XII Seminário Anual de Metas para a Inflação
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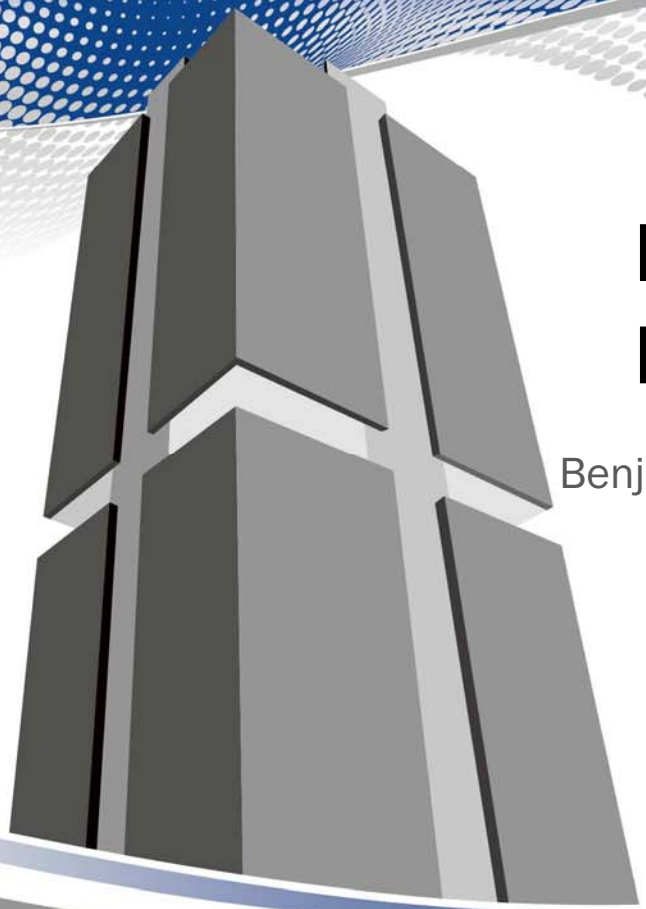

Financial Stability and Monetary Policy

Benjamin M. Tabak, Marcela T. Laiz and Daniel O. Cajueiro

BANCO CENTRAL DO BRASIL

Financial Stability

- There are many definitions of financial stability ! Not yet a consensus !
- Asymmetric Information – price discovery process !
- Situations in which shocks that hit the economy may incur in the insolvency of a large number of financial institutions, which may induce a loss of confidence – triggering a disruption in financial markets.
- Increase in bank default probabilities coupled with a decrease in profits. NPLs – Macroprudential Indicator !
- Brazil: Credit Market ! Credit risk exposure - important source of risk.

Main Results and Conclusions

- Monetary Policy matters !! It has an important impact on bank's balance sheet !

- Impact on credit lending and risk taking !

- Important to account for Interest Rates in the design of Stress Testing Scenarios for the banking system !

- Inflation Targeting Framework –

i. Transparency
ii. Accountability
iii. gradual policy changes
   – positive impact on financial stability !

Overview of the Presentation

- Motivation
- Bank Lending Channel versus Risk Taking Channel
- Empirical evidence on the Bank Lending Channel and the Risk Taking Channel
- Data and Econometric Model
- Results
- Conclusions

Motivation

- The recent financial crisis has drawn the attention to the existence of the risk taking channel and has intensified the discussion concerning the bank lending channel.

- Understanding the transmission channels that exist between the financial and the real sectors of the economy is crucial when analyzing financial stability.

- Furthermore, there is a scarce number of studies relating to developing countries.

- Concerning these issues, it is important to study more deeply the role of monetary policy in creating an environment of financial stability.

Empirical Evidence on the Bank Lending Channel

- Bernanke and Blinder (1988) attest that the bank lending channel acts through the impact of monetary policy over deposits. Banks face frictions in issuing uninsured liabilities to replace the shortfall in deposits.

- Nier and Zicchino (2008) analyzed more than 600 banks from 32 countries, and verified that tightening/loosing monetary policy is associated with loan decrease/increase.

- Disyatat (2010) argues that the emphasis on policy-induced changes in deposits is misplaced. A reformulation of the bank lending channel is proposed, in which monetary policy impacts primarily banks' balance sheet strength and risk perception.

Monetary policy has different effects depending on banks' characteristics:

- Better capitalized banks experience less pronounced impacts on their lending (**Altunbas et al., 2002**; **Francis and Osborne, 2009**; **Gambacorta and Mistrulli, 2004**; **Gambacorta, 2005**) ;

- On the other hand, poorly capitalized banks have less access to markets for uninsured funding, therefore their lending is more dependent on monetary policy shocks (**Peek and Rosengren, 1995**; **Kishan and Opiela, 2000**; **Van den Heuvel, 2001**);

- Size has also been an important variable - **Kashyap and Stein** (1995)

Empirical Evidence on the Risk Taking Channel

- The risk taking channel is characterized by changes in banks' risk tolerance due to expansive monetary policy.

- **Altunbas et al.** (2009) investigate banks operating in the European Union and the United States in the last decade and find that unusually low interest rates lead to an increase in banks' risk taking.

- **Jimenez et al.** (2009) use Spanish banks to show that low interest rates encourage risk-taking.

- **Ioannidouet al.** (2009) analyze Bolivia between 1999 and 2003 and conclude that during periods of low interest rates, banks not only increase risky loans but also reduce the rates charged to riskier borrowers.

Data and Econometric Model

- We use a sample consisting of an unbalanced panel with 5183 observations and 99 banks for the period 2003-2009.
- We focus on commercial banks that engage in loan operations.
- We test the impact of monetary policy over loan growth, NPL and a risk exposure measure.
- Additionally, we verify the different impacts of monetary policy controlling for ownership and other control variables.
- We employ the Feasible Generalized Least Squares (FGLS).

Bank Lending Channel

Equation 1

- We test the bank lending channel in Brazil by analyzing the relationship between monetary policy and loan growth.

- The benchmark equation is presented as follows:

$$\begin{aligned}\Delta Loans_{it} = {} & \alpha \Delta Loans_{i,t-1} + \beta Size_{i,t-1} + \gamma Cap_{i,t-1} \\ & + \delta \Delta IP_{t-1} + \psi \Delta Selic_{t-1} + \varphi DummyOwnership_{i,t} \\ & + \tau \Delta Selic_{t-1} * DummyOwnership_{i,t} \\ & + \chi Size_{i,t-1} * \Delta Selic_{t-1} + \varsigma Cap_{i,t-1} * \Delta Selic_{t-1} + \varepsilon_{i,t}\end{aligned} \tag{1}$$

Table 1. The Determinants of Loan Growth

	(1)	(2)	(3)
Dependent Variable: $\Delta\ Loans_t$	Baseline Model	Dummy Ownership	Interaction
$\Delta\ Loans_{t-1}$	0.0636***	0.0636***	0.0881***
	(0.0143)	(0.0143)	(0.0142)
$Size_{t-1}$	0.00134***	0.00136***	0.00118***
	(0.000358)	(0.000363)	(0.000340)
Cap_{t-1}	0.00342**	0.00391**	0.00301*
	(0.00142)	(0.00164)	(0.00157)
$\Delta\ IP_{t-1}$	0.00227**	0.00229**	0.000497
	(0.00101)	(0.00101)	(0.00117)
$\Delta\ Selic_{t-1}$	-0.0558***	-0.0561***	-0.506***
	(0.0189)	(0.0189)	(0.173)
State-Owned		0.00101	0.00252*
		(0.00155)	(0.00150)
Foreign		-0.00131	-0.00126
		(0.00191)	(0.00189)
$\Delta\ Selic_{t-1}$*State-Owned			0.215***
			(0.0384)
$\Delta\ Selic_{t-1}$*Foreign			0.102*
			(0.0522)
$Size_{t-1}$*$\Delta\ Selic_{t-1}$			0.0289***
			(0.00797)
Cap_{t-1}*$\Delta\ Selic_{t-1}$			0.0482***
			(0.0122)
Constant	-0.00794	-0.00760	-0.0130**
	(0.00646)	(0.00648)	(0.00622)
Time Dummies	YES	YES	YES
Observations	5150	5150	5150
Number of banks	99	99	99
AR(1)	0.1490	0.1489	0.1196
Wald	105.3	106.8	285.4
Modified Wald test	$1.8 \cdot 10^5$***	$1.8 \cdot 10^5$***	$3.6 \cdot 10^5$***

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Results Table 1

- Main Findings:

- The response of bank lending to a monetary policy shock is negative: when Selic increases/decreases, banks reduce/increase their lending activity.

- Larger and well-capitalized banks in Brazil are less sensitive to monetary policy.

Risk Taking Channel

Equations 3 and 4

- We analyze the effects of monetary policy on non-performing loans and on a risk measure following the same steps made for loan growth:

$$\begin{aligned}\Delta NPL_{it} = {} & \alpha \Delta NPL_{i,t-1} + \beta \Delta Loans_{i,t-1} + \gamma Size_{i,t-1} \\ & + \delta Cap_{i,t-1} + \psi \Delta Selic_{t-1} + \varphi DummyOwnership_{i,t} \\ & + \tau \Delta Selic_{t-1} * DummyOwnership_{i,t} \\ & + \chi Size_{i,t-1} * \Delta Selic_{t-1} + \varepsilon_{i,t}\end{aligned} \tag{3}$$

$$\begin{aligned}\Delta Risk_{it} = {} & \alpha \Delta NPL_{i,t-1} + \beta \Delta Loans_{i,t-1} + \gamma Size_{i,t-1} \\ & + \delta Cap_{i,t-1} + \psi \Delta Selic_{t-1} + \varphi DummyOwnership_{i,t} \\ & + \tau \Delta Selic_{t-1} * DummyOwnership_{i,t} \\ & + \chi Size_{i,t-1} * \Delta Selic_{t-1} + \varepsilon_{i,t}\end{aligned} \tag{4}$$

Table 2. Determinants of NPL

	(1)	(2)
Dependent Variable: $\Delta\ NPL_t$	Baseline Model	Dummy Ownership
$\Delta\ NPL_{t-1}$	-0.126***	-0.125***
	(0.0148)	(0.0149)
$\Delta\ Selic_{t-1}$	0.0569***	0.0475***
	(0.00913)	(0.0117)
State-Owned		-0.0135*
		(0.00760)
Foreign		0.00210
		(0.00697)
Constant	0.00953***	0.0107**
	(0.00272)	(0.00477)
Time Dummies	YES	YES
Observations	5155	5155
Number of banks	99	99
AR(1)	0.0382	0.0377
Wald	159.4***	145.3***
Modified Wald test	$5.5{\cdot}10^{7}$***	$5.4{\cdot}10^{7}$***

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Results Table 2

- Increases/decreases in interest rates imply in increases/decreases in the growth rate of NPL.

- State-owned banks have a lower NPL on average if compared to private domestic and foreign banks. This may be due to the fact that state-owned banks have a lower credit risk exposure if compared to their private counterparts. Also, they may be more willing to renegotiate contracts.

Table 3. The Determinants of Credit Risk Exposure

	(1)	(2)	(3)
Dependent Variable: $\Delta\ Risk_t$	Baseline Model	Interaction	Dummy Ownership
$Size_{t-1}$	0.135***	0.130***	0.136***
	(0.0133)	(0.0134)	(0.0133)
$\Delta\ Selic_{t-1}$	-0.00617**	-0.0050**	-0.00631**
	(0.00266)	(0.0027)	(0.00265)
State-Owned			0.00450***
			(0.00140)
Foreign			0.00276*
			(0.00162)
$Size_{t-1}$*$\Delta\ Selic_{t-1}$		-0.1206*	
		(0.0535)	
Constant	-0.00151**	-0.00153**	-0.00365***
	(0.000719)	(0.000720)	(0.00100)
Time Dummies	YES	YES	YES
Observations	5155	5155	5155
Number of banks	99	99	99
AR(1)	-0.0164	-0.0143	-0.0165
Wald	203.2***	204.0***	215.9***
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Foreign			0.00276*
			(0.00162)
$Size_{t-1}{}^{*}\Delta\ Selic_{t-1}$		-0.1206*	
		(0.0535)	
Constant	-0.00151**	-0.00153**	-0.00365***
	(0.000719)	(0.000720)	(0.00100)
Time Dummies	YES	YES	YES
Observations	5155	5155	5155
Number of banks	99	99	99
AR(1)	-0.0164	-0.0143	-0.0165
Wald	203.2***	204.0***	215.9***
Modified Wald test	$2.1{\cdot}10^{5}$***	$2.1{\cdot}10^{5}$***	$2.2{\cdot}10^{5}$***

Results Table 3

- When Selic increases/decreases, banks take on less/more credit risk.
- Monetary policy has different effects depending on the banks' size.
- State-owned and foreign banks have a different risk-taking profile.

Robustness Check

- Overall, the empirical results imply that both the **bank lending and the risk-taking channels are operational in Brazil**. These results are robust to periods of distress, as the recent financial crisis.
- We also run all regressions using the Least Squares Dummy Variable (LSDV) with **Bias Correction for Dynamic Panel** (LSDVC) estimator. Qualitative results remain the same, which suggests that the bias is small in our case as expected due to the large number of time periods and large number of banks.
- Furthermore, as tested, our regressions are **heteroscedastic**. Therefore, the use of FGLS is adequate in our case;
- We also run these regressions without the control variables in other to check whether **endogeneity** may be a problem in our specification. Despite qualitative similar results, we find small changes in the coefficients, which may suggest omitted variable bias.

Conclusions

- Our paper analyzes the role of monetary policy by accessing a detailed database of Brazil during the period of 2003-2009.

- The results indicate that monetary policy changes affect bank's performance.

- Our results support the idea that lower interest rates increase banks' risk-taking.

Conclusions

- Our results are important for the development of macro stress tests for the banking system.

- We have done a similar exercise for loans for non-earmarked lending in different economic sectors and results are qualitatively similar.

- Further research could exploit how the competitive enviroment within the banking system affects the bank lending channel and risk taking channel.

Main Results and Conclusions

- Monetary Policy matters !! It has an important impact on bank's balance sheet !

- Impact on credit lending and risk taking !

- Important to account for Interest Rates in the design of Stress Testing Scenarios for the banking system !

- Inflation Targeting Framework –

i. Transparency
ii. Accountability
iii. gradual policy changes
   – positive impact on financial stability !

The End

- Many Thanks !

- Any Suggestions may be sent to: Benjamin.Tabak@bcb.gov.br.