	122.7	135.3	155.0	168.4

Source: IMF/IFS, calculations by the author.

that time, the exchange band was successfully defended on that occasion.

Nevertheless, after renewed attacks on the currency in the run-up to August 1998,[5] the government was forced to default on its domestic debt obligations. The rouble was devalued and lost 62% of its nominal value between the end of July and the end of September 1998. The exchange rate band was abandoned, leading to the adoption of a "dirty floating" regime (albeit Russia followed a *de facto* targeting of an exchange rate indicator also after 1998). One consequence of the sharp depreciation was a rapid but short-lived acceleration in inflation (it jumped to over 84% in 1998).

[5] The year 1998 also the low point of a downward price cycle of energy commodities, the main Russian exports: this also substantially affected Russia's external position.

As a consequence of the renewed inflationary pressures in 1998, one of the main objectives of the Bank of Russia was to bring inflation down, initially to 30%, while keeping output decline in the range of 1–3% (see Table 3, for the CBR's post-1998 *stated* objectives and instruments).

To achieve this objective, monetary policy was tightened by reducing net credit to the banking system. Because of this measure, inflation fell in 1999 to 37%, and the real exchange rate depreciation stopped. Furthermore, fiscal performance significantly improved, due to the approval of a new package of fiscal measures, and to improvements in revenue collection.

This improved fiscal and external performance was also linked to energy prices: 1999 signaled the beginning of a new upward price cycle for energy

Table 3. *Stated objectives and targets of the CBR*

1999	2000	2001	2002	2003	2004
M2 aggregate growth rates as an intermediate target: 18%-26% growth.	M2 aggregate growth rates as an intermediate target: 21%-25% growth.	M2 aggregate growth rates as an intermediate target: 27%-34% growth.	M2 aggregate growth rates as an intermediate target: 22%-28% growth.	M2 aggregate growth rates as an intermediate target: 20%-26% growth.	M2 aggregate growth rates as an intermediate target: 19%-25% growth.
Reduction of the inflation rate to 30%.	Reduction of the inflation rate to 18%.	Reduction of the inflation rate to 12%-14% a year.	Reduction of inflation to 12%-14% a year range ("core inflation" concept introduced)	Reduction of inflation to 10-12% (core inflation should be kept within the 8.0%-8.5% range).	Reduction of inflation to 8-10% (or 7%-8% core inflation), to 6.5%-8.5% in 2005 and to 5.5-7.5% in 2006.
GDP growth: -1% to -3% GDP fall.	GDP growth: 1.5%.	GDP growth: 4%-5%.	GDP growth: 3.5-4.5%.	GDP growth: 3.5%-4.5%.	GDP growth: 3.5%-4.5%.
Exchange rate: in 1999 the exchange rate was not a formal monetary policy target.	Exchange rate: in 2000 the exchange rate was not a formal monetary policy target.	Exchange rate: in 2001 the exchange rate was not a formal monetary policy target.	Exchange rate: nominal exchange rate targeting?	Exchange rate: "The Bank of Russia believes that the ruble's REER may safely rise by 4% to 6% in 2003".	Exchange rate: "the REER of the ruble may rise by 3%-5%. The Bank of Russia will try to stop it from rising by more than 7%".

Source: Esanov, Merkel, Vinhas de Souza (2005).

Table 4. *Share of state, foreign and other banks in total assets (%)*

	2002	2003	2004
State banks*	37.5	36.0	38.1
- Sberbank	28.4	27.6	28.6
- VEB	4.9	5.2	6.0
Foreign banks (>50% foreign-owned)	8.1	7.4	7.6
Other banks (private domestic banks, banks owned by state corporations, etc.)	54.4	56.6	54.3

* Banks where over 50% of the shares are owned by federal, regional and local governments, their non-corporatised (so-called unitary) enterprises, the Federal Property Fund, and the CBR. Vnesheconombank is not included.
Source: CBR.

commodities. World energy prices increased (over 50% of Russia's exports are of energy-related products – oil and gas), resulting in very substantial trade and current account surpluses (in some years close to 10% of GDP), renewed capital inflows and a strong resumption of growth in Russia. Given the effects of these developments on the (real) exchange rate, it became again one of the main targets of monetary policy. Since 2003 the CBR has had formal real exchange rate target ranges. The CBR policy has slowed the *real* appreciation of the rouble and reduced inflation, albeit the pace of disinflation has been slower than the one formally targeted by the authorities.

6. The Russian banking system[6]

Russia has a concentrated, mostly state-owned, banking system, with a still relatively limited significance in GDP terms. At mid-2005, the total Russian banking sector assets amounted to roughly 44% of GDP, up from 33% at end-1999. The number of operating credit institutions in Russia continued to decline gradually, from about 1330 in 2003 to 1276 in late 2005. The concentration of the Russian banking sector has slightly increased recently, with the five largest banks currently accounting for 45% of the total assets.

Russia has a very large, albeit decreasing, share of its bank assets in the hands of state owned banks. According to estimates by the CBR, the number of state banks declined slightly to 21, while their share of the total banking sector assets at end-2004 rose to about 38% (see Table 4).[7] The two largest banks, Sberbank[8] and Vneshtorgbank (VEB), increased their market share (to about 29% and 6% of the assets, respectively), as did the rest of the state banks (to 3.5%, of which over 2% is accounted for by the Bank of Moscow, controlled by the Moscow City Government).

On the other hand, banks that are over 50% foreign-owned have gradually grown in number throughout this decade (from 33 to 48 banks, currently). In 2004, they also slightly increased their share of banking sector assets (7.6%). The three largest foreign banks account for about 5% of total banking assets.

Other domestic banks, most of them controlled by private domestic owners (but also including banks controlled by state-controlled corporations), saw their share in total assets decline in 2004 to little over 54%, as two large banks faced problems with funding (and another bank was taken over by the VEB), and there were a number of license withdrawals. The three largest private banks, representing about 7% of the total assets, another 7 of the 30 largest banks and several small banks belong to the so-called financial-industrial groups.[9] Those groups are often controlled by a few ultimate beneficial owners.

7. Data and estimation results

In this work we use annual data covering 1995-2003. We have bank balance sheet data for 323 Russian banks, provided by BankScope, representing almost 4 trillion Roubles at end 2003, or roughly two thirds of the total assets of the banking system.[10] These data clearly have a non-normal distribution, as Table 5 below shows.

The Figure 1 below also shows that the Sberbank alone is responsible for 39% of all assets in 2003 and

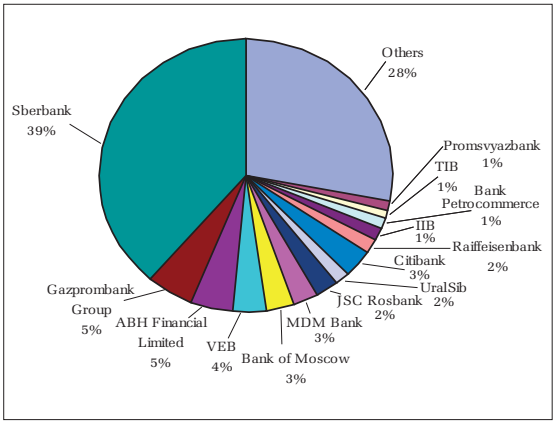
[6] This section is largely based on ECB (2005) and Vinhas de Souza, Gaspar (2004).
[7] In addition, there are banks controlled by state-controlled corporations, the largest being Gazprombank, with 5% of the sector's assets, banks where the state holds a non-controlling minority stake and Vnesheconombank (which is state-owned but not registered as a bank), with about 2% of the assets. Banking sector analysts estimate that, on the whole, over 50% of banking sector assets are directly or indirectly controlled by the state.
[8] The CBR is the major shareholder of Sberbank.
[9] The concept of "financial-industrial groups" in Russia refers to groupings of banks and non-bank companies where a non-bank company owns or controls the bank. They can be seen as a rather Russian type of "banking network".
[10] BankScope data has a know bias towards smaller banks. As small banks in Russia are very small and are, by far and large, not involved in lending, this bias is likely to be less serious here.

Table 5. *Basic statistics, total assets (2003), BankScope sample*

Mean	1,072,406.17	Skewness	10.14
Standard Error	420,842.71	Minimum	12,391.00
Median	285,973.00	Maximum	50,162,157.00
Mode	471,178.00	Sum	129,761,146.00
Standard Deviation	4,629,269.82	Largest	50,162,157.00
Sample Variance	12.73	Smallest	12,391.00
Kurtosis	107.74		

Source: own calculations.

Figure 1. *Bank shares of total assets, BankScope sample (2003)*



Source: BankScope.

that only 14 banks in our sample have 1% or more of the total assets.

Total assets are defined as the sum of all bank assets, while capital is bank equity. We initially estimated both OLS fixed and random effect versions of our model, and tested each against the other using a Hausman test. In all cases, the fixed effects' was the preferred one, so these are the results that will be presented here. The specification is as in (1) above. We added GDP, real exchange rate (REER) and inflation as macro controls. Additionally, the bank specific features listed in the vector BS_{it} have all been centred in the sample average, so as to help in the economic interpretation of the variables. The estimation results for the model are shown in Table 6 below.

Our aim is to test for the existence of the bank lending channel in Russia. In terms of our specification, this implies that all coefficients Δi_{t-j} on should be negative (and significant) and the coefficients on BS_{it} and Δi_{t-j} cross products should be positive (and significant). The coefficients on the contemporaneous and lagged monetary policy indicators are negative but non-significant (headings "Model 1" and "Model 2" -which includes the macro control set, Table 6). The term $\Delta i * A$ is positive significant, but $\Delta i * A$ (-1) is negative significant, and with a higher point estimate, while Δi(-1)*A(-1) is positive but non-significant (the assets variable is positive significant). All the *CA* cross terms are non-significant, and only the contemporaneous and double lagged ones are positive. All the *LIQ* cross terms are non-significant, while the contemporaneous and double lagged terms are negative.

The results are similar, if we estimate the model for consumer loans rather than total loans (headings "Model 3" and "Model 4", Table 6). Consumer loans, which are gaining in importance in Russia, should be more sensitive to changes in the short-term interest rate.[11] Nevertheless, the coefficients are generally consistent with those in the respective model for total loans. Robustness tests, namely the usage of an alternative indicator for monetary policy – the refinancing rate - produce essentially the same qualitative results. Also, all the variables in both the bank specific and macro control set are non-significant.

There are additional econometric and data reasons why we may be obtaining the results below. Firstly, in order to eliminate the individual effect in (1), one should use the Arellano and Bond (1991) generalized method of moments (GMM) estimator, which applies the entire set of lagged values of the endogenous variable as instruments.[12] Secondly, the large state-owned banks may be non-sensitive or less sensitive to interest rate changes than private banks, so we eliminate those from our sample. Thirdly, the time period covered in our sample is rather short but quite heterogeneous, including both the lead-up to the 1998 crisis and its aftermath, and the recovery from 1999 onwards, so we break the sample into two periods, 1995-1999 and 2000-03. The results with those three modifications for the 1995-1999 sample – the sub-sample when interest rates were increased by the CBR[13] – are presented in Table 7 below, for the same models as above (total loans, "Model 1" and

[11] Albeit in Russia they are mostly indexed to the USD.

[12] For consistent Arellano-Bond estimates, the test of overidentification cannot be rejected and therefore autocorrelation of order two or higher should not exist. In all of the following results, the tests indicated that there is no autocorrelation of higher order.

[13] Before two back to back increases in March and April 2006, the last time that the CBR refinancing rate had been increased was in May 1998 (as compared with 13 reductions since 1998, reflecting both the relatively high level of the rate post the 1998 increase and the structural excess liquidity in the Russian money markets).

Table 6. *Estimation results*

	Model 1		Model 2		Model 3		Model 4	
	Coef.	P>|t|	Coef.	P>|t|	Coef.	P>|t|	Coef.	P>|t|
$\Delta LN_{it(-1)}$	-1.08	**0.00**	-1.10	**0.00**	–	–	–	–
$\Delta LCN_{it(-1)}$	–	–	–	–	-0.47	**0.00**	-0.44	**0.00**
Δi	-0.003	0.65	-0.006	0.43	-0.004	0.40	-0.002	0.70
$\Delta i(-1)$	-0.002	0.43	-0.004	0.24	-0.001	0.57	-0.002	0.49
A	0.48	0.00	0.70	0.01	0.34	0.01	0.46	**0.01**
CA	0.82	0.21	0.79	0.24	0.14	0.78	0.20	0.69
LIQ	-1.33	**0.05**	-1.43	**0.04**	-1.57	**0.00**	-1.62	**0.00**
$\Delta i * A$	0.01	**0.02**	0.01	**0.07**	0.01	**0.07**	0.01	0.31
$\Delta i * A(-1)$	-0.02	**0.01**	-0.02	**0.04**	-0.01	**0.10**	0.00	0.43
$\Delta i(-1) * A(-1)$	0.00	0.27	0.00	0.25	0.00	0.19	0.00	0.17
$\Delta i * CA$	0.02	0.19	0.02	0.20	0.03	**0.02**	0.03	**0.03**
$\Delta i * CA(-1)$	-0.01	0.67	-0.01	0.73	-0.01	0.53	-0.01	0.53
$\Delta i(-1) * CA(-1)$	0.02	0.35	0.01	0.38	0.01	0.31	0.01	0.40
$\Delta i * LIQ$	-0.04	0.11	-0.04	0.13	-0.01	0.63	-0.01	0.67
$\Delta i * LIQ(-1)$	0.01	0.77	0.00	0.91	-0.01	0.39	-0.02	0.20
$\Delta i(-1) * LIQ(-1)$	-0.01	0.42	-0.01	0.38	0.00	0.52	-0.01	0.41
ΔTDE	0.00	0.56	0.00	0.66	0.00	0.43	0.00	0.38
ΔTBF	0.00	0.41	0.00	0.52	0.00	0.52	0.00	0.51
$\Delta TDE(-1)$	0.00	0.11	0.00	0.17	0.00	0.20	0.00	0.31
$\Delta TBF(-1)$	0.00	0.65	0.00	0.84	0.00	0.45	0.00	0.41
GDP	–	–	-0.05	0.31	–	–	0.00	0.96
INF	–	–	-0.01	0.31	–	–	0.00	0.87
$REER$	–	–	-0.02	0.17	–	–	-0.01	0.39
Constant	1.07	0.00	4.43	0.08	0.69	0.00	2.11	0.26

Significant variables in bold.
Source: own calculations.

"Model 3" – the latter with macro controls and consumer loans, "Model 2" and "Model 4" – the latter with macro controls).

The results in Table 7 seem to be somewhat stronger (in the sense of conforming to theoretical predictions) than in the previous estimations, especially for consumer loans and the cross products coefficients. The coefficients on the contemporaneous and lagged monetary policy indicators are negative for consumer loans, but they are non-significant. The terms $\Delta i * A$ and $\Delta i * A$(-1) are indeed all positive, but only the lagged ones for total loans are significant. All the *CA* cross terms are also positive but only the contemporaneous ones are significant. On the other hand, all the *LIQ* cross terms are non-significant, some being positive and some being negative.

Further, given the possibility that domestic and foreign private banks may have different reactions within the privately owned sub-sample, we present below the results for domestic private banks: the statistical significance of the results is stronger and they conform rather well to the theoretical expectations, but here the stronger results are obtained using a full time sample (see Table 8).

We can only conclude that we currently have only weak signs of both an IRC[14] and of the bank lending channel in Russia - but that those become somewhat strong using privately owned banks, and especially domestically owned private banks - and these are linked to the level of assets and capitalization.

These results may be explained by the limited use by the monetary authority itself of interests rates as an instrument of monetary policy, by the limited – but growing - importance of the Russian banking sector as provider of loans to domestic companies and households, by the persistent excess liquidity stemming form the very large current account surpluses after 1999, and by institutional features that limit the effectiveness of the banking channel (namely, a large state presence in the banking sector, the existence of a deposit insurance system in the largest, "systemic" bank in Russia, and the existence of a very particular type of "banking networks").

Our results may indicate that the CBR, which aims to switch to a monetary policy framework based

[14] Esanov, Merkl and Vinhas de Souza (2005) had already come to this conclusion, which was also supported by a separate VAR macro estimation of the IRC. Those results are not shown here, but they are available from the author upon request.

Table 7. *Estimation results II*

	Model 1		Model 2		Model 3		Model 4	
	Coef.	P>|z|	Coef.	P>|z|	Coef.	P>|z|	Coef.	P>|z|
$\Delta LN_{it(-1)}$	-0.428	**0.00**	-0.375	**0.01**	-0.053	0.79	-0.064	0.72
A	0.874	**0.00**	0.752	**0.01**	0.517	**0.08**	0.433	0.11
CA	-0.576	0.23	-0.681	0.14	-0.581	0.22	-0.676	0.12
LIQ	-0.511	0.28	-0.481	0.29	-0.222	0.64	-0.226	0.61
Δi	0.004	0.52	0.005	0.39	-0.005	0.40	-0.005	0.41
$\Delta i(-1)$	0.003	0.36	0.003	0.27	-0.004	0.25	-0.004	0.26
$\Delta i * A$	0.003	0.23	0.003	0.16	0.003	0.20	0.002	0.21
$\Delta i(-1) * A(-1)$	0.002	**0.05**	0.002	**0.04**	0.001	0.40	0.001	0.36
$\Delta i * CA$	0.032	**0.03**	0.030	**0.03**	0.028	**0.05**	0.029	**0.03**
$\Delta i(-1) * CA(-1)$	0.003	0.77	0.006	0.52	0.004	0.68	0.009	0.27
$\Delta i * LIQ$	0.000	0.98	0.001	0.96	-0.009	0.54	-0.005	0.71
$\Delta i(-1) * LIQ(-1)$	-0.001	0.84	0.000	0.95	0.003	0.72	0.004	0.57
ΔTDE	0.000	0.68	0.000	0.59	0.000	0.85	0.000	1.00
$\Delta TDE(-1)$	0.000	0.23	0.000	0.19	0.000	0.82	0.000	0.58
ΔTBF	0.000	0.70	0.000	0.60	0.000	0.88	0.000	0.80
$\Delta TBF(-1)$	0.000	0.43	0.000	0.62	0.000	0.90	0.000	0.64
INF	–	–	–	0.012	0.00	0.011	0.00	–
Constant	0.068	0.34	0.048	0.48	0.057	0.42	0.039	0.55

*GDP and REER dropped due to collinearity.
Significant variables in bold

Source: own calculations.

on inflation targeting *cum* floating exchange rate as early as 2007, has to be cautious concerning the effectiveness of any interest rate based monetary policy in Russia. Changes are necessary to strengthen the transmission mechanism of interest rates decision, if such a policy switch is to work.

Among the possible changes that are under the control of the Russian policy makers, one is the reforming of the state owned banks. Either expanding the market share of private banks, or increasing the interest-rate sensitivity of state-owned banks could lead to a greater role for the MTM.

Table 8. *Estimation results III*

Model 1	Model 1		Model 2		Model 3		Model 4	
	Coef.	P>|z|	Coef.	P>|z|	Coef.	P>|z|	Coef.	P>|z|
$\Delta LN_{it(-1)}$	-0.047	0.51	0.012	0.87	0.061	0.40	0.106	0.14
A	0.247	**0.04**	0.245	**0.03**	0.336	**0.02**	0.289	**0.04**
CA	-0.261	0.45	-0.359	0.28	-0.546	**0.10**	-0.642	**0.05**
LIQ	-1.572	**0.00**	-1.488	0.00	-1.662	**0.00**	-1.538	**0.00**
Δi	-0.004	0.32	-0.003	0.51	-0.010	0.25	-0.006	0.49
$\Delta i(-1)$	0.000	0.86	0.000	0.79	-0.005	0.20	-0.003	0.47
$\Delta i * A$	0.003	**0.04**	0.003	**0.03**	0.003	**0.03**	0.004	**0.02**
$\Delta i(-1) * A(-1)$	0.001	**0.09**	0.001	**0.07**	0.001	**0.12**	0.001	**0.08**
$\Delta i * CA$	0.037	**0.00**	0.036	**0.00**	0.042	**0.00**	0.041	**0.00**
$\Delta i(-1) * CA(-1)$	0.004	0.65	0.008	0.30	0.010	0.18	0.016	**0.04**
$\Delta i(-1) * LIQ$	0.015	0.22	0.014	0.22	0.001	0.94	0.002	0.85
$\Delta i(-1) * LIQ(-1)$	0.004	0.57	0.005	0.41	0.006	0.30	0.007	0.20
ΔTDE	0.000	**0.11**	0.000	**0.09**	0.000	**0.09**	0.000	**0.08**
$\Delta TDE(-1)$	0.000	0.53	0.000	0.81	0.000	0.61	0.000	0.50
ΔTBF	0.000	0.24	0.000	0.16	0.000	0.12	0.000	0.09
$\Delta TBF(-1)$	0.000	0.75	0.000	0.57	0.000	0.76	0.000	0.51
GDP	–	–	–	–	-0.023	0.68	-0.001	0.99
INF	–	–	–	–	-0.008	0.47	-0.002	0.84
$REER$	–	–	–	–	0.012	**0.00**	0.011	**0.01**
Constant	-0.056	0.26	-0.063	0.18	0.003	0.98	-0.039	0.74

*GDP and REER dropped due to collinearity.
Significant variables in bold

Source: own calculations.

One may also note that these results are relevant not only for Russia, but to all countries who link or are considering linking their currency to the Russian rouble or whose financial systems have a significant participation of Russian banks (like, for instance, Belarus, which experienced side effects from the Russian mini banking crisis during the summer of 2004).

8. Conclusions

The existence of the bank lending channel has important implications for the conduct of monetary policy by a central bank. The literature predicts that if the bank lending channel is present, banks would cut back on lending in response to monetary contraction and undercapitalized banks would be more affected than larger, better capitalized banks. This happens because for the former it is more difficult to compensate the reduction in deposits with funds from other external sources.

Tests for the existence of the bank lending channel usually classify banks according to some measure of balance sheet strength, like capitalization or asset size, and then estimating the lending responses to a monetary shock. This paper uses capitalization, bank assets and liquidity as "separating" variables.

This work, using annual data covering 1995-2003 and applying GLS (fixed and random) and GMM estimators, finds only limited signs that the bank lending channel is operational in Russia: the higher the assets and/or capital, the less sensitive a bank is to changes in monetary policy. These results seem to be stronger for a sample without the Russian state-owned banks and limited to the period 1995-1999 (for all private banks; for Russian private banks only, the results are stronger using the full sample), when excess liquidity was not a permanent feature of the Russian money market.

These results are consistent with theoretical predictions and with the specificities of the Russian situation, and they imply that bank lending channel has some, albeit limited, degree of effectiveness in Russia. This effectiveness is expected to increase in time, with the continued development of the Russian banking system, and future work using longer time series will show if this is the truly observed outcome.

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