

Tracing the Impact of Liquidity Infusions by the Central Bank on Financially Constrained Banks: Evidence from a Natural Experiment

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Motivation

- A number of recent papers demonstrate that exogenous variations in banks' financial constraints significantly impacts their investment decisions

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- Paravisini, JF (2008) uses data on allocation of government funds across banks in Argentina and estimates that there is an immediate expansion of lending of \$0.66 for every dollar of external finance. Khwaja and Mian, AER (2008) examine the impact of liquidity shock on banks induced by government constraints on dollar deposits following unanticipated nuclear tests in Pakistan. Iyer and Peydro, RFS (2010) find that variation in interbank exposure to a suddenly collapsed bank in India has real economic effect on loan growth

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- **Question:** Do central bank's liquidity infusions mitigate financial constraints of banks and have an impact on banks' lending decisions after the unexpected sudden stop of external financing?

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- Banks have increasingly rely on non-deposit liabilities to finance their business. Hale and Santos (2009) estimate that bond financing relative to deposits went from 3.5% in 1988 to 9% in 2007 in the US. Gropp and Heider (2009) demonstrate a significant shift in the capital structure in the direction of more capital markets funding

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- After the crisis central banks across the globe responded to capital market misallocations with massive liquidity infusions into the banking system. Taylor and Williams (2009), Brunnermeier (2009) study the impact of interventions on interest rate spreads
- No studies that look at the impact of the interventions in the individual bank context!

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 - From the peak of \$ 596.6 bln. in August 2008 the international reserves of the CBR went down to \$ 384.1 bln. in March 2009
 - The domestic liquidity infusions provided banks with credit both on a secured and unsecured basis and allowed them to purchase US dollars from the CBR in order to repay foreign loans

Natural Experiment

- Almeida *et al.* (2009) suggest that decisions about long-term borrowing were made *ex ante* before the crisis, and as the crisis came unexpectedly, firms with a large fraction of debt maturing during the collapse of the capital market were more constrained than otherwise similar firm whose debt matured outside of the crisis event window

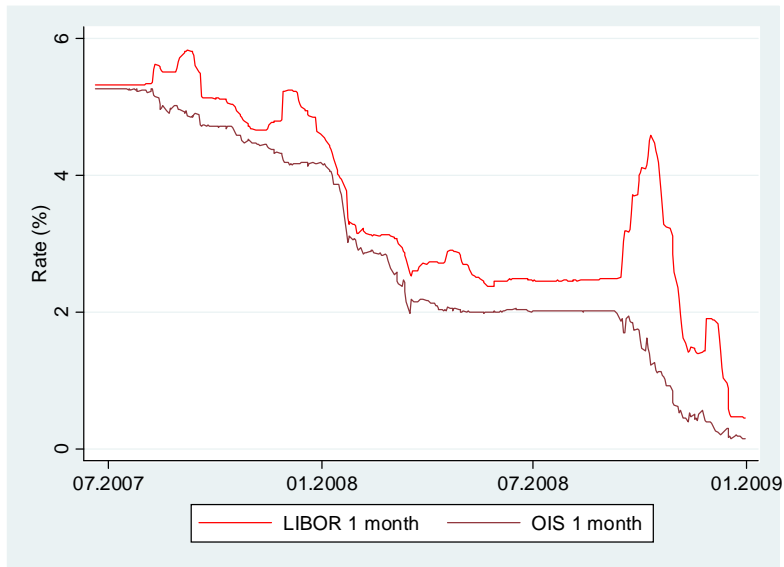
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- The sudden stop of external financing to Russian banks in late 2008 was not caused by domestic fundamentals and can therefore be considered exogenous in character. Variation among banks with respect to proportion of foreign debt maturing immediately after the sudden stop is a pre-determined variable

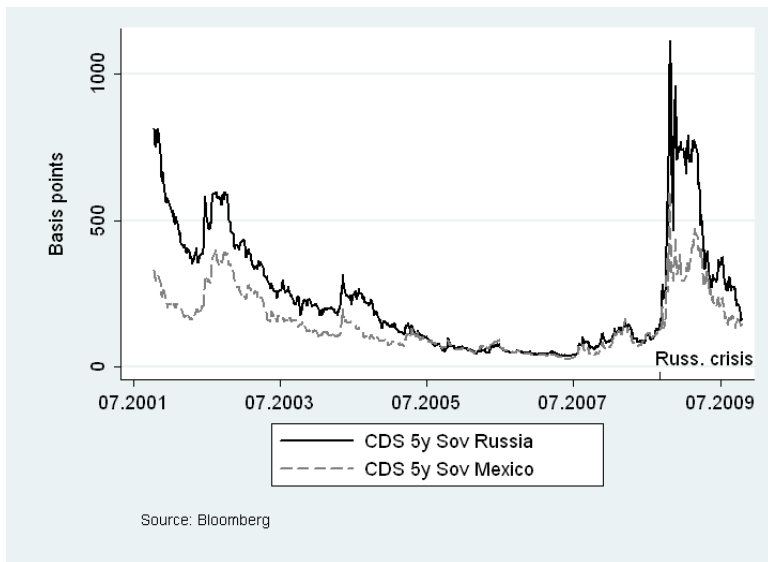
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- Banks with a ratio of more than 2% of foreign loans expiring within 6 months after the crisis are allocated to the “treatment group”, while banks whose ratio of such loans is less than 2% are allocated to the “control group”

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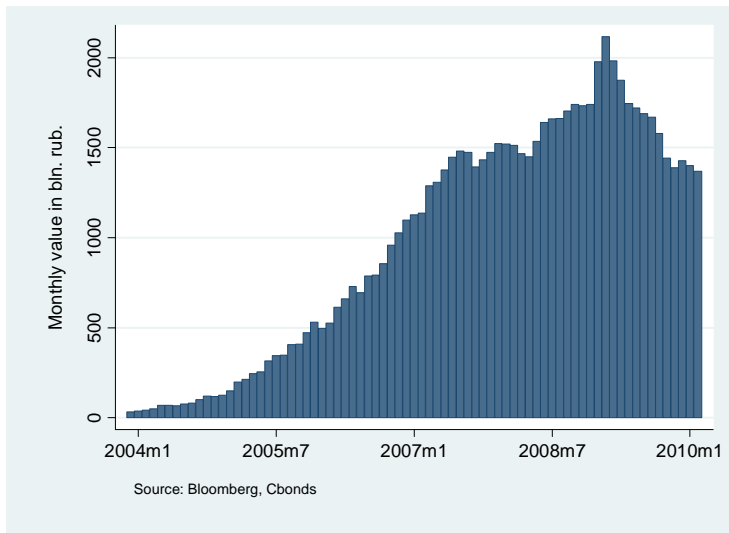
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- In each of the two sub-sample I allocate banks with a ratio of more than 2% of foreign loans expiring within 6 months after the crisis into the “treatment group”, while banks whose ratio of such loans is less than 2% into the “control group”.

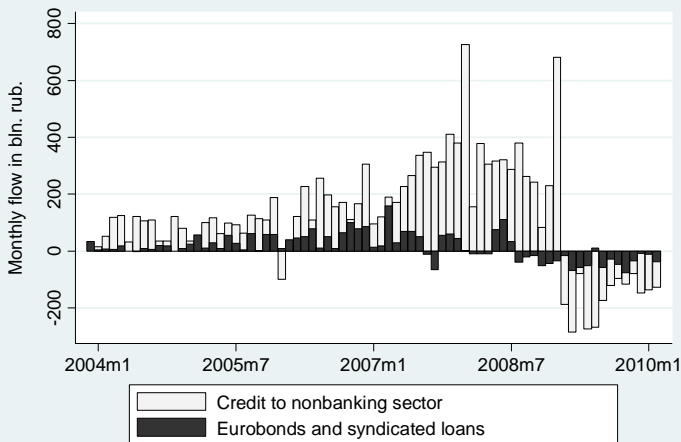
Summary statistics

	Banks that issued Eurobonds or syndicated loans		Banks that borrowed from interbank market	
	Treatment group	Control group	Treatment group	Control group
Numb. obs.	16	20	16	47
Total credit to assets ratio	0.671 (0.093)	0.704 (0.097)	0.668 (0.171)	0.657 (0.153)
Deposits to assets ratio	0.158 (0.084)	0.179 (0.148)	0.164 (0.142)	0.270 (0.156)
Foreign liabilities- to assets ratio	0.217 (0.086)	0.285 (0.219)	0.310 (0.205)	0.148 (0.165)

Aggregate value of banks' liabilities from Eurobonds and Syndicated loans



Aggregate monthly flow of funds for a sample of banks that used foreign capital markets borrowing



Source: CBR, Interfax spark

Empirical specification



$$Y_{i\tau} = \alpha + \beta_1 TREAT + \beta_2 \tau + \beta_3 (\tau \times TREAT) + \beta_4 X_{i\tau} + \varepsilon_{it}$$

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- $Y_{i\tau}$ - represents two outcome variables: cumulative net borrowing from the CBR in the period before and after the sudden stop; cumulative volume of credit extended to non-financial borrowers in the period before and after the sudden stop

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 - 2 Is there difference across experimental groups in terms of lending to corporate borrowers in more than 1 year maturity segment?

Difference-in-Difference placebo test of Net Borrowing from the Central Bank

Panel A. Sample of banks that issued Eurobonds or syndicated loans		
Average Cumulative Net Borrowing during Six months		
	1 year Before the crisis	6 months Before the crisis
Treated banks	4.1 (6.6)	-6.5 (6.0)
Control banks	3.1 (6.0)	-9.6 (5.6)
Difference at a point of time	1.0 (6.6)	3.1 (6.4)
Difference-in-Difference		2.0 (9.1)
Panel B. Sample of banks that borrowed from interbank market		
	1 year Before the crisis	6 months Before the crisis
Treated banks	-0.01 (0.2)	-0.11 (0.17)
Control banks	0.13 (0.14)	-0.17 (0.14)
Difference at a point of time	-0.15 (0.2)	0.06 (0.19)
Difference-in-Difference		0.21 (0.27)

Difference-in-Difference of bank Net Borrowing from the Central Bank before and after the sudden stop

Panel A. Sample of banks that issued Eurobonds or syndicated loans		
Average Cumulative Net Borrowing during Six months		
	6 months Before the crisis	6 months After the crisis
Treated banks	-40.0 (25.0)	-110.0*** (29.0)
Control banks	-42.0* (23.0)	-43.0* (25.0)
Difference at a point of time	2.8 (27.0)	-65.0** (28.4)
Difference-in-Difference		-68.0* (38.0)
Panel B. Sample of banks that borrowed from interbank market		
	6 months Before the crisis	6 months After the crisis
Treated banks	-0.51 (0.8)	-4.0*** (0.82)
Control banks	-0.6 (0.6)	-1.1* (0.6)
Difference at a point of time	0.1 (0.8)	-3.0*** (0.8)
Difference-in-Difference		-3.1*** (1.2)

Difference-in-Difference placebo test for Lending to non-financial corporate borrowers with up to 1 year maturity

Panel A. Sample of banks that issued Eurobonds or syndicated loans		
Average Cumulative Lending during Six months		
	1 year Before the crisis	6 months Before the crisis
Treated banks	19.0*** (7.4)	22.0*** (6.6)
Control banks	15.0** (6.5)	11.0* (6.2)
Difference at a point of time	3.7 (7.2)	11.0 (7.0)
Difference-in-Difference		7.5 (9.9)
Panel B. Sample of banks that borrowed from interbank market		
	1 year Before the crisis	6 months Before the crisis
Treated banks	0.68 (0.8)	2.7*** (0.74)
Control banks	0.1 (0.5)	0.46 (0.6)
Difference at a point of time	0.6 (0.8)	2.2*** (0.8)
Difference-in-Difference		1.6 (1.1)

Difference-in-Difference of bank Lending to non-financial corporate borrowers with up to 1 year maturity Before and After the sudden stop

Panel A. Sample of banks that issued Eurobonds or syndicated loans		
Average Cumulative Lending during Six months		
	6 months Before the crisis	6 months After the crisis
Treated banks	24.0*** (7.3)	5.7 (8.3)
Control banks	11.0 (6.8)	4.5 (7.2)
Difference at a point of time	13.0 (7.9)	1.2 (8.1)
Difference-in-Difference		-11.0 (11.0)
Panel B. Sample of banks that borrowed from interbank market		
	6 months Before the crisis	6 months After the crisis
Treated banks	2.6** (1.3)	-3.7*** (1.3)
Control banks	0.45 (1.0)	-0.54 (1.0)
Difference at a point of time	2.1 (1.4)	-3.1** (1.4)
Difference-in-Difference		-5.3*** (1.9)

Difference-in-Difference placebo test for Lending to non-financial corporate borrowers with more than 1 year maturity

Panel A. Sample of banks that issued Eurobonds or syndicated loans		
Average Cumulative Net Borrowing during Six months		
	1 year Before the crisis	6 months Before the crisis
Treated banks	15.0*** (5.7)	14.0*** (5.7)
Control banks	6.5 (5.2)	8.1 (5.1)
Difference at a point of time	8.6 (7.7)	6.3 (7.6)
Difference-in-Difference		-2.3 (11.0)
Panel B. Sample of banks that borrowed from interbank market		
	1 year Before the crisis	6 months Before the crisis
Treated banks	0.43 (0.38)	0.82** (0.35)
Control banks	0.26 (0.28)	0.06 (0.28)
Difference at a point of time	0.17 (0.4)	0.76** (0.38)
Difference-in-Difference		0.59 (0.54)

Difference-in-Difference test for Lending to non-financial corporate borrowers with more than 1 year maturity Before and After the sudden stop

Panel A. Sample of banks that issued Eurobonds or syndicated loans		
Average Cumulative Net Borrowing during Six months		
	6 months Before the crisis	6 months After the crisis
Treated banks	36.0*** (15.0)	69.0*** (17.0)
Control banks	30.0** (14.0)	35.0*** (14.0)
Difference at a point of time	5.8 (16.0)	34.0** (16.4)
Difference-in-Difference		28.0 (22.0)
Panel B. Sample of banks that borrowed from interbank market		
Average Cumulative Lending during Six months		
	6 months Before the crisis	6 months After the crisis
Treated banks	1.0** (0.4)	1.6*** (0.4)
Control banks	0.32 (0.33)	0.32 (0.33)
Difference at a point of time	0.68 (0.45)	1.3*** (0.4)
Difference-in-Difference		0.59 (0.62)

Conclusions

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- My last finding is that financially constrained banks increased lending to corporate borrowers in the long-term maturity segment. This result is puzzling and is probably due to the fact that banks were forced to extend the terms of credit to existing borrowers after the crisis
- My study contributes to the literature on funding constraints of banks and their lending decisions by demonstrating that after the sudden stop even in case of massive liquidity infusions by the central bank financial frictions remain present and have an impact on banks' lending policies