

# Macroprudential Policy and Intra-Group Dynamics: The Effects of Reserve Requirements in Brazil

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Workshop on Banking, Credit, and Macroprudential policy: What Can We Learn  
from Micro Data?

*“[T]he so-called developed world . . . has reserve ratios of less than 10 percent, and we here have [a reserve ratio] of 53 percent on our demand deposits. What was in the past a defect has turned into an advantage for us. . . .”*

(Brazilian Finance Minister Guido Mantega  
quoted from an interview in Folha de São Paulo,  
October 19, 2008.)

# Motivation

- ▶ The severe disruptions during the recent financial crisis resulted into substantial reforms of banking regulation and the introduction of **macroprudential policy tools**.
- ▶ These measures aim at reducing the risk of a build-up of systemic imbalances by steering for example the **cycle of banks' credit supply**.
- ▶ While macroprudential policies have only recently been added to the set of policy instruments in European countries, they have a **long history in Latin America**.
- ▶ **This paper exploits the Brazilian experience with macroprudential regulation to investigate whether the funding structure of a banking group affects the pass-through of reserve requirements to branches' credit supply.**

# Research Question

- ▶ We analyze the effects of reserve requirements used as a macroprudential instrument within a banking group.
  - ▶ Does the funding structure of the headquarter of a banking group affect the **transmission of reserve requirements to the credit supply** of regional branches of those banks?
  - ▶ Does the lending sensitivity of branches differ depending on **characteristics of parent banks** that can be associated with a differential access to funding sources?
- ▶ For the identification, we rely on a data structure that allows separating macroprudential shocks from the outcome variable and controlling for demand side effects.
  - ▶ We exploit that reserve requirements are implemented as a **time-varying** macroprudential policy instrument **responding to shocks from abroad**.
  - ▶ We exploit the granularity of Brazilian banking data and use information on the **location and ownership of branches** to extract demand side effects.

# Findings

- ▶ Macroprudential instruments targeting balance sheet items of a parent bank affect the credit supply of its branches.
  - ▶ Branches owned by parent banks that are more exposed to reserve requirements reduce credit supply by more than other branches.
  - ▶ **New insight:** macroprudential policies can be transmitted via intra-group dynamics.
- ▶ Liquidity and capitalization within the banking group matter regarding the intra-group pass-through of macroprudential instruments.
  - ▶ State-owned, liquidity-constrained, and low-capitalized banks are more prone to transmit the effect of reserve requirements to branches' credit supply.
  - ▶ This may have implications for the **aggregate outcome** of macroprudential policies.

# Related Literature

## (Heterogeneous) effects of macroprudential policy instruments.

- ▶ *Aiyar et al. (2014), Buch and Goldberg (2017), Claessens et al. (2013), Danisewicz et al. (2015), IMF (2011, 2013)*
- ▶ We focus on effects of reserve requirements on credit supply depending on **banks' funding structure** for an emerging country.

## Transmission of liquidity/ regulatory shocks through internal capital markets.

- ▶ *Ashcraft (2008), Campello (2002), Cetorelli et al. (2012), Dahl et al. (2002), De Haas and van Lelyveld (2010), Houston et al. (1997), Houston and James (1998)*
- ▶ We assess whether **intra-group ownership structures** matter for the transmission of reserve requirements.

## Reserve requirements and its usage as a macroprudential tool in Latin America.

- ▶ *Dassatti Camors et al. (2014), Glockner and Towbin (2015), Tovar et al. (2012), Montoro and Moreno (2011), Robitaille (2011), Pereira da Silva and Harris (2012)*
- ▶ We provide **micro-level evidence** on credit supply responses in Brazil.

Data and sample

# Data

The IWH Latin-American Banking Database (IWH-LAB) [SumStats](#) [TabDep](#)

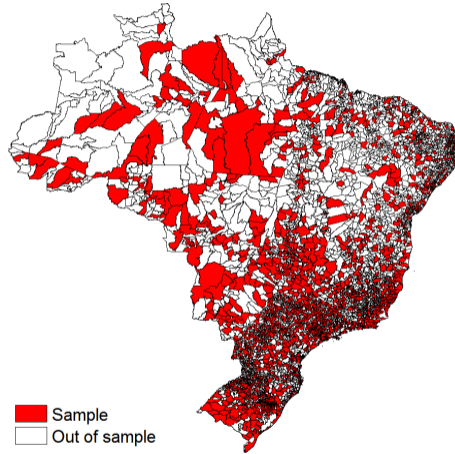
- ▶ Branch-level data for Brazil on a quarterly basis between 2008 and 2014.
- ▶ Network of 56 parent banks with 6,081 branches in 1,678 municipalities.
- ▶ Regulatory data with mandatory reporting.
- ▶ Balance sheet items on branch-level and items on parent bank-level.
- ▶ Ownership link between parent bank and branch available.

Reserve requirements [Graph-Res](#) [Graph-RR](#)

- ▶ Share of deposits that financial institutions have to hold as reserves at central bank.
- ▶ We focus on the reserve requirements on short-term (demand) deposits.



## Municipalities with branch activities



# Reserve Requirements in Brazil

## **Policymakers adjust reserve requirements as a response to foreign shocks.**

- ▶ Reserve requirements serve as a liquidity provision tool during periods of capital outflows.
- ▶ A tightening of reserve requirements helps mitigating credit booms given capital inflows.

## **Reserve requirements are applied as a macroprudential tool to steer the credit cycle.**

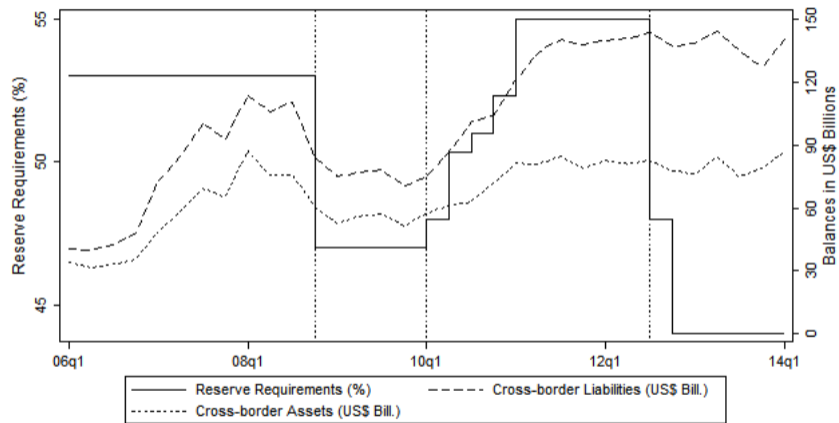
- ▶ Central bank applied counter-cyclical adjustment of reserve requirements. [Graph-Credit](#)
- ▶ High rates and several policy changes over time yield sufficient variation.

## **We focus on reserve requirements on (short-term) demand deposits.**

- ▶ Highest reserve requirement rates apply on demand deposit funding. [Graph-RR](#)
- ▶ Different exposure of parent banks might have implications on how liquidity constraints transmit within a banking group.

## Reserve Requirements and Brazilian Banks' Cross-border Exposures

Graph-MP



Empirical model

Do branches change credit supply as a response to reserve requirements and conditional on the exposure of the parent bank?

$$\begin{aligned} \text{Credit Growth}_{b,t} = & \beta_1 (\text{dep.share}_{p,t-1}) + \beta_2 (\text{dep.share}_{p,t-1} \times \text{RR}_{t-1}) \\ & + \gamma_1 X_{b,t-1} + \mu_b + \nu_{t,m} + \varepsilon_{b,t} \end{aligned} \quad (1)$$

- ▶  $\text{Credit Growth}_{b,t} = \frac{\text{credit}_{b,t} - \text{credit}_{b,t-1}}{\text{credit}_{b,t-1}}$ .
- ▶  $\text{dep.share}_{p,t-1}$ : Parent bank's consolidated demand deposit funding to total assets.
- ▶  $\text{RR}_{t-1}$ : Reserve requirements on demand deposits.
- ▶  $X_{b,t-1}$ : Branch and respective parent bank controls (e.g. size, profitability, equity).
- ▶ Branch ( $\mu_b$ ) and time-municipality ( $\nu_{t,m}$ ) fixed effects.
- ▶ Standard errors clustered by parent bank and quarter.

# Identification

## ▶ Reverse causality

- ▶ Reserve requirements are set as a reaction to [shocks from abroad](#) as opposed to being related to individual behavior of domestic banks. [Graph](#)
- ▶ [Branch-level data](#) further dissociates the decision levels – unlikely that changes in reserve requirements occur due to the behavior of a single branch.

## ▶ Heterogeneous exposure

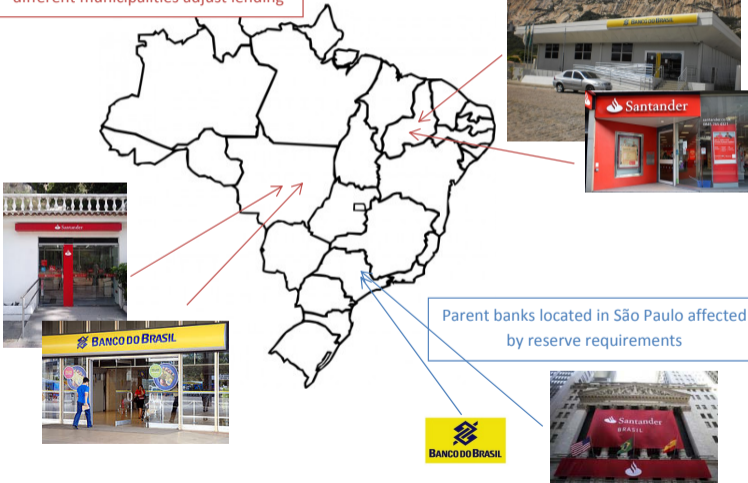
- ▶ Banks with a higher share of demand deposits funding are [more exposed](#) to reserve requirements.
- ▶ Identify effects through [parent bank heterogeneity](#) and lending sensitivity of branches. [Tab](#)

## ▶ Demand side effects

- ▶ We only keep municipalities with [at least two parent banks](#) being represented through branches.
- ▶ Municipality-time fixed effects account for variations in [credit demand on a regional level](#).

# Illustration of identification strategy

Branches of parent bank located in different municipalities adjust lending



## Results



## Negative effect of reserve requirements on branch credit growth... Tab

	Baseline (1)	Interaction (2)	Clustered SE (3)	Parent (4)	Controls (5)	TimexMun FE (6)	Branch (7)
Reserve requirements	<b>-0.220***</b> (0.008)	<b>-0.126***</b> (0.011)					
Deposit ratio		0.098*** (0.007)	0.052 (0.036)	0.094*** (0.006)	0.097*** (0.006)	0.099** (0.039)	-0.014 (0.130)
Deposit ratio X Reserve requirements		-0.181*** (0.014)	-0.114* (0.068)	-0.180*** (0.011)	-0.195*** (0.011)	-0.192*** (0.070)	0.162 (0.256)
Branch FE	No	No	Yes	Yes	Yes	Yes	Yes
Quarter FE	No	No	Yes	Yes	Yes	Yes	Yes
Parent Controls	No	No	No	Yes	Yes	Yes	Yes
Branch Controls	No	No	No	No	Yes	Yes	Yes
Quarter X Mun. FE	No	No	No	No	No	Yes	Yes
Obs	145,944	145,944	145,944	145,944	145,944	145,944	145,944
R2	0.005	0.007	0.369	0.375	0.383	0.542	0.542

Standard errors in parentheses.

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

... which is depending on parent banks' deposit share...

MargEff

	Baseline (1)	Interaction (2)	Clustered SE (3)	Parent (4)	Controls (5)	TimexMun FE (6)	Branch (7)
Reserve requirements	-0.220*** (0.008)	-0.126*** (0.011)					
Deposit ratio		0.098*** (0.007)	0.052 (0.036)	0.094*** (0.006)	0.097*** (0.006)	0.099** (0.039)	-0.014 (0.130)
Deposit ratio X Reserve requirements		<b>-0.181*** (0.014)</b>	<b>-0.114* (0.068)</b>	<b>-0.180*** (0.011)</b>	<b>-0.195*** (0.011)</b>	<b>-0.192*** (0.070)</b>	0.162 (0.256)
Branch FE	No	No	Yes	Yes	Yes	Yes	Yes
Quarter FE	No	No	Yes	Yes	Yes	Yes	Yes
Parent Controls	No	No	No	Yes	Yes	Yes	Yes
Branch Controls	No	No	No	No	Yes	Yes	Yes
Quarter X Mun. FE	No	No	No	No	No	Yes	Yes
Obs	145,944	145,944	145,944	145,944	145,944	145,944	145,944
R2	0.005	0.007	0.369	0.375	0.383	0.542	0.542

Standard errors in parentheses.

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

... but unaffected by the deposit share of the branch.

	Baseline (1)	Interaction (2)	Clustered SE (3)	Parent (4)	Controls (5)	TimexMun FE (6)	Branch (7)
Reserve requirements	<b>-0.220***</b> (0.008)	<b>-0.126***</b> (0.011)					
Deposit ratio		0.098*** (0.007)	0.052 (0.036)	0.094*** (0.006)	0.097*** (0.006)	0.099** (0.039)	-0.014 (0.130)
Deposit ratio X Reserve requirements		<b>-0.181***</b> (0.014)	<b>-0.114*</b> (0.068)	<b>-0.180***</b> (0.011)	<b>-0.195***</b> (0.011)	<b>-0.192***</b> (0.070)	<b>0.162</b> (0.256)
Branch FE	No	No	Yes	Yes	Yes	Yes	Yes
Quarter FE	No	No	Yes	Yes	Yes	Yes	Yes
Parent Controls	No	No	No	Yes	Yes	Yes	Yes
Branch Controls	No	No	No	No	Yes	Yes	Yes
Quarter X Mun. FE	No	No	No	No	No	Yes	Yes
Obs	145,944	145,944	145,944	145,944	145,944	145,944	145,944
R2	0.005	0.007	0.369	0.375	0.383	0.542	0.542

Standard errors in parentheses.

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

# Extending the baseline estimation

Assymmetric effects over cycle and ownership

- ▶ We extend the baseline model to address the role of the economic cycle and banks' ownership structure in driving the results.
  - ▶ **Effect over cycle**: Periods when reserve requirements are loosened drive the results.
  - ▶ **(State)-ownership dimension**: Credit growth of branches of **state-owned parent banks** is more sensitive to reserve requirements.

The negative sensitivity is driven by periods with looser reserve requirements.

	Baseline (1)	Crisis (2)	Tightening (3)	Loosening (4)
Deposit ratio	0.099** (0.039)	0.155 (0.101)	-0.140 (0.157)	0.149*** (0.045)
Deposit ratio X Reserve requirements	-0.192*** (0.070)	<b>-0.367**</b> <b>(0.187)</b>	0.155 (0.290)	<b>-0.201***</b> <b>(0.068)</b>
Parent Controls	Yes	Yes	Yes	Yes
Branch Controls	Yes	Yes	Yes	Yes
Branch FE	Yes	Yes	Yes	Yes
Time X Municipality FE	Yes	Yes	Yes	Yes
Obs	145,944	48,648	24,324	72,972
R2	0.542	0.639	0.508	0.535

Standard errors in parentheses.

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

## Ownership dimension matters: State banks lead the pack.

	Baseline (1)	Domestic (2)	Foreign (3)	State-owned (4)	Private (5)
Deposit ratio	0.099** (0.039)	0.158*** (0.049)	0.008 (0.074)	0.148*** (0.055)	-0.073 (0.055)
Deposit ratio X Reserve requirements	-0.192*** (0.070)	<b>-0.281***</b> <b>(0.083)</b>	-0.213 (0.152)	<b>-0.243**</b> <b>(0.098)</b>	0.177 (0.134)
Branch FE	Yes	Yes	Yes	Yes	Yes
Quarter X Mun. FE	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes
Obs	145,944	128,280	7,296	65,760	53,424
R2	0.542	0.566	0.641	0.652	0.598

Standard errors in parentheses.

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

## Heterogeneity across banks: Further results

- ▶ **Intra-group dynamics:** During crisis times and for state-owned parent banks, credit growth of branches that are **less profitable** is more sensitive to a loosening of the policy.
- ▶ **Branch characteristics:** Branches that are more **liquidity-constrained themselves and are net borrowers** within their banking group are more affected by changes in the level of reserve requirements.
- ▶ **Parent characteristics:** Parent banks' **liquidity and capital structure** is of importance: Branches owned by liquidity-constrained and low-capitalized banks respond more to reserve requirements.

Tab

Tab

Tab

# Robustness Tests

- ▶ We conduct additional tests to control for **credit demand** and accumulating/ anticipatory **effects over time**. [Tab](#) [Tab](#)
- ▶ **Monetary policy** also responds to changes in economic conditions. Thus, we test whether we simply capture the bank lending channel of monetary policy by conducting a “horse race”. [Tab](#)
- ▶ We control for alternative **confounding factors** like exchange rate movements and sovereign yield spreads. [Tab](#) [Tab](#)
- ▶ We test whether the results prevail also at the **aggregate (municipality) level** and can confirm that the net effect is unequal to zero and not washed out by e.g. substitution effects. [Tab](#)



# Conclusion

## **Effects of reserve requirements applied to parent banks transmit to branches' credit supply:**

- ▶ However, this transmission depends on parent banks' reliance on targeted demand deposits: A higher demand deposit ratio leads to a stronger transmission.
- ▶ This holds especially during periods, in which reserve requirements have been loosened.

## **Bank traits approximating the availability of alternative funding sources explain our finding:**

- ▶ Branches are more responsive if they depend on intra-group liquidity and belong to state-owned, liquidity-constrained, low-capitalized parent banks.
- ▶ The aggregate outcome of reserve requirements is determined by heterogeneity of banks' responses!

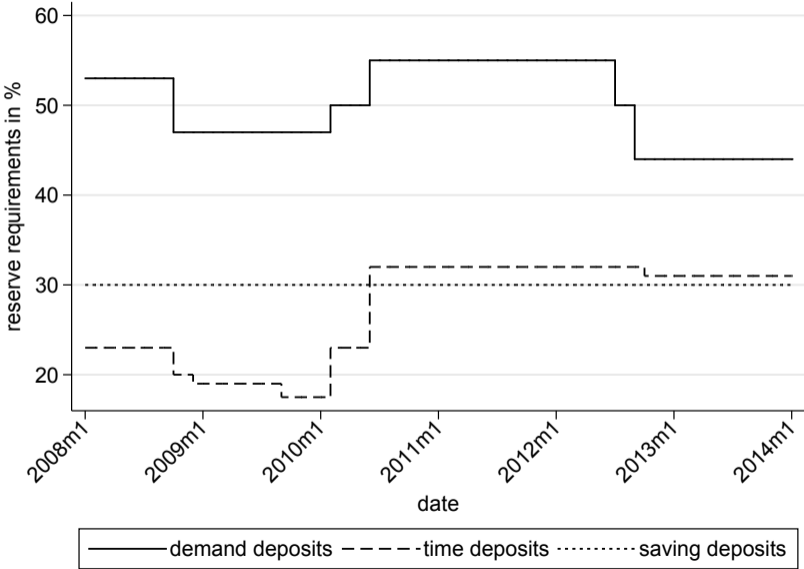
## Summary Statistics [Back](#)

	mean	median	sd	min	max
<b>Branch-level</b>					
$\Delta$ Credit	0.030	0.022	0.130	-0.274	0.523
Log(Assets)	3.166	3.000	1.312	0.518	7.551
Liquidity ratio	0.015	0.009	0.015	0.000	0.084
Deposit ratio	0.137	0.120	0.086	0.006	0.440
RoA	0.009	0.008	0.007	-0.005	0.033
$\Delta$ Demand	0.027	0.021	0.077	-0.771	0.221
<b>Parent-level</b>					
Deposit ratio	0.035	0.017	0.046	0.000	0.236
Log(Assets)	7.798	7.712	2.290	3.641	12.919
Liquidity ratio	0.004	0.000	0.006	0.000	0.030
Capital ratio	0.156	0.136	0.096	0.023	0.499
Adm. cost / total cost	0.004	0.003	0.005	0.000	0.036
Public sector deposit ratio	0.003	0.000	0.016	0.000	0.192
<b>Country-level</b>					
Reserve requirements	0.497	0.492	0.042	0.440	0.550
$\Delta$ SELIC rate	-0.001	0.000	0.010	-0.023	0.013
$\Delta$ M0	0.022	0.017	0.040	-0.037	0.117
Exchange rate	1.896	1.801	0.226	1.594	2.316
Sovereign yield	0.120	0.123	0.014	0.093	0.156
Sovereign spread	2.338	2.206	0.680	1.638	4.243
$\Delta$ Foreign funding	0.014	-0.002	0.083	-0.170	0.204
Political uncertainty	131.261	133.567	45.553	62.962	275.073
<b>Municipality-level</b>					
$\Delta$ Agg. claims	0.024	0.029	0.090	-0.386	0.321
$\Delta$ Job creation	0.011	0.005	0.339	-1.394	1.557
$\Delta$ GDP	-0.067	0.006	0.248	-1.000	0.977
<b>Observations</b>	145,944				

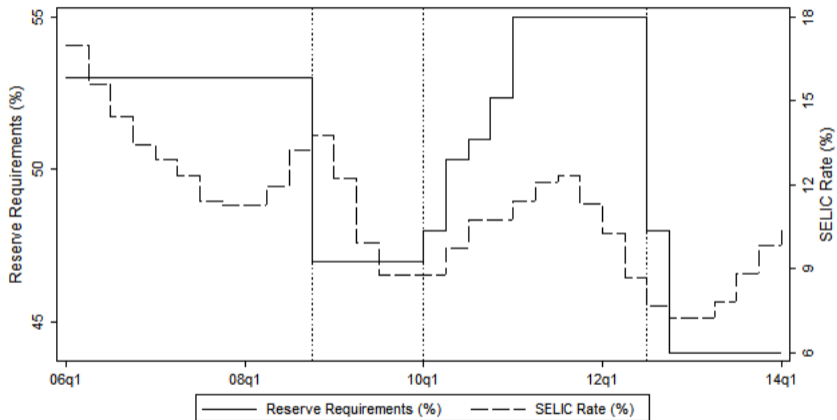
# The Recent Evolution of Reserve Requirements in Brazil

[Back-Data](#)

[Back-Macropru](#)

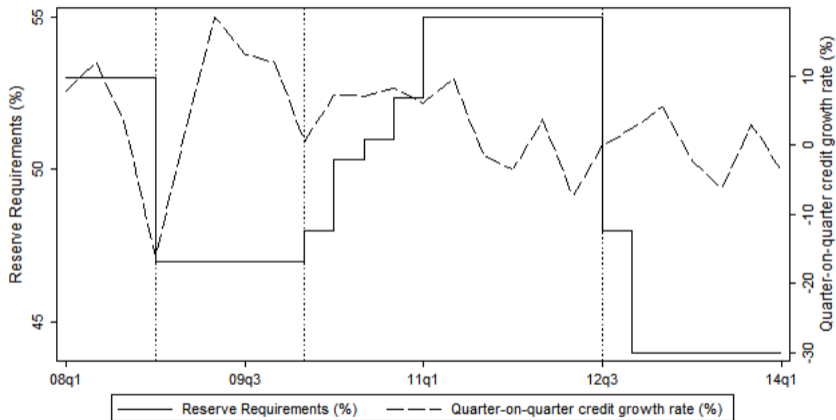


## Reserve Requirements and Monetary Policy Rate [Back](#)



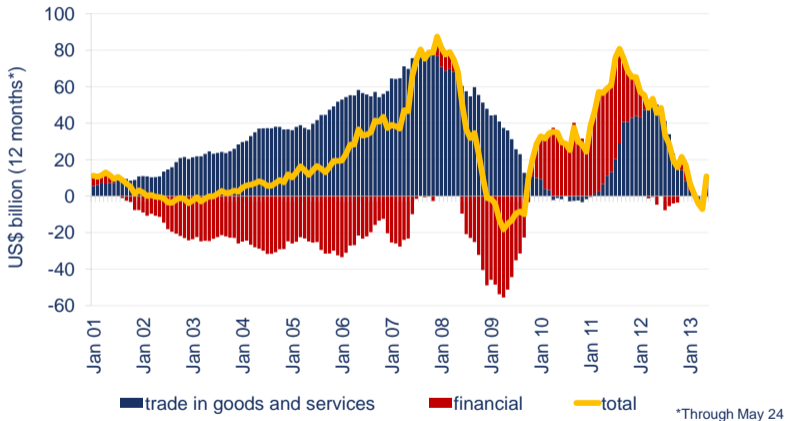
## Reserve Requirements and Credit Supply (Averaged Quarterly Change)

[Back](#)

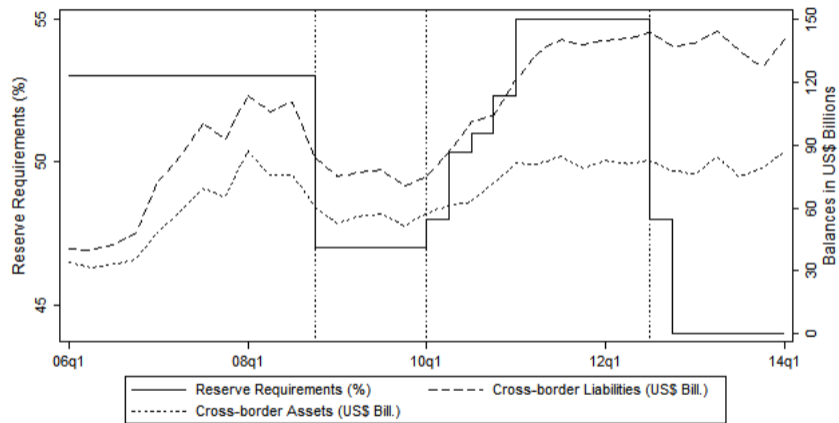


# BoP Flows Boosted by High Liquidity

High liquidity in global markets and unprecedented low levels of interest rates in AEs led to excessive capital flows into Emerging Economies (EMEs)



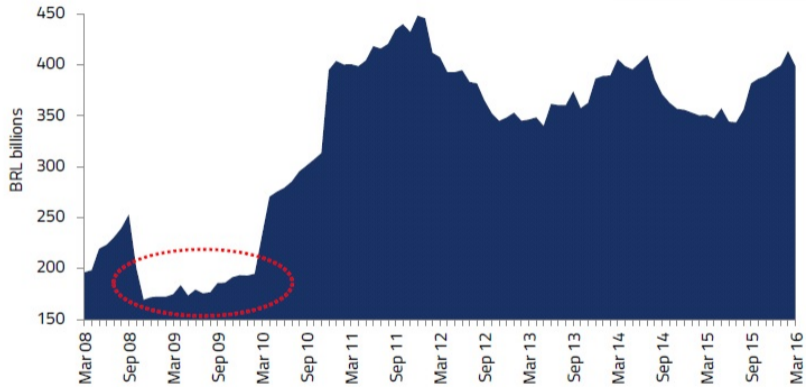
## Reserve Requirements and Brazilian Banks' Cross-Border Exposures [Back](#)



# Total Reserves of Banks at Brazilian Central Bank

[Back-Data](#)

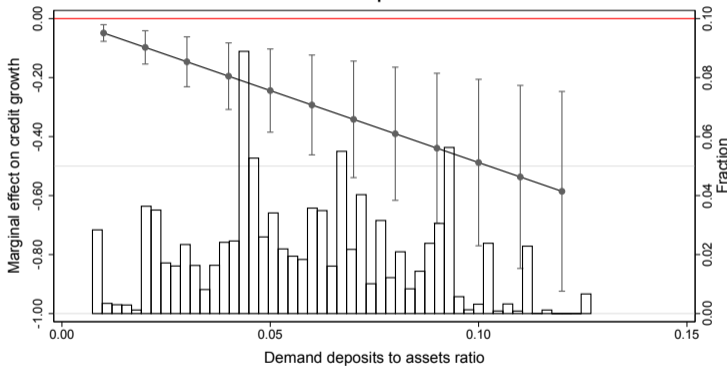
[Back-Macropru](#)





# Marginal Effect of Reserve Requirements on Branch Credit Growth Conditional on Parent Banks' Deposit Share

[Back](#)



## Deposit Share of Parent Banks for Sub-Samples

Parent banks sub-samples	mean	median	sd	min	max
Foreign	0.022	0.013	0.028	0.000	0.126
Domestic	0.039	0.019	0.050	0.000	0.236
State-owned	0.095	0.086	0.061	0.005	0.236
Private	0.023	0.013	0.030	0.000	0.229
High liquid assets	0.129	0.097	0.069	0.041	0.236
Low liquid assets	0.028	0.015	0.034	0.000	0.229
High capital ratio	0.025	0.014	0.032	0.000	0.229
Low capital ratio	0.057	0.039	0.060	0.000	0.236
Total	0.035	0.017	0.046	0.000	0.236

[Back - Data](#)[Back - Identification](#)

## Baseline Table with Controls Back

	Baseline (1)	Interaction (2)	Clustered SE (3)	Parent (4)	Controls (5)	TimexMun FE (6)	Branch (7)
Reserve requirements	-0.220*** (0.008)	-0.126*** (0.011)					
Deposit ratio		0.098*** (0.007)	0.052 (0.036)	0.094*** (0.006)	0.097*** (0.006)	0.099** (0.039)	-0.014 (0.130)
Deposit ratio X Reserve requirements		-0.181*** (0.014)	-0.114* (0.068)	-0.180*** (0.011)	-0.195*** (0.011)	-0.192*** (0.070)	0.162 (0.256)
<b>Parent controls</b>							
Log(Assets)				0.061*** (0.008)	0.125*** (0.009)	0.133*** (0.047)	0.112*** (0.041)
Liquidity ratio				0.027*** (0.002)	0.025*** (0.002)	0.026*** (0.008)	0.026*** (0.008)
Capital ratio				0.101*** (0.004)	0.101*** (0.004)	0.101*** (0.030)	0.098*** (0.030)
Adm. costs / total costs				-0.033*** (0.005)	-0.028*** (0.005)	-0.030 (0.022)	-0.024 (0.023)
<b>Branch controls</b>							
Log(Assets)					-0.058*** (0.003)	-0.061*** (0.012)	-0.060*** (0.012)
Liquidity ratio					0.842*** (0.053)	0.877*** (0.082)	0.867*** (0.082)
Deposit ratio					0.052*** (0.007)	0.066*** (0.019)	
RoA					-32.286*** (12.379)	-27.208** (13.688)	-27.402** (13.597)
Branch FE	No	No	Yes	Yes	Yes	Yes	Yes
Quarter FE	No	No	Yes	Yes	Yes	Yes	Yes
Quarter X Mun. FE	No	No	No	No	No	Yes	Yes
Obs	145,944	145,944	145,944	145,944	145,944	145,944	145,944
R2	0.005	0.007	0.369	0.375	0.383	0.542	0.542

## Robustness - Credit Demand Back

	Credit demand				
	Baseline		Demand control		Within
	full FE	partial FE	partial FE	full FE	state banks
	(1)	(2)	(3)	(4)	(5)
Deposit ratio	0.099** (0.039)	0.097*** (0.035)	0.097*** (0.035)	0.097*** (0.037)	0.148*** (0.055)
Deposit ratio X Reserve requirements	-0.192*** (0.070)	-0.195*** (0.061)	-0.196*** (0.062)	-0.178*** (0.069)	-0.243** (0.098)
$\Delta$ Demand			0.020*** (0.007)	-0.331*** (0.042)	
Branch FE	Yes	Yes	Yes	Yes	Yes
Quarter FE	Yes	Yes	Yes	Yes	Yes
Mun. FE	Yes	Yes	Yes	Yes	Yes
Quarter X Mun. FE	Yes	No	No	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes
Obs	145,944	145,944	145,944	145,944	65,760
R2	0.542	0.383	0.383	0.605	0.652

## Robustness - Time Effects [Back](#)

	Cumulative/ anticipated effect				
	Baseline (1)	Cumulative effect partial FE (2)	Cumulative effect full FE (3)	Lead of reserve policy $RR_{t+1}$ (4)	Lead of reserve policy $Int_{t+1}$ (5)
Deposit ratio	0.099** (0.039)	0.112** (0.046)	0.116** (0.055)	0.093 (0.066)	0.067 (0.065)
Deposit ratio X Reserve requirements	-0.192*** (0.070)	-0.185** (0.084)	-0.190** (0.100)	-0.191 (0.128)	-0.173 (0.127)
Branch FE	Yes	Yes	Yes	Yes	Yes
Quarter FE	Yes	Yes	Yes	Yes	Yes
Mun. FE	Yes	Yes	Yes	Yes	Yes
Quarter X Mun. FE	Yes	No	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes
Obs	145,944	145,944	145,944	139,863	139,863
R2	0.542	0.384	0.544	0.541	0.541

# Monetary Policy [Back](#)

Type of model:	Horse race:			Triple interaction:	
	Baseline (1)	M0 (2)	SELIC (3)	M0 (4)	SELIC (5)
Deposit ratio	0.099** (0.039)	0.098*** (0.038)	0.097*** (0.038)	0.077** (0.037)	0.097*** (0.037)
Deposit ratio X Reserve requirements	-0.192*** (0.070)	-0.194*** (0.070)	-0.185*** (0.067)	-0.151** (0.070)	-0.185*** (0.067)
Deposit ratio X Monetary policy		0.107 (0.126)	-0.563* (0.341)	1.743 (1.325)	0.235 (4.116)
Dep. ratio X RR X MP				-3.300 (2.564)	-1.613 (8.163)
Branch FE	Yes	Yes	Yes	Yes	Yes
Quarter FE	Yes	Yes	Yes	Yes	Yes
Quarter X Mun. FE	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes
Obs	145,944	145,944	145,944	145,944	145,944
R2	0.542	0.543	0.543	0.543	0.543

## Macroprudential and Country-Level Variables [Back](#)

	Macro confounders				
	Baseline (1)	Ex. rate (2)	Sov. yield (3)	Sov. spread (4)	Foreign funding (5)
Deposit ratio	0.099** (0.039)	0.103*** (0.038)	0.127*** (0.046)	0.119** (0.046)	0.094** (0.037)
Deposit ratio X Reserve requirements	-0.192*** (0.070)	-0.200*** (0.069)	-0.174** (0.078)	-0.210*** (0.069)	-0.182*** (0.065)
Deposit ratio X Macro confounder		0.018 (0.027)	-0.275 (0.325)	-0.004 (0.006)	-0.024 (0.046)
Branch FE	Yes	Yes	Yes	Yes	Yes
Quarter FE	Yes	Yes	Yes	Yes	Yes
Quarter X Mun. FE	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes
Obs	145,944	145,944	145,944	145,944	145,944
R2	0.542	0.543	0.543	0.543	0.543

## Political Confounders [Back](#)

	Political confounders				
	Baseline	Political uncertainty	RR on foreign fund.	Tax on foreign fun.	Public dep. ratio
	(1)	(2)	(3)	(4)	(5)
Deposit ratio	0.099** (0.039)	0.099** (0.039)	0.099** (0.042)	0.099** (0.039)	0.096** (0.044)
Deposit ratio X Reserve requirements	-0.192*** (0.070)	-0.193*** (0.070)	-0.193** (0.077)	-0.192*** (0.070)	-0.183** (0.083)
Deposit ratio X Political confounder		-0.000 (0.000)	0.000 (0.005)	-0.000 (0.004)	
Public dep. ratio X Reserve requirements					-0.013 (0.060)
Branch FE	Yes	Yes	Yes	Yes	Yes
Quarter FE	Yes	Yes	Yes	Yes	Yes
Quarter X Mun. FE	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes
Obs	145,944	145,944	145,944	145,944	145,944
R2	0.542	0.542	0.542	0.542	0.543



## Ownership - Sub-samples Back

	Baseline (1)	Domestic (2)	Foreign (3)	State-owned (4)	Private (5)
Deposit ratio	0.099** (0.039)	0.158*** (0.049)	0.008 (0.074)	0.148*** (0.055)	-0.073 (0.055)
Deposit ratio X Reserve requirements	-0.192*** (0.070)	-0.281*** (0.083)	-0.213 (0.152)	-0.243** (0.098)	0.177 (0.134)
<b>Parent controls</b>					
Log(Assets)	0.133*** (0.047)	0.201*** (0.059)	-0.031 (0.068)	0.216*** (0.062)	-0.018 (0.059)
Liquidity ratio	0.026*** (0.008)	0.027*** (0.008)	0.019 (0.021)	0.020** (0.009)	0.015 (0.012)
Capital ratio	0.101*** (0.030)	0.129*** (0.045)	0.122** (0.052)	0.126*** (0.039)	0.118*** (0.039)
Adm. costs / total costs	-0.030 (0.022)	-0.033 (0.026)	-0.061 (0.079)	-0.002 (0.033)	-0.020 (0.022)
<b>Branch controls</b>					
Log(Assets)	-0.061*** (0.012)	-0.077*** (0.018)	-0.023* (0.013)	-0.078*** (0.022)	-0.058*** (0.012)
Liquidity ratio	0.877*** (0.082)	0.842*** (0.082)	1.020 (0.720)	2.462*** (0.490)	1.326*** (0.120)
Deposit ratio	0.066*** (0.019)	0.071*** (0.021)	0.071 (0.050)	0.022 (0.023)	0.071*** (0.024)
RoA	-27.208** (13.688)	-47.694** (22.490)	-10.501 (7.752)	38.509* (20.544)	-50.899* (26.513)
Branch FE	Yes	Yes	Yes	Yes	Yes
Quarter X Mun. FE	Yes	Yes	Yes	Yes	Yes
Obs	145,944	128,280	7,296	65,760	53,424
R2	0.542	0.566	0.641	0.652	0.598

# Crisis Sample & State-Owned Banks: Intra-Group Dynamics

[Back](#)

Branch indicator:	RoA			Share in group assets	
	Baseline (1)	High (2)	Low (3)	High (4)	Low (5)
Deposit ratio	0.103 (0.084)	0.073 (0.094)	0.031 (0.080)	-0.020 (0.113)	0.629*** (0.046)
Deposit ratio X Reserve requirements	-0.307** (0.141)	-0.109 (0.161)	-0.252* (0.132)	-0.099 (0.190)	-0.992*** (0.064)
<b>Parent controls</b>					
Log(Assets)	0.654*** (0.235)	0.448** (0.209)	0.568* (0.287)	1.045*** (0.325)	0.870*** (0.110)
Liquidity ratio	-0.028** (0.013)	0.006 (0.012)	0.040* (0.023)	-0.037** (0.014)	-0.013 (0.014)
Capital ratio	0.588*** (0.166)	0.145 (0.107)	1.021*** (0.202)	0.743*** (0.190)	1.337*** (0.054)
Adm. costs / total costs	0.038 (0.056)	0.084** (0.035)	-0.019 (0.062)	0.021 (0.094)	0.012 (0.017)
<b>Branch controls</b>					
Log(Assets)	-0.078 (0.069)	-0.151*** (0.044)	-0.023 (0.101)	-0.173** (0.078)	-0.028 (0.086)
Liquidity ratio	5.687*** (1.506)	2.391 (1.488)	5.649** (2.814)	7.151** (2.731)	5.882** (2.734)
Deposit ratio	0.070 (0.045)	0.071 (0.049)	0.084 (0.083)	0.135** (0.064)	-0.047 (0.082)
RoA	9.534 (56.662)	-12.262 (32.276)	-183.920* (102.086)	21.258 (81.996)	-24.603 (84.488)
<b>Fixed Effects</b>					
Branch FE	Yes	Yes	Yes	Yes	Yes
Quarter FE	Yes	Yes	Yes	Yes	Yes
Mun. FE	Yes	Yes	Yes	Yes	Yes
Quarter X Mun. FE	Yes	Yes	Yes	Yes	Yes
<b>Summary Statistics</b>					
Obs	21,920	5,264	8,728	9,320	2,480
R2	0.731	0.800	0.735	0.690	0.855

## Branch and Parent Constraints [Back](#)

	Branches characteristics				Parent characteristics			
	Liquid assets ratio		Internal funding ratio		Liquid assets ratio		Capital ratio	
	High (1)	Low (2)	High (3)	Low (4)	High (5)	Low (6)	High (7)	Low (8)
Deposit ratio	0.058 (0.049)	<b>0.127***</b> (0.041)	0.047 (0.037)	<b>0.113**</b> (0.046)	0.053 (0.084)	<b>0.155***</b> (0.052)	0.002 (0.055)	<b>0.107**</b> (0.048)
Deposit ratio X Reserve requirements	-0.134 (0.090)	<b>-0.234***</b> (0.073)	-0.121* (0.071)	<b>-0.225***</b> (0.084)	-0.021 (0.110)	<b>-0.290***</b> (0.092)	0.028 (0.100)	<b>-0.218**</b> (0.088)
Branch FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Quarter X Mun. FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs	37,608	97,872	18,792	101,712	23,040	98,328	13,800	96,744
R2	0.578	0.588	0.595	0.552	0.678	0.589	0.612	0.571

## Aggregate Effects at the Municipality Level Back

	Asset-based market shares		Credit-based market shares	
	Time FE (1)	Time and region FE (2)	Time FE (3)	Time and region FE (4)
Deposit ratio	0.112*** (0.023)	0.019 (0.029)	0.105*** (0.021)	0.015 (0.027)
Deposit ratio X Reserve requirements	-0.245*** (0.046)	-0.139*** (0.052)	-0.224*** (0.042)	-0.129*** (0.048)
<b>Parent controls</b>				
Log(Assets)	-0.009** (0.004)	-0.077*** (0.015)	-0.001 (0.003)	-0.056*** (0.012)
Liquidity ratio	0.053*** (0.014)	0.049*** (0.015)	0.045*** (0.014)	0.039*** (0.015)
Capital ratio	-0.023** (0.010)	-0.030 (0.038)	-0.005 (0.009)	0.024 (0.033)
Adm. costs / total costs	0.051*** (0.012)	0.018 (0.022)	0.058*** (0.012)	0.018 (0.022)
<b>Branch controls</b>				
Log(Assets)	0.007*** (0.003)	-0.069*** (0.013)	0.006** (0.003)	-0.072*** (0.013)
Liquidity ratio	0.012*** (0.002)	0.003 (0.005)	0.013*** (0.002)	0.004 (0.005)
Deposit ratio	0.005** (0.002)	0.003 (0.005)	0.004** (0.002)	0.005 (0.005)
RoA	-0.007** (0.003)	-0.023*** (0.007)	-0.008** (0.003)	-0.023*** (0.007)
Quarter FE	Yes	Yes	Yes	Yes
Municipality FE	No	Yes	No	Yes
Obs	38,615	38,615	38,615	38,615
R2	0.651	0.670	0.651	0.671

## Credit Demand Proxies by Deposit Ratio

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Deposit ratio percentile:	<25th (1)	>25th <50th (2)	>50th <75th (3)	>75th (4)
<b>Δ Agg. claims</b>				
mean	-0.007	0.018	0.025	0.024
s.d.	0.160	0.121	0.087	0.089
diff.	-0.026	-0.007	0.001	0.032
test	-0.127	-0.045	0.006	0.172
<b>Δ Job creation</b>				
mean	0.012	0.019	0.010	0.011
s.d.	0.103	0.342	0.317	0.351
diff.	-0.007	0.009	-0.001	-0.001
test	-0.021	0.019	-0.001	-0.002
<b>Δ GDP</b>				
mean	-0.112	-0.100	-0.102	-0.100
s.d.	0.372	0.356	0.363	0.356
diff.	-0.011	0.002	-0.002	0.012
test	-0.022	0.004	-0.005	0.023
<b>Δ Demand</b>				
mean	0.020	0.032	0.020	0.030
s.d.	0.074	0.068	0.054	0.066
diff.	-0.012	0.012	-0.010	0.010
test	-0.119	0.134	-0.113	0.101

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