World Academy of Science, Engineering and Technology
International Journal of Economics and Management Engineering
Vol:5, No:11, 2011

Into the Bank Lending Channel of SEE: Greek Banks' Buffering Effects

Stefanos V. Fotopoulos, Harry V. Papapanagos and Fotios M. Siokis

***Abstract*—**This paper tries to shed light on the existence of a bank lending channel (BLC) in South Eastern European countries (SEE). Based on a VAR framework we test the responsiveness of credit supply to monetary policy shocks. By compiling a new data set and using the reserve requirement ratio, among others, as the policy instrument we measure the effectiveness of the BLC and the buffering effect of the banks in the SEE countries. The results indicate that loan supply is significantly affected by shifts in monetary policy, when demand factors are controlled. Furthermore, by analyzing the effect of the Greek banks in the region we conclude that Greek banks do buffer the negative effects of monetary policy transmission. By having a significant market share of the SEE's banking markets we argue that Greek banks influence positively the economic growth of SEE countries.

***Keywords*—**Bank Lending Channel, Monetary Policy Transmission, Policy Buffering, South Eastern Europe

I. Introduction

ACCURATELY defining the role of banks in the transmission of monetary policy may hold the key to explaining the effects of policy on economy [1]. The bank lending channel (BLC) hypothesis postulates the existence of a channel of monetary policy transmission through bank credit. Initially, by employing the VAR methodology we test the above hypothesis by examining the monetary policy transmission channel in five South East European economies (5-SEE), namely Albania, Bulgaria, FYROM, Romania, and Serbia during the period 2000 – 2009. Later, we narrow our analysis by examining the role of the Greek banks in the transmission channel.

The results, based on a comparative analysis including two four-variable VAR systems, indicate the respond of the loan supply to a monetary policy shock, while Greek banks-in comparison to other banks in the 5-SEE - respond in a different, more moderate pattern. Our findings are reinforced by the variance decomposition results, implying that Greek banks sustained economic activity in the 5-SEE, given the great share they possessed in the loan market.

The next section summarizes the literature relevant to the topic while the rest of the paper is organized as follows: Section 3 presents the data utilized and the methodology employed regarding the bank lending channel in 5-SEE.

Impulse response function results and variance decomposition are also discussed. A comparative analysis regarding the role of Greek banks in the BLC is developed in section 4 while section 5 concludes.

S. V. Fotopoulos is with the University of Macedonia, Thessaloniki, P.O. Box 1591, 540 06, Greece (phone: +30-2310-584903; fax: +30-2310-584910; e-mail: fotostefanos@ gmail.com).

H. V. Papapanagos is with the University of Macedonia, Thessaloniki, P.O. Box 1591, 540 06, Greece (e-mail: hp@uom.gr).

F. M. Siokis is with University of Macedonia, Thessaloniki, P.O. Box 1591, 540 06, Greece (e-mail: fsiokis@uom.gr).

II. Literature Review

There are numerous attempts in trying to accurately address the question of how BLC works. Credit effects are viewed as a key part of the monetary policy transmission mechanism [2, 3].

A contractionary monetary policy negatively impacts after six to nine months the growth rate of the bank credit [4], while [5, 8], focusing on the credit effects of monetary policy, provide evidence that monetary policy can indeed regulate the flow of bank credit.

An interesting point of view has been recently emerged [1, 9]; if there is to be an active lending channel, it must be that banks cannot frictionlessly tap uninsured sources of funds to make up for a Fed-induced shortfall in insured deposits. Assuming asymmetric information between lenders and borrowers, the credit channel is claimed to offer a reasonable explanation for the strength, timing and distributional effects of monetary policy on the real American economy.

Also, analysis on UK's monetary transmission policy [10] shows that a tight monetary policy in the UK leads to a decline in bank credit implying the existence of an active BLC.

The Euro area seems to have been a fruitful area of research on monetary transmission mechanism. The existence of BLC is confirmed for the economies of France, Germany, Italy, and Spain [11], while [12, 13, 14] tested BLC in the economies of France, Greece and Netherlands. Lastly, relevant results were reported for the cases of Austria and Portugal [15, 16].

On emerging economies the lending channel was investigated for the economies of Indonesia and Chile respectively [17, 18], while [19] reconfirmed the existence of the lending channel for the cases of Estonia and Mexico and [20] for Latin America and Asia.

Regarding the buffering effects generated by the operation of one or more foreign banks in an economy, there seems to be a consensus. Many studies, among them [21] and [22], supported the beneficiary role foreign banks play on buffering the negative effects of a monetary shock transmitted to the real economy, while [23] stressed the role of internal capital markets in order to explain the insensitivity of foreign banks to monetary shocks. The same exercise was also performed on US banks solely [24].

In addition, studies shed light on the impact of foreign penetration on lending to small and medium-sized enterprises. Utilizing evidence from asking borrowers, reference [25] showed that foreign bank penetration improved financing for enterprises of all sizes. Also, [26] supported the same regarding the behaviour of foreign banks in Argentina and

Mexico whereas a relative analysis was developed in a narrower context focusing on US banks [27].

The beneficiary role foreign banks play in the BLC was underlined in [28] and [29] which provided supportive evidence of the mitigating effect of multi-bank holding companies on the negative response of bank lending to a monetary contraction. Important differences between state-owned and privately-owned banks were also underlined [30, 31]. Lastly, in a more recent study the different roles foreign and domestic banks play in the BLC of the Indian economy were analyzed [32].

Please note that this is the first attempt made in providing evidence on the existence of BLC and the role of foreign banks in the transition economies of South Eastern Europe.

III. The BLC in SEE

A. Methodology and Data

The Vector Autoregression (VAR) model is a useful tool for studying the dynamics of the economy in the aftermath of a monetary policy shock. Capturing the impact of monetary policy mechanism through a VAR system is a common practice now in the monetary policy literature [31-32, 34-35].

The basic recursive VAR set-up of this paper takes the following form

$$Y_t = A_0 + A_1 Y_{t-1} + ... + A_k Y_{t-k} + U_t \ , \qquad (1)$$

where Y_t is the n-dimensional vector of variables, A_i are *(n* x *n)* coefficient matrices and U_t is the vector containing the reduced form residuals, assuming to be normally distributed white noise with constant covariance matrix $E(U_t U_t') = \Sigma_U$.

In this VAR analysis we use the variable employed by other researches as well [32-34], in the following order:

$$Y = [GDPPC, INFL, MP, TCREDITGDP] \qquad (2)$$

where *GDPPC* and *INFL* denote the growth rate of the real gross domestic product per capita and the inflation rate of the 5-SEE respectively. The variable *TCREDITGDP* is the ratio of the total credit supply in the 5-SEE economies for the period we study divided by the gross domestic product (GDP) of the respective host economies. Data on *GDP*, *GDPPC*, and *INFL* are taken from the World Bank (Data and Statistics) while data on total credit supply are taken from the IMF's International Financial Statistics (IFS: line 32b).

MP denotes the monetary policy instruments and in order to capture monetary policy we employ three different instruments:

1) the money market rate (*MMR*) which refers to the standing facilities and includes lending (collateralized loans for maintaining daily liquidity) and deposit facilities (excess liquidity deposits with the central banks). These operations are initiated by commercial banks. Interest rates on lending and deposit faculties constitute the ceiling and floor of the interest rate corridor which enables control of liquidity and eases fluctuations in short-term interest rates in the interbank market. Interbank money market interest rate affects significantly commercial banks' potential lending. Data on *MMR* are taken from the IMF's International Financial Statistics (IFS: line 60b).

2) The Treasury–Bill rate *(TBR)*, referring to the three-month bill auction and it's negatively related to credit supply since higher rates imply contractionary monetary policy. The relation in this case is not as obvious as in the case of the previous instrument. Higher interest rates make the bills more attractive indicating the need and will of the central bank to gather money and not to supply. Data on TBR are taken from IMF's International Financial Statistics (IFS: line 60c).

3) The reserve requirement ratio (*RRR*), which is the ratio of the required reserves to the total deposits or to a portion of deposits banks hold. Required reserves are funds which commercial banks have to deposit on a special account with the central bank. By changing the reserve requirement ratio, central banks are able to induce a reduction or expansion of commercial banks potential lending. In market economies, reserve requirement ratio is used as a supplementary instrument for regulating bank credit potential rather than bank liquidity. Note that in spite of the fact that all 5-SEE Central Banks consider RRR to be a monetary policy instrument there are no available data. Thus, we have to construct a database regarding the specific variable. Our sources are the Annual Reports of the host economies' central banks[1].

The identification scheme used is the standard approach which imposes a recursive structure of the VAR, with the ordering of variables given by (2). Intuitively, the scheme assumes that inflation (INFL) has no immediate effects on growth rate (GDPPC), monetary policy shock (MP) has no immediate effect on inflation and total credit (TCREDITGDP) has no immediate effect on the monetary policy instrument. Technically, we estimate the reduced form, and then compute the Cholesky factorization of the reduced form VAR covariance matrix.

Regarding the VAR order, as we mentioned above we assume that policy makers react to shocks in production and prices while they do not react to shocks in loans. Though, shocks to monetary policy may affect loans contemporaneously. Note that in our analysis we pay special attention to the response of total credit supply to a monetary policy shock. To be more specific, if there is a BLC in the 5-SEE then banks would restrict total loans in response to a tightening monetary policy.

B. Impulse Responses and Variance Decomposition

The results of the recursive VAR model under the identification scheme mentioned before are shown in Figures 1, 2 and 3. The graphs display the impact (the responses) to a Cholesky one-standard deviation monetary policy shock, which is defined as a temporary rise in the policy instrument

[1] See Appendix for details.

on GDP growth, prices, monetary instrument and the total loan credit along with a 95 percent confidence. The results indicate the existence of such channel no matter what the monetary policy instrument employed.

More specifically, Figure 1 depicts the impulse response functions of the variables to a Cholesky one-standard deviation. The monetary instrument is proxied by MMR. Looking closer at the first panel of the second row, one can see that total loans respond strongly and contemporaneously to an increase in the money rate. This negative impact culminates about 1 year after the shock. After that period credit supply increases since banks seem to adjust their portfolios and offset the negative effects of the monetary contraction. Such a claim seems reasonable if one takes into account that the negative effects of the shock fade away as time passes and banks gradually adapt to the new conditions. The effect of a monetary policy shock on output appears to be positive but statistically insignificant, given that the horizontal axis is broadly within the 95 percent confidence band. However, this is not a surprising result given the structural weaknesses in the financial sectors of the SEE countries, which are likely to hamper the transmission mechanism of monetary policy.

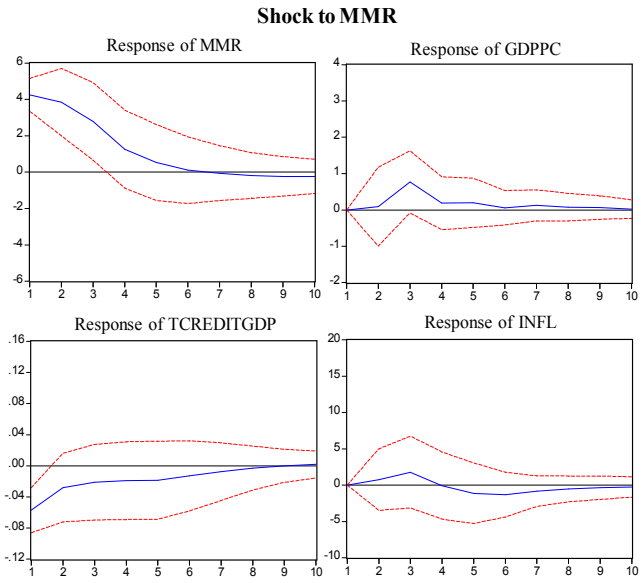

Fig. 1 Responses of variables to a Cholesky one-S.D. impulse of MMR

On the other hand, the monetary shock has an impact on inflation. Prices increase with a delay confirming the "price puzzle" reported in previous research.[2]

Figure 2 and 3 reiterate the analysis and the results by using the other two alternative monetary policy instruments.

[2] Reference [33] labeled the delayed response of inflation to an interest rate shock 'price puzzle'. According to the author, policy makers may have information not captured by the variables in the VAR system, regarding inflationary pressures and thus they increase the interest rates as a means of forestalling forthcoming inflation.

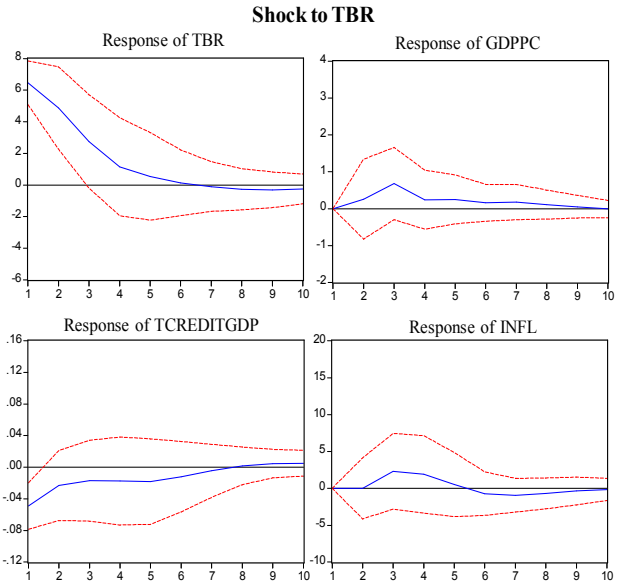

Fig. 2 Responses of variables to a Cholesky one-S.D. impulse of TBR

Additionally, note that the decrease in credit supply caused by a given shock in the MMR is much greater compared to the ones caused by the same shock on TBR and RRR, suggesting that the MMR is the most effective policy instrument central banks employ in the economies we study.

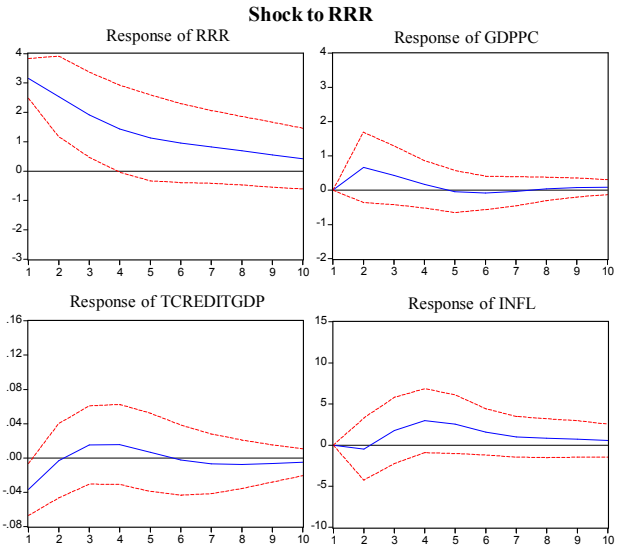

Fig. 3 Responses of variables to a Cholesky one-S.D. impulse of RRR

Furthermore, the above claim is reinforced by the variance decomposition presented in table 1. MMR contributes to the variance of the economic variable (TCREDITGDP) to a greater extent compared to the contribution of the variables TBR and RRR.

TABLE I
RELATIVE CONTRIBUTION OF THE ALTERNATIVE MONETARY VARIABLES TO TOTAL CREDIT SUPPLIED IN THE 5SEE ECONOMIES

Variance Decomposition of TCREDITGDP:

Period	S.E.	GDPPC	INFL	**MMR**	TCREDIT GDP
1	0.1094	4.7985	4.7069	**27.050**	63.443
		(6.17573)	(7.50887)	(9.59381)	(10.0831)
2	0.1525	18.276	2.4740	17.310	61.939
		(9.89461)	(5.74623)	(7.83096)	(10.8026)

Period	S.E.	GDPPC	INFL	**TBR**	TCREDIT GDP
1	0.1103	4.9175	6.8662	**19.731**	68.485
		(6.58894)	(6.63820)	(10.1579)	(11.1326)
2	0.1533	18.0880	3.9372	12.475	65.498
		(11.0893)	(4.72678)	(8.75012)	(11.6153)

Period	S.E.	GDPPC	INFL	**RRR**	TCREDIT GDP
1	0.1087	3.1569	5.7038	**11.481**	79.658
		(5.70459)	(6.98563)	(7.65719)	(10.4271)
2	0.1495	13.8000	3.3090	6.1230	76.767
		(10.2132)	(4.44039)	(5.00586)	(10.7742)

C. Controlling for Demand Factors

In periods of monetary tightening banks tend to curtail their loans supply. But this decline in loan provision is caused on the weakness of banks to supply credit or due to the limited demand for loans? In other words, it is commonly supported that a decline in loans could be possibly driven by adverse economic conditions which in turn wouldn't allow consumers (business) to consum (invest) and thus there would be no need to borrow.

This question was central for many researchers and gave rise to two competing theories, the credit view versus the money view. Supporters of the money view, as [4], attributed the decline in credit supply to the decreased demand in the economy. Furthermore, [35] supported that since the decline in bank credit lagged behind the response of the other variables and additionally the movements of credit and production coincided, the decline in credit supply was driven by the decreased demand.

In the case of our results obtained by the impulse response functions of fig. 1 - 3, none of the two above assumptions hold. More specifically, the decline in credit supply does not lag behind the response of the other variables. Furthermore, TCREDITGDP responds to monetary shock contemporaneously whereas on the other hand GDPPC responds to the same policy shock with a delay. Based on the above one has no reason to interpret our results as consistent with the money view.

In order to deal with the issue of the demand effects on loans and as a robustness test we substitute GDP growth with the ratio of private consumption to GDP (CONSGDP) for all SEE countries. Data on CONSGDP were obtained by the World Bank (Data & Statistics). The employment of such a variable is based on the following rationale. If the monetary instrument affects loan supply but also affects consumption, then one could claim that the decline in loan supply could be due to the decline in consumption, especially if the response of loan supply lagged behind the decline in consumption. Such a claim would indicate a money view and not the credit one.

Impulse response functions depicted in fig. 4, show that an increase in MMR affects contemporaneously loans' supply but does not affect consumption at all.[3] Keeping in mind that in the previous VAR system GDP growth was always positive to a contractionary monetary policy (figures 1-3) it is now apparent that during periods of contractionary monetary policy, the decline in credit is attributed to the weakness of banks to supply money rather than to reduced demand for money.

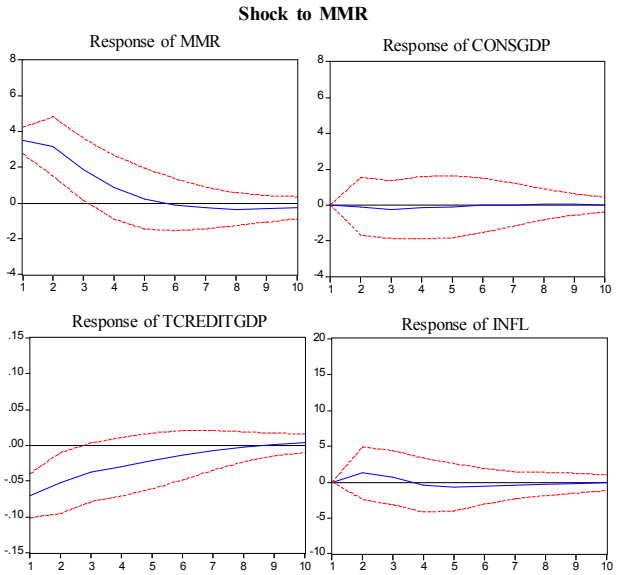

Fig. 4 Responses of variables to a Cholesky one-S.D. impulse of RRR

Despite the slight differences regarding the extent and duration of the effects of the alternative monetary policy shocks, the results of the VAR system (2) indicate the existence of the BLC in the 5-SEE. Furthermore, once the operation of the BLC in the 5-SEE is confirmed, the role of Greek banks is cautiously examined below.

IV. THE ROLE OF GREEK BANKS ON BUFFERING POLICY TRANSMISSION

The hypothesis that there is a relationship between bank ownership and the response to monetary policy shocks is well documented in the literature. As already described in previous section, foreign banks are capable of protecting their loan portfolio in case of a contractionary monetary shock, while domestic banks have to cut loans significantly in order to adjust to the new monetary schedule. In this section we test this hypothesis in a narrower context focusing on the response of Greek banks to a given monetary policy shock. We claim such an advent to be one of great importance given the large

[3] MMR was chosen for the robustness test since the Variance Decomposition depicted in table 1 indicates that among the monetary policy instruments, MMR has the greatest impact on loans' supply.

operational scale of Greek banks in the banking systems of the SEE countries. Note that Greek banks hold remarkably high market shares in these SEE loan markets, and in some cases is in excess of fifty percent.

A. Methodology and Data

Whether Greek banks buffer the negative effects of a monetary contraction in the 5-SEE countries, we compare the response of Greek credit supply to the response of the other non-Greek banks. Two VAR systems are constructed in order to do the comparative analysis. In the first VAR we include the loans variable supplied by Greek banks which is divided by GDP (GRCGDP), while in the second we include the loans supplied by the rest of the banks (RCGDP). Since there was no available database for loans broken down by Greek banks and rest, we constructed a new database using the balance sheets of all Greek banks' subsidiaries that operate in the 5-SEE, as well as loan information derived from Annual Reports of the mother banks. As for the non-Greek Banks loans we simply subtracted the calculated Greek loans from the total loans of each SEE country. Therefore the vector of the endogenous variables takes the following form:

$$Y' = [GDPPC, INFL, MP, GRCGDP] \quad (3)$$

$$Y'' = [GDPPC, INFL, MP, RCGDP] \quad (4)$$

If Greek banks do buffer monetary policy transmission in the region, we would expect Greek loans to resist to a policy shock. In other words if the above hypothesis holds, Greek banks would keep on supplying credit after a shock or at least they would dampen their credit supply for a shorter period or/and to a more moderate extent compared to the response of credit provided by the rest of the banks in the region to a given shock.

B. Impulse Responses and Variance Decomposition

Fig. 5 displays the impact (the impulse response) of a monetary policy shock, defined as a temporary rise in MMR, TBR and RRR, on output, inflation and loan supply, together with a 95 percent confidence interval. As one can see in Fig. 5, an increase in MMR causes a four-per-cent decrease in the non-Greek credit supply in SEE and only one-per-cent reduction in Greek credit supply indicating a buffering role of the Greek banks. Almost the same results emerged if the other two policy instruments (TBR, RRR) are employed in identifying monetary policy shock.

From the following impulse response function results, it is clear that Greek banks, even though responding to policy shocks, they do so in a moderate way mitigating thus the overall negative effect generated in the bank lending channel.

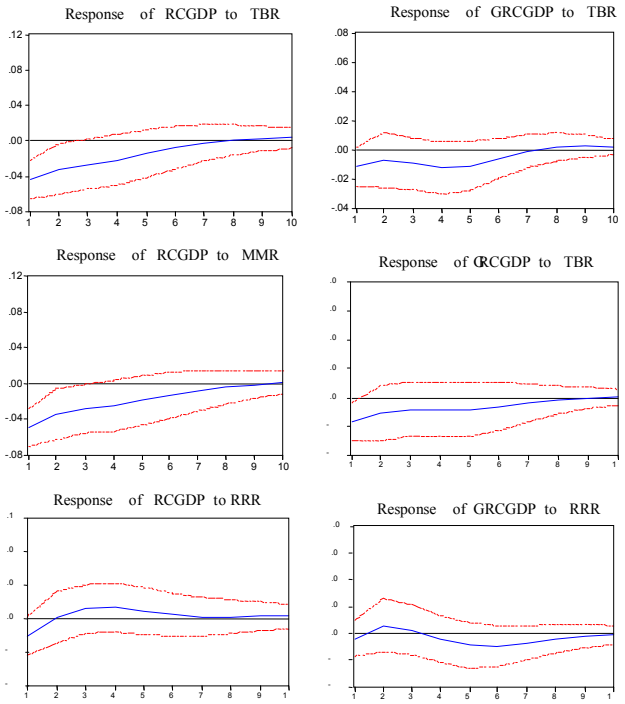

Fig. 5 Responses of variables to a Cholesky one-S.D. impulse of policy instruments.

Lastly, we reinforce the validity of our results, by using variance decomposition. Table II depicts the relative contribution of policy instrument MMR to the variance of the credit supply

TABLE II
CONTRIBUTION OF MMR TO GREEK AND REST CREDIT SUPPLY

A) Variance Decomposition of RCGDP:

Period	S.E.	GDPPC	INFL	**MMR**	RCGDP
1	0.0819	5.8199	10.724	**26.909**	56.546
		(6.62493)	(9.46967)	(8.94124)	(10.3932)

B) Variance Decomposition of GRCGDP:

Period	S.E.	GDPPC	INFL	**MMR**	GRCGDP
1	0.0399	3.126995	0.253	**8.969**	87.650
		(4.93909)	(3.1656)	(5.6775)	(8.7517)

Please note that MMR contribution to non-Greek credit (panel A) is much higher compared to the contribution of the same policy instrument to Greek credit supply. Namely MMR affects RCGDP variance by twenty seven-per-cent while GRCGDP is just affected by nine-per-cent. Practically, non-Greek banking institutions seem to be three times more sensitive to monetary policy. The buffering effect gets even more pronounce in the case of the other two policy instruments.

Tables III and IV provide information of the contribution of TBR and RRR to Greek and non-Greek banks loans.

TABLE III
CONTRIBUTION OF TBR TO GREEK AND REST CREDIT SUPPLY

A) Variance Decomposition of RCGDP:

Period	S.E.	GDPPC	INFL	**TBR**	RCGDP
1	0.0829	5.8860	12.060	**21.43817**	60.615
		(6.882)	(7.6645)	(9.905)	(10.532)

B) Variance Decomposition of GRCGDP:

Period	S.E.	GDPPC	INFL	**TBR**	GRCGDP
1	0.0386	3.0552	0.0377	**3.864325**	93.042
		(4.973)	(2.9175)	(5.353)	(8.278)

TABLE IV
CONTRIBUTION OF RRR TO GREEK AND REST CREDIT SUPPLY

A) Variance Decomposition of RCREDITGDP:

Period	S.E.	GDPPC	INFL	**RRR**	RCGDP
1	0.0801	4.220	9.79776	**11.3053**	74.676
		(5.54071)	(8.87448)	(8.1340)	(11.6536)

B) Variance Decomposition of GRCREDITGDP:

Period	S.E.	GDPPC	INFL	**RRR**	GRCGDP
1	0.0393	1.892	0.34641	**0.5323**	97.228
		(4.7096)	(2.5801)	(4.2101)	(6.6379)

V. CONCLUDING REMARKS

In this study we tried to contribute to the Bank Lending Channel literature by shedding light on the monetary policy transmission in five transition economies, during the period 2000 - 2009. We compiled a new database regarding the reserve requirements for the economies we study. We studied the transmission mechanism of monetary policy based on a recursive vector autoregression framework. The impulse response functions derived by a four-variable VAR system suggest that a temporary rise in the policy instrument tends to be followed by a decrease in the supply of loans from all banking institutions operating in the 5-SEE countries. This indicates that a bank lending channel is at work, although, structural weakness of the financial markets probably hinders, to a certain extent, the monetary transmission to the real sector.

Total credit supply decreases after an increase in the interbank money market rate, an increase in the T-Bill rate or a raise in banks' minimum required reserves ratio. Also, demand factors were controlled so as to ensure that credit decline was not driven by the reduced demand. Additionally, variance decomposition indicates that money market rate is the most effective monetary policy instrument (among the other instruments) used by the SEE central banks during the period 2000 – 2009.

Lastly, by compiling a new data for the Greek credit supply we test the impact of the monetary policy shock on the loans provided by Greek banks. We found that given a monetary policy shock, Greek banks reduce their loans immediately but to a much lesser degree than the loans provided by the other non-Greek banks. Having said that, a number of caveats have to be taken into account in interpreting the results. First the sample period 2000-2009 is short and secondly data quality might be a concern.

APPENDIX

A. RRR Data Compilation

RESERVE REQUIREMENTS – ALBANIA

Year	Reserve requirements
2000	Bank of Albania dropped the reserve requirements from 10% to 7.35%, due to high levels of liquidity in the Albanian banking system.
2001	In January the required reserve was 4.0%, exhibiting an upward rate until December. The average reserve ratio throughout the months was around 4.7% indicating an easing monetary policy.
2002	Reserve requirement was left unchanged still indicating an easing monetary policy.
2003	While Bank of Albania increased slightly the reserve requirement ratio by 3.4%, its objective still remained throughout the year to enhance money supply to the banking system.
2004	Bank of Albania dropped by 16% the reserve ratio.
2005	Bank of Albania kept on dropping the reserve ratio in an attempt to limit the liquidity of the banking system.
2006	Liquidity is drained from the banking system by a 10% increase in the required reserve almost reaching the 2004 levels.
2007	Bank of Albania, still applying a tightening monetary policy, raised the minimum reserve ratio nearly to the prior-to-2000 levels. As of December 2007, the minimum reserve ratio holds marginally below 10%.
2008	Bank of Albania decided to slightly raise the minimum required reserves at 10%
2009	No change in the required reserve.

Sources: Annual Reports of Bank of Albania, own compilation and calculations.

Reserve Requirements – Bulgaria

Year	Reserve requirements
2000	Bulgarian National Bank reduced the percentage of minimum required reserves from 11% to 8% from 1 July 2000 impacting interbank market developments to some extent.
2001	During the review period the BNB did not intervene on money supply, keeping the level of minimum required reserves unchanged, and did not perform its function of lender of last resort. Monetary aggregates' dynamics matched money demand by economic agents and entirely reflected reserve money growth. The share of minimum required reserves remained unchanged at 8% of the deposit base.
2002	Over 2002 minimum required reserve levels remained unchanged at 8% of the deposit base. The past year saw a gradual increase of borrowed funds forming the deposit base used for determining minimum required reserves.
2003	The decision taken in June 2003 by National Bulgarian bank made minimum required reserve management more flexible.
2004	During the second half of 2004 amendments were made to minimum required reserves. In July a requirement to allocate reserves equal to 4% of funds attracted with a maturity of over two years became effective. Since October only half of cash balances have been recognized in reporting minimum required reserve performance.
2005	Bulgarian National Bank used additional minimum required reserves in order to curb credit growth. From early December of 2004 minimum required reserves on attracted funds with a term to maturity of over two years were raised to 8% and the option to use lev cash balances in maintaining required reserves was removed entirely.
2006	In June the Bulgarian National Bank Governing Council adopted a decision to restore the initial requirements whereby minimum required reserves were double the excess over the set lending limit. Additional reserves over the maintenance period between 4 May and 3 August 2006 were determined by the BNB's November 2005 decision on introducing a progressive scale of minimum required reserves. At average the reserve requirement ratio was 8.65%
2007	Supplementary reserve requirements imposed by the Bulgarian National bank (reaching 12%) for particular banks had the effect of restraining liquidity until being dropped in May.
2008	As part of its anti-cycle policy, the BNB facilitated banks' liquidity by releasing liquidity buffers accumulated in earlier years. Reserve requirement ratio was reduced to 10%
2009	Bulgarian National Bank reduced the minimum required reserves on fund attracted by banks to 5% as of 01 December of 2008.

Sources: Annual Reports of Central Bank of Bulgaria, own compilation and calculations.

RESERVE REQUIREMENTS – FYROM

Year	Reserve requirements
2000	National Bank of FYROM conducted contractionary monetary policy raising slightly the required reserves to 8%.
2001	The high amount of withdrawn reserve money in the third quarter partly reflects the increased reserve requirements rates. Namely, in May 2001 the reserve requirement rate on short-term and long-term deposits was increased by 0,5% and additional 1,5% and 1,0%, respectively (increase from 8% to 10% for short-term and from 3.5% to 5% for long-term deposits). These changes are in line with the changes in the monetary policy stance, as a reaction to the upheaval of the economic movements, due to the war crisis.
2002	In an attempt to conduct a less contractionary monetary policy, National Bank of FYROM reduces the required reserves held by banks from 8.5% to 7.5%.
2003	National Bank of FYROM left the required reserve unchanged
2004	The statutory reserve requirement of the banks in denars is set at a rate of 7.5% of the denar liabilities towards resident and non-resident, legal and physical persons, in accordance with the relevant regulations. The reserve requirement of banks in denars is fulfilled in part with the settlement accounts of banks held at NBRM (note 18) and in part with the banks cash in vaults
2005	National Bank of FYROM raised the required reserves. (11.33% change)
2006	National Bank of FYROM left the required reserve unchanged.
2007	National Bank of FYROM left the required reserve unchanged
2008	National Bank of FYROM left the required reserve unchanged
2009	National Bank of FYROM left the required reserve unchanged

Sources: Annual Reports of Central Bank of FYROM, own compilation and calculations.

RESERVE REQUIREMENTS – ROMANIA

Year	Reserve requirements
2000	In 2000 reserve requirements were instrumental in fending off liquidity providing operations in excess. The general features of reserve requirements mechanism remained unchanged, including a relatively high reserve ratio. The sterilization operations called for further tight reserve requirements, which throughout the year preserved their essential parameters, i.e. the reserve ratio on ROL-denominated deposits stood at 30 percent while that on foreign currency deposits ran at 20 percent of total deposits.
2001	Reserve requirements were actively used; the reserve ratio for deposits in ROL was lowered from 30 percent to 27 percent in July and to 25 percent in October 2001; this move was aimed at narrowing the spread between banks' lending and deposit rates.
2002	National bank of Romania introduced different reserve ratios depending on the residual maturity of the items included in the reserve base (a zero reserve ratio is applied to banks' liabilities with a residual maturity of over two years while 18 percent reserve ratio and 25 percent reserve ratio are applied to the other balance sheet items in ROL and foreign exchange respectively.
2003	The required reserve mechanism retained the features it had exhibited at end-2002. The choice of leaving required reserve ratio on ROL-denominated deposits unchanged relied on the persistently high excess liquidity in the banking system. The maintenance of the differential between required reserve ratio on ROL-denominated deposits and that on foreign-exchange-denominated deposits was aimed at putting a cap on lending in foreign exchange by influencing relative costs. The main factor behind the developments of interbank rates in 2003 was the flexibility of the required reserve mechanism
2004	The required reserve ratio on ROL-denominated deposits stayed high, having a strong anti-inflationary impact, while the required reserve ratio on foreign exchange-denominated deposits was raised. The other features of the required reserve mechanism, including the interest rate set by the National Bank of Romania for ROL- and foreign exchange-denominated reserves, were left unchanged.
2005	The reserve base for foreign currency-denominated deposits was enlarged and the reserve ratio on deposits in domestic currency was lowered to 16 percent, from 18 percent. The prudential measures implemented in August 2005 were aimed at limiting credit risk for households by tightening their access to bank loans. The administrative measures, effective September 2005, focused on limiting credit institutions' exposure to unhedged borrowers.

RESERVE REQUIREMENTS – ROMANIA (CONTINUED)

Year	Reserve requirements
2006	During 2006 H1, the NBR Board raised the policy rate twice, by one percentage point on 8 February (to 8.5 percent) and by a quarter of a percentage point on 27 June (to 8.75 percent). At the same time, the monetary authority increased the restrictiveness of minimum reserve requirements. Thus, the NBR Board decided in February to proceed to a new rise, by 5 percentage points, in the reserve ratio on foreign exchange-denominated liabilities of credit institutions. Four months later, the central bank resorted for the first time in six-and-a-half years to an increase, by 4 percentage points, in the reserve ratio on RON-denominated liabilities.
2007	In order to ensure restrictive broad monetary conditions, the central bank kept in place tight reserve requirements throughout 2007, the reserve ratios on both RON-denominated liabilities2 and foreign exchange-denominated liabilities of credit institutions being left unchanged at 20 percent and 40 percent respectively.
2008	The central bank tailored its monetary policy instruments to the newly-created context of an ongoing gradual reduction in excess liquidity of banks and their switch to a net debtor position since October 2008; the reserve requirements ratio on leu-denominated liabilities of credit institutions was lowered from 20 percent to 18 percent
2009	The central bank alleviated the minimum reserve requirements' tightness by reducing in several stages the reserve ratios on credit institutions' leu-denominated and foreign exchange-denominated liabilities with residual maturity of up to 2 years from 18% to 15% and from 40% to 30% respectively. Moreover, the reserve ratio on foreign exchange-denominated liabilities with residual maturity of more than 2 years and free from contractual clauses was lowered from 40%to nil.

Sources: Annual Reports of Bank of Romania, own compilation and calculations.

RESERVE REQUIREMENTS – SERBIA

Year	Reserve requirements
2000	In early February, the rate for computing and setting-aside required the reserves was raised from 17% to 19.5%. In order to offset the effects of reserve money creation on the basis of central bank credits for the purchase of wheat, at the end of July reserve requirements were raised from 19.5% to 24.5%, and remained unchanged until the year-end. The banks that participated in the financing of the Housing Construction Project in the Republic of Serbia were allowed to keep a part of the required reserves (in the amount corresponding to the increase of reserve requirements, i.e. up to 5 percentage points) in securities of the Republic Directorate for Reconstruction of the Country, for the financing of the project.
2001	Taking into account that liquidity of the banking system in that year was at a high level, the NBY preserved a relatively high rate of the reserve requirement, of 24.5%
2002	The NBY on 11 April 2002 transformed reserve requirements by reduced from 24.5% to 20%
2003	In 2003 the NBS pursued an active policy relating to bank required reserves and the ratio was subject to relatively frequent changes, depending on the liquidity of banks. In the first months of the year, in January and February, the required reserve ratio was 20%. However, with respect to the considerably improved liquidity of banks, the NBS increased the required reserve ratio from 20% to 23% on 10 March.
2004	Reserve requirement rate equaled 18%. By the end of April, a new Decision on Banks' Required Reserves held with the National Bank of Serbia was issued resulting to an increase in the reserve requirement ratio to 21%.
2005	A revision of reserve requirement ratio was applied to the dinar base from 21.0% to 18%.
2006	NBS imposed a cut in the reserve requirement ratio reserving base from 18% down to 15%.
2007	On 10 January 2007, the reserving base was lowered from 15% to 10%
2008	Reserve ratio remains unchanged at 10%.
2009	According to a new Decision, in force since March 2010, the reserve requirement ratio was reduced on the dinar base to 5%.

Sources: Annual Reports of Bank of Serbia, own compilation and calculations.

RESERVE REQUIREMENTS – SERBIA

Year	Reserve requirements
2000	In early February, the rate for computing and setting-aside required the reserves was raised from 17% to 19.5%. In order to offset the effects of reserve money creation on the basis of central bank credits for the purchase of wheat, at the end of July reserve requirements were raised from 19.5% to 24.5%, and remained unchanged until the year-end. The

	banks that participated in the financing of the Housing Construction Project in the Republic of Serbia were allowed to keep a part of the required reserves (in the amount corresponding to the increase of reserve requirements, i.e. up to 5 percentage points) in securities of the Republic Directorate for Reconstruction of the Country, for the financing of the project.
2001	Taking into account that liquidity of the banking system in that year was at a high level, the NBY preserved a relatively high rate of the reserve requirement, of 24.5%
2002	The NBY on 11 April 2002 transformed reserve requirements by reduced from 24.5% to 20%
2003	In 2003 the NBS pursued an active policy relating to bank required reserves and the ratio was subject to relatively frequent changes, depending on the liquidity of banks. In the first months of the year, in January and February, the required reserve ratio was 20%. However, with respect to the considerably improved liquidity of banks, the NBS increased the required reserve ratio from 20% to 23% on 10 March.
2004	Reserve requirement rate equaled 18%. By the end of April, a new Decision on Banks' Required Reserves held with the National Bank of Serbia was issued resulting to an increase in the reserve requirement ratio to 21%.
2005	A revision of reserve requirement ratio was applied to the dinar base from 21.0% to 18%.
2006	NBS imposed a cut in the reserve requirement ratio reserving base from 18% down to 15%.
2007	On 10 January 2007, the reserving base was lowered from 15% to 10%
2008	Reserve ratio remains unchanged at 10%.
2009	According to a new Decision, in force since March 2010, the reserve requirement ratio was reduced on the dinar base to 5%.

Sources: Annual Reports of Bank of Serbia, own compilation and calculations.

REFERENCES

[1] Kishan and Opiela, "Bank, Size and the Bank Lending Channel," *Journal of Money, Credit and Banking*, vol.32, pp. 121 -141, 2000.

[2] B.S. Bernanke, and M. Gertler, "Inside the Black Box: The Credit Channel of Monetary Transmission," *Journal of Economic Perspectives*, vol. 9, pp. 27-48, 1995.

[3] J. C. Stein, ''An adverse-selection model of bank asset and liability management with implications for the transmission of monetary policy,'' *RAND Journal of Economics*, vol.29, pp. 466-486, 1998.

[4] C. Romer, and D. Romer, ''Does monetary policy matter? A new test in the spirit of Friedman and Schwartz,'' *NBER Macroeconomics Annual*, vol. 4, pp. 121-70, 1989.

[5] A. Kashyap, D. Wilcox, and J. Stein, ''The monetary transmission mechanism, evidence from the composition of external finance,'' Mimeo, MIT. 1991.

[6] B. Bernanke, and A. S. Blinder, ''The federal funds rate and the transmission of monetary policy,'' *American Economic Review*, vol. 82, pp. 901-921, 1992.

[7] A. Berger, and G. Udell, "Some Evidence on the Empirical Significance of Credit Rationing," *Journal of Political Economy*, vol. 100, pp. 1047-77, 1992.

[8] P. Morgan and P. Donald, "The credit effects of Monetary Policy: Evidence Using Loan Commitments," *Journal of Money, Credit, and Banking*, vol.30, pp. 102-118, 1998.

[9] A. K .Kashyap, and J. C. Stein, "What Do a Million Banks Say about the Transmission of Monetary Policy?" *The American Economic Review*, vol. 90, pp. 407-428, 2000.

[10] L. Gambacorta, L. "Inside the Bank Lending Channel," European Economic Review, vol.49, pp.1737-1759, 2005.

[11] M. Ehrmann, L. Gambacorta, J. Martinez-Pages, P. Sevestre, and A. Worms, "Financial system and the role of the banks in monetary transmission in the Euro area. in: I. Angeloni, A. Kashyap, and B. Mojon, (eds.) Monetary policy transmission in the Euro area. United Kingdom: Cambridge University Press, 2003.

[12] C. Loupias, F. Savignac, and P. Sevestre, ''Is there a bank-lending channel in France? Evidence from bank panel data. in: I. Angeloni, Kashyap, A. & Mojon, B. (eds.) Monetary policy transmission in the Euro area. United Kingdom: Cambridge University Press, 2003.

[13] S. Brissimis, N. Kamberoglou, and G. T. Simigiannis, 2003). ''Is there a bank-lending channel of monetary policy in Greece? Evidence from bank-level data,'' in: ANGELONI, I., KASHYAP, A. & MOJON, B. (eds.) Monetary policy transmission in the Euro area. United Kingdom: Cambridge University Press, 2003.

[14] Haan, L. D., (2003). The impact of monetary policy on bank lending in the Netherlands. In: Angeloni, I., Kashyap, A. & Mojon, B. (eds.) Monetary policy transmission in the Euro area. United Kingdom: Cambridge University Press.

[15] S. Kaufmann, ''The cross-sectional and the time dimension of the bank-lending channel: the Austrian case. In: Angeloni, I., Kashyap, A. and Mojon, B. (eds.) Monetary policy transmission in the Euro area. United Kingdom: Cambridge University Press, 2003.

[16] L. Farinha, and C. R. Marques, ''The bank-lending channel of monetary policy: identification and estimation using Portugese micro bank data. In: Angeloni, I., Kashyap, A. & Mojon, B. (eds.) Monetary policy transmission in the Euro area. United Kingdom: Cambridge University Press, 2003.

[17] J. Agung, "Financial Deregulation and the Bank Lending Channel in Developing Countries: the Case of Indonesia," *Asian Economic Journal*, vol.12, pp. 273-294, 1998.

[18] R. Alfaro, C. Garcia, A. Jara and H. Franken, "The Bank Lending Channel in Chile," BIS paper no.22, 2004.

[19] R. Juks, "The Importance of the Bank-Lending Channel in Estonia: Evidence from Micro-Economic Data", Working papers of Eesti Pank, No.6 2004.

[20] M. Arena, C. Reinhart, and F. Vanquez, ''The Lending Channel in Emerging Economies: Are Foreign Banks Different?'' NBER, Working Paper 12340, 2006.

[21] J. Houston, C. James and D. Marcus, "Capital market frictions and the role of internal capital markets in banking," *Journal of Financial Economics*, vol. 46, pp. 135-164, 1997.

[22] A. Ashcraft, "New Evidence on the Lending Channel," Department of Economics, mimeo, MIT, 2000.

[23] G. Clarke, R. Cull, and M. Martinez Peria, ''Does Foreign Bank Penetration Reduces Access to Credit in Developing Countries? Evidence from Asking Borrowers,'' World Bank, Policy Research Working Paper, 2716, 2001.

[24] B. G. Dages, L. Goldberg, and D. Kinney, "Foreign and Domestic Bank participation in Emerging Markets: Lessons from Mexico and Argentina," FRBNY Economic Policy Review, pp. 17-36, 2000.

[25] L. Goldberg, ''When is US Bank Lending to Emerging Markets Volatile?'' Federal Reserve Bank of New York, Working Paper, 2001.

[26] J. Crystal, G. Dages, and L.S. Goldberg, ''Has Foreign Bank Entry Led to Sounder banks in Latin America?'' Federal Reserve Bank of New York, Current Issues in Economics and Finance, vol. 8, 2002.

[27] A. B. Ashcraft, ''Are bank holding companies a source of strength to their banking subsidiaries?'' Federal Reserve Bank of New York, Staff Reports, No. 189, New York, 2004.

[28] A.N. Berger, L.F. Klapper, M.S. Peria, and R. Zaidi, ''Bank ownership type and banking relationships,'' *Journal of Financial Intermediation*, vol. 17, pp. 37-62, 2008.

[29] S.K. Bhaumik, and J. Piesse, 2008). ''Does lending behavior of banks in emerging economies vary by ownership? Evidence from the Indian banking sector,'' *Economic Systems*, vol. 32, pp. 177-196, 2008.

[30] S.K. Bhaumik, D. Vinh, and A. M. Kutan, ''Implications of bank ownership for the credit channel of monetary policy transmission: Evidence from India,'' The William Davidson Institute at University of Michigan ,Working Paper 988, 2010.

[31] B.M. Friedmanm and K.N. Kuttner, ''Economic Activity and Short-term Credit Markets: An Analysis of Prices and Quantities,'' Brookings Papers on Economic Activity, vol. 2, pp. 193-266, 1993.

[32] L. J. Christiano, M. Eichenbaum, and C. Evans, ''The effects of monetary Policy Shocks: Evidence from the Flow of Funds,'' Federal Reserve Bank of Chicago, Working Paper, No 94-2, 1994.

[33] C.A. Sims, "Interpreting the Macroeconomic Time Series Facts: The Effects of Monetary Policy," European Economic Review, vol. 36, pp. 975–1000, 1992.

[34] D. P. Morgan, "The credit effects of Monetary Policy: Evidence Using Loan Commitments," Journal of Money, Credit, and Banking, vol.30, pp. 102-118, 1998.

[35] M. Gertler, and G. Gilchrist, "The Role of Credit Market Imperfections in the monetary Transmission Mechanism: Arguments and Evidence," *The Scandinavian Journal of Economics*, vol. 95, pp. 43-64, 1993