Serbia: The Bank Lending Channel in a Euroized Economy

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Motivation (1)

Empirical evidence suggests that the functioning of the bank lending channel is *inter alia* determined by bank **size**, **capitalization**, **liquidity**, **foreign ownership** and **foreign liabilities.**

- **mainly foreign owned** (21 out of 32 banks were foreign-owned at the end of Q1 2013.)

- **considerably fragmented** (A large number of banks holding only a small share in total assets, lending, deposits and income – the HHI for assets was 688 at the end of Q1 2013.)

- **well-capitalized** (The capital adequacy ratio of the banking sector equaled to 20.4% at the end of Q1 2013.)

- **very liquid** (Serbian banks are holding excess dinar liquidity, mainly in CB bills and T-bills and deposit facility which made up around 9% of banks' assets at the end of Q1 2013.)

Motivation (2)

We analize the bank lending channel in Serbia by using balance sheet data (33 banks for the period from 2008Q3-2011Q2).

- Our central aim is to identify the reaction of loan supply to monetary policy

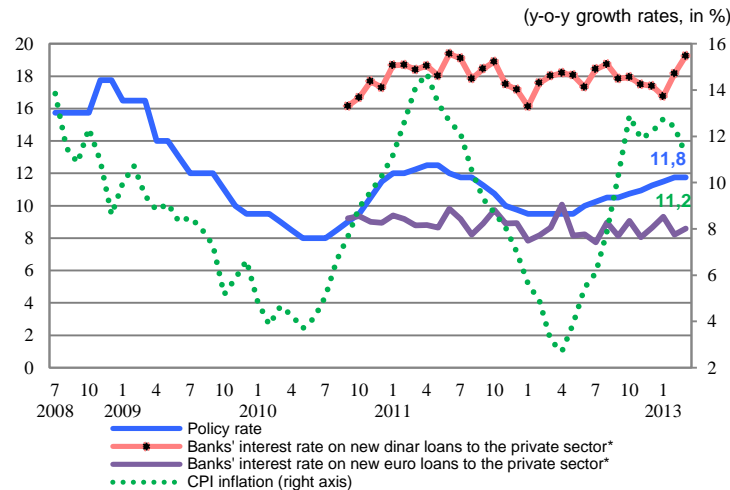- We estimate two loan supply functions by disaggregating the loans by currency (RSD vs. Euro)

The NBS pursues inflation targeting as a monetary strategy and its main monetary policy instrument is the **key policy rate.**

The NBS supports the economic policies of the Government (sustainable economic growth) if this does not conflict with its primary goal.

Chart 1 **CPI developments and interest rates**
(in %)

(y-o-y growth rates, in %)

Legend:
— Policy rate
— Banks' interest rate on new dinar loans to the private sector*
— Banks' interest rate on new euro loans to the private sector*
····· CPI inflation (right axis)

* Official data avaiable before September 2010 is not comparable due to change of methodology and is therefore not presented.

Chart 2 **GDP developments and credit activity**
(in %)

Legend:
— GDP y-o-y growth (seasonal adjusted, 2005 = 100)
— Gredit-to-GDP (right axis)
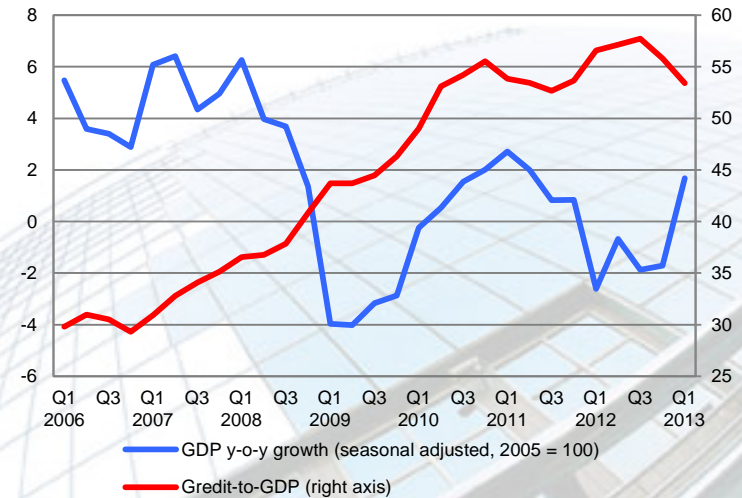
- **In the period after the global economic crisis hit in 2008, Serbia is faced by a high and volatile inflation rate and a real GDP growth which is either negative or smaller in comparison to the period before the crisis.**

- **Bank interest rates on new dinar loans react to changes in the key policy rate (interest rate pass-through) but are high due to volatile and high inflation.**

- **Bank interest rates on new fx (mainly euro) loans are high and barely affected by domestic MP measures.**

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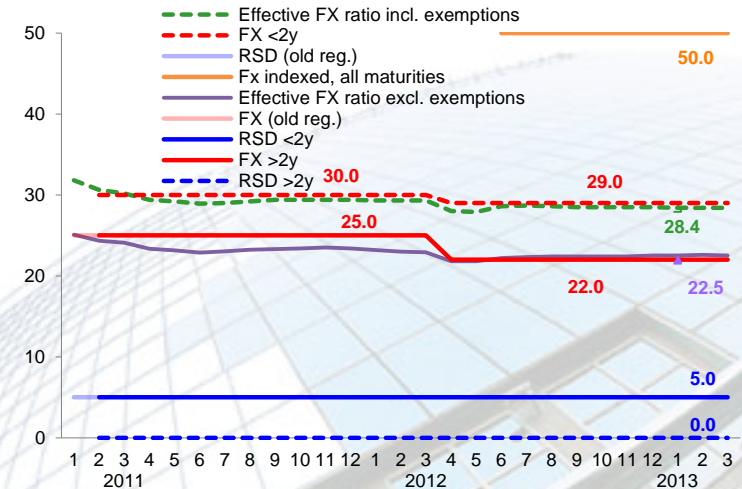**The NBS pursues a managed float exchange rate regime.**

Reserve requirement policy is set to stimulate dinar and longer-term bank funding.

Chart 3 **Exchange rate developments***
(2005 = 100)

- Nominal exchange rate of the dinar vis-à-vis the euro
- Real effective exchange rate (right axis)
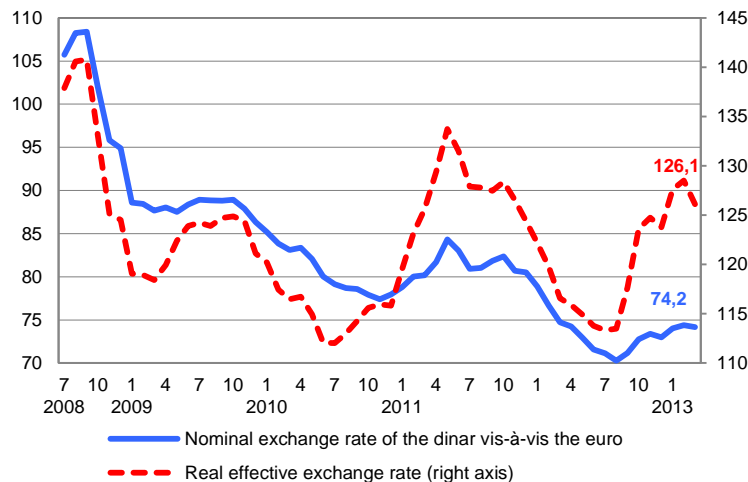
*An increase represents the appreciation of the dinar.

Chart 4 **Reserve requirement ratios**
(in %)

- Effective FX ratio incl. exemptions
- FX <2y
- RSD (old reg.)
- Fx indexed, all maturities
- Effective FX ratio excl. exemptions
- FX (old reg.)
- RSD <2y
- FX >2y
- RSD >2y

- **Strong dinar depreciation affects borrower repayment ability (negatively) if borrowers are not appropriately hedged.**
- **The NBS encouraged banks to use long term and more stable sources of finance, by exempting the subordinated debt and debt from IFIs from RR and by lowering RR rates on sources with maturities longer than two years.**
- **RR allocated in FX decreased by €824.1m, while RR allocated in dinars increased by RSD 80.9bn from January 2011 to March 2013.**

Some facts about the Serbian banking system (1)

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Loan and deposit euroization in the Serbian banking sector are **among the highest in Central and Eastern European countries** and stood at about **72% and 80%,** respectively at the end of **March 2013.**

Chart 5 **The share of banks' foreign currency loans to enterprises and households in total loans**
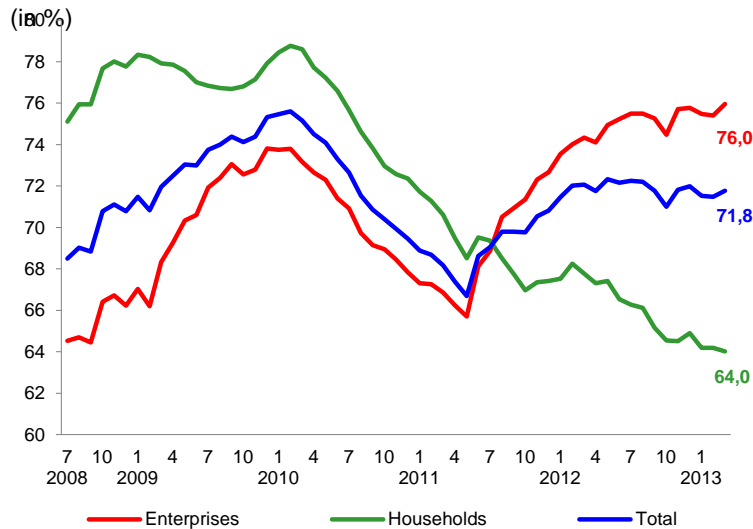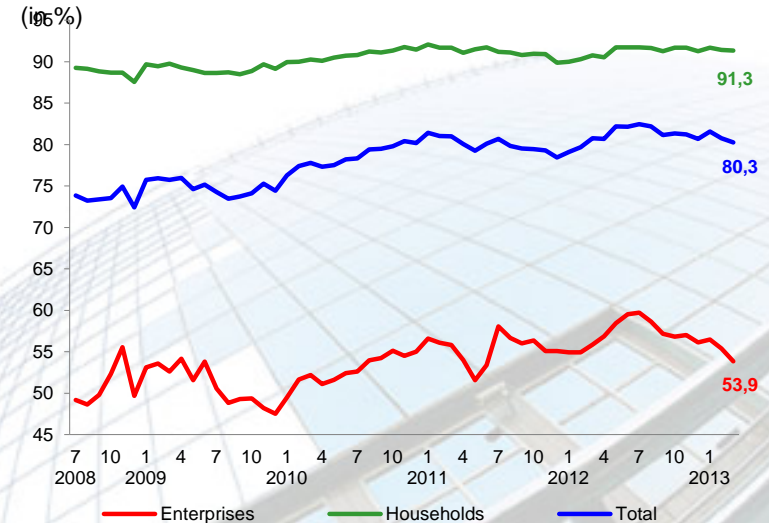
(in %)

76,0
71,8
64,0

Enterprises   Households   Total

Chart 6 **The share of banks' foreign currency deposits of enterprises and households in total deposits**

(in %)

91,3
80,3
53,9

Enterprises   Households   Total

- **Most of foreign currency loans are dinar loans indexed to the euro.**
- **It is justified to assume that banking sector euroization affects the pass-through from policy interest rates onto bank lending in Serbia.**
- **Additionally, there is evidence that euroization impairs the transmission channels of MP in Serbia, specifically the interest rate channel (Aleksić et al. (2008))**

Some facts about the Serbian banking system (2)

Domestic currency loans to enterprises and households **are mainly short-term.** This is due to the dominance of short-term loans to enterprises in total domestic currency loans.

Foreign currency loans to enterprises and households **are mainly long-term**

Table 1 **Term structure of loans and deposits**
(calculated on outstanding amounts, initial maturity)

	Dinar loans		Fx loans	
	Enterprises	HH's	Enterprises	HH's
July 2008	18.1%	46.8%	59.8%	95.8%
March 2013	32.6%	74.6%	69.7%	91.2%
	Dinar deposits		Fx deposits	
	Enterprises	HH's	Enterprises	HH's
July 2008	2.2%	3.0%	5.7%	20.3%
March 2013	2.3%	1.5%	8.8%	18.7%

- **Short-term loans should be more responsive to monetary policy shocks and thus we expect to find conclusive evidence on the existence of a bank lending channel in the case of domestic currency loans.**

- **Long-term loans should be relatively resistant to monetary policy shocks in the short term (one quarter) and thus we do not expect to find conclusive evidence on the existence of a bank lending channel in the case of foreign currency loans.**

- **On the contrary, short-term deposits dominate in the term structure of private sector deposits with banks.**

Some facts about the Serbian banking system (3)

Enterprises decreased their borrowing from abroad while borrowing from domestic banks increased at the same time.

Diminishing growth in bank lending…

Chart 7 **Private sector debt**
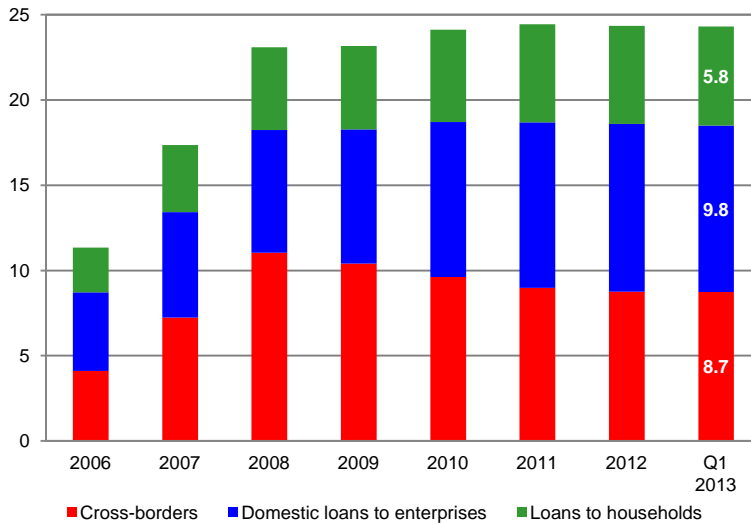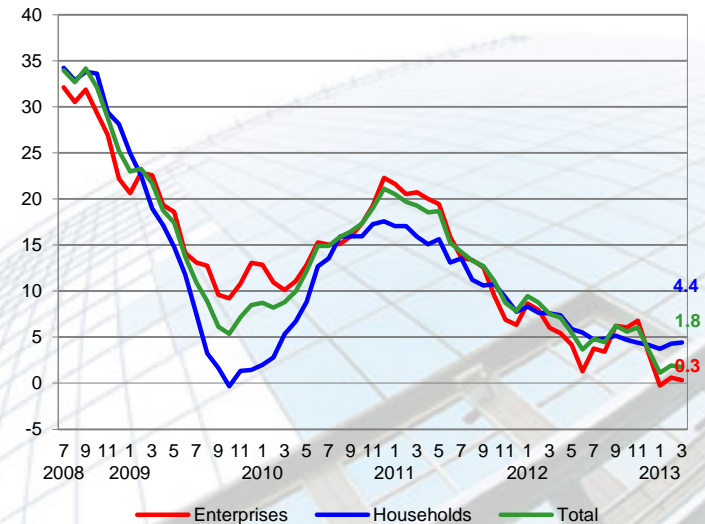(in EUR bln)

Chart 8 **Bank Lending to Enterprises and Households**
(y-o-y rates, excluding exchange rate effects, in %)

- **After the crisis hit in 2008, real growth in lending activity started slowing down.**
- **Government subsidy programs resulted in temporary accelerations in 2010 and Q4 2012, but the trend of decelerating real growth rates persisted.**
- **Consequently, the Credit-to-GDP ratio is decreasing.**

Theory of the bank lending channel

- Bernanke and Blinder (1988) among the first to offer a theoretical framework
- Restrictive monetary policy shrinks bank reserves and consequently their lending potential

Two hypotheses are crucial for the functioning of the bank lending channel:

(i) The imperfect substitution between credit and other assets on bank balance sheets
(ii) The imperfect substitution between bank credit and other forms of financing in firm balance sheets

These forms of imperfect substitution cause a two stage monetary policy impact on economic activity f.e. In the case of monetary policy contraction:

1. the imperfect substitution of bank assets causes a contraction in bank supply of loans

2. Once the credit supply has diminished (due to imperfect substitution on firm balance sheets), investment spending decreases, and so does economic activity;

… and vice versa in the case of monetary policy expansion

Short literature review

Theoretical works: **Bernanke and Blinder (1988, 1992)**, **Bernanke and Gertler (1995)**

First studies to analyse the BLC **Kashyap and Stein (1997) for the US and Ehrmann et al (2001) for EU,**

Empirical evidence on the BLC in transition countries and CEEs:

Among others:

- **Brissimis, Kamberoglou and Simigiannis (2001) – Greece,**

- **Wrobel and Pawlowska (2002) - Poland,**

- **Havrylchyk and Jurzyk (2005) - Poland,**

- **Schmitz (2004) – EU Accession countries,**

- **Kierzenkowski (2005) - Poland,**

- **Köhler et al. (2005) – Baltic countries,**

- **Golodniuk (2006) - Ukraine,**

- **Jimborean (2009) – new EU member states,**

- **Matousek and Sarantis (2009) - CEE,**

- **Bogoev (2011) – Macedonia,**

- **Jamilov (2013) - Azerbaijan**

- In general, the empirical results strongly support the view **that banks react differently to monetary policy changes depending on bank-specific characteristics** such **as size, capitalization, liquidity and foreign ownership**.

Empirical representation of the **generalized model** without restrictions for every bank has the following form for **domestic currency loans**:

$$\Delta \ln L_{it}^d = \sum_{j=1}^{l} \alpha_j \Delta \ln L_{i(t-j)}^d + \sum_{j=0}^{l} \beta_j^{dd} \Delta r_{t-j}^d + \sum_{j=0}^{l} \beta_j^{df} \Delta r_{t-j}^f + \sum_{j=0}^{l} \gamma_j^d \Delta \ln x_{t-j}$$

$$+ \sum_{j=0}^{l} \delta_j^d \ln er_{t-j}^d + \sum_{j=0}^{l} \phi_j^d \Delta \ln RR\_rsd_{t-j} + \sum_{j=0}^{l} \varphi_j^d \pi_{t-j} + \sum_{j=1}^{l} \eta_j^d \Delta \ln D\_rsd_{t-j} + \kappa^d z_{i(t-1)}$$

$$+ \lambda^d FDummy_{i(t-1)} + \sum_{j=0}^{l} v_j^{dd} \left[\Delta r_{t-j}^d \times z_{i(t-1)} \right] + \sum_{j=0}^{l} v_j^{df} \left[\Delta r_{t-j}^f \times z_{i(t-1)} \right]$$

$$+ \sum_{j=0}^{l} \vartheta_j^{dd} \left[\Delta r_{t-j}^d \times FDummy_{i(t-1)} \right] + \sum_{j=0}^{l} \vartheta_j^{df} \left[\Delta r_{t-j}^f \times FDummy_{i(t-1)} \right] + \mu_i^d + e_{it}$$

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Empirical representation of the **generalized model** without restrictions for every bank has the following form for **foreign currency loans:**

$$\Delta \ln L_{it}^f = \sum_{j=1}^{l} \alpha_j \Delta \ln L_{i(t-j)}^f + \sum_{j=0}^{l} \beta_j^{fd} \Delta r_{t-j}^d + \sum_{j=0}^{l} \beta_j^{ff} \Delta r_{t-j}^f + \sum_{j=0}^{l} \gamma_j^f \Delta \ln x_{t-j}$$

$$+ \sum_{j=0}^{l} \delta_j^f \ln er_{t-j}^d + \sum_{j=0}^{l} \phi_j^f \Delta \ln RR\_eur_{t-j} + \sum_{j=0}^{l} \varphi_j^f \pi_{t-j} + \sum_{j=1}^{l} \eta_j^f \Delta \ln D\_eur_{t-j} + \kappa^f z_{i(t-1)}$$

$$+ \lambda^f FDummy_{i(t-1)} + \sum_{j=0}^{l} v_j^{fd} \left[\Delta r_{t-j}^d \times z_{i(t-1)} \right] + \sum_{j=0}^{l} v_j^{ff} \left[\Delta r_{t-j}^f \times z_{i(t-1)} \right]$$

$$+ \sum_{j=0}^{l} \vartheta_j^{fd} \left[\Delta r_{t-j}^d \times FDummy_{i(t-1)} \right] + \sum_{j=0}^{l} \vartheta_j^{ff} \left[\Delta r_{t-j}^f \times FDummy_{i(t-1)} \right] + \mu_i^f + e_{it}$$

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Econometric methodology

We estimate the model by **two step Arellano-Bond estimator**

During the estimation we try to circumvent the problem of too many instruments by:

- Using difference GMM instead of system GMM,

- Keeping the number of instruments lower than the number of banks (32),

- Restricting the lag ranges used in generating the instrument sets (second and consecutive lags of the first difference of log of loans, the bank characteristics and the interaction terms),

- Collapsing the instrument set.

We apply a standard battery of diagnostic tests such as Arellano-Bond test for the second order serial correlation in the error term, Sargan/Hansen test for the validity of overidentifying restrictions and Difference-in-Hansen test for the validity of subsets of instruments

Dynamic panel estimation results (1)

Total domestic currency loans		
Explanatory variable	**Coefficient**	**Comment**
Loans_rsd (LD)	from 0.317 to 0.632	High inertia
BELIBOR 3M (LD)	from -0.041 to -0.049	Domestic MP affects lending in DC with a 1Q lag …
EURIBOR 3M (D)	from -0.043 to -0.072	but foreign MP affects lending in DC within the same quarter
GDP (LD)	from 0.036 to 0.049	+
CPI (LD)	from 0.013 to 0.015	+
Deposits_rsd (LD)	from 0.045 to 0.077	Currency matching
Size (L)	-0.892	
Interaction terms		
Size*BELIBOR 3M	0.055/-0.046	Changes sign (ambiguous)
Size*EURIBOR 3M (L)	-0.074	
Capitalization*BELIBOR 3M	0.213	
Capitalization*EURIBOR 3M (L)	-0.501	
Liquidity*BELIBOR 3M	0.366	
Liquidity*EURIBOR 3M	0.341/-0.724	Changes sign (ambiguous).
F_Dummy*BELIBOR 3M (L)	-0.018	

Dynamic panel estimation results (2)

Total foreign currency loans		
Explanatory variable	**Coefficient**	**Comment**
Loans_eur (LD)	from 0.301 to 0.478	High inertia
GDP (LD)	from 0.022 to 0.037	+
ER (LD)	from 0.008 to 0.012	+
CPI (D)	from -0.027 to -0.064	-
Interaction terms		
Size*EURIBOR 3M	0.039	
Liquidity*BELIBOR 3M	0.573/-0.533	Changes sign (ambiguous)

Concluding observations (1)

- Our findings indicate that the **growth of dinar bank loans** is **responsive** to the **domestic and foreign reference rate**.

- There is **weak evidence on the existence of a bank lending channel through foreign currency loans**. This might be due to the **prevalence of long-term loans in total foreign currency loans**. We hypothesize that long-term lending is less responsive to monetary policy shocks within relatively short periods such as one quarter.

- This leads us to conclude that in a highly euroized economy like Serbia, monetary authorities have **limited impact on the banks' supply of foreign currency loans.**

- Opposite to our expectations, we did **not find statistical evidence** that banks in Serbia adjust their lending in response to the changes of **reserve requirements.**

- Furthermore, we find evidence for **bank currency matching** (an increase of dinar/fx deposits leads to an increase of dinar/fx loans).

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- **Bank characteristics** affect bank lending behavior but the results are not always straightforward (possibly due to heterogeneity in the sample).

- **Smaller banks** enjoy **higher growth of dinar loans**.

- **Better capitalized banks reduce** the **amount of dinar loans proportionally less** than smaller banks when the **domestic reference rate increases** and **proportionally more** in the case of an increase of the **foreign reference rate**.

- **More liquid** banks seem to contract their dinar lending proportionally less in response to a domestic MP contraction.

- **Larger banks reduce** the amount of **fx loans proportionally less** than smaller banks when the **foreign reference rate increases**.

- Depending on their **liquidity**, bank **foreign currency lending** responds differently to changes in **domestic monetary policy**.

Thank you for your attention