

Internal Liquidity Management and Local Credit Provision

Nicholas Coleman

Federal Reserve Board

Ricardo Correa

Federal Reserve Board*

Leo Feler

Johns Hopkins University

Jason Goldrosen

Harvard University

December 2015

* These slides and associated remarks represent only the author's current opinions, not those of the Board of Governors of the Federal Reserve System or of any other person associated with the Federal Reserve System.

Research questions

1. How do banks manage liquidity within their organizations?

Research questions

1. How do banks manage liquidity within their organizations?
2. Does this change after suffering a liquidity shock?

Research questions

1. How do banks manage liquidity within their organizations?
2. Does this change after suffering a liquidity shock?
3. What is the impact of liquidity management within the banking organization on bank lending and the real economy?

Contributions

- We use micro-level data from Brazil that allows us to track net internal lending for branches of Brazilian banks at the municipality level on a monthly basis.

Contributions

- We use micro-level data from Brazil that allows us to track net internal lending for branches of Brazilian banks at the municipality level on a monthly basis.
- We test for the effect of liquidity management on lending at the municipality level. Do banks pick “winners” and “losers”?

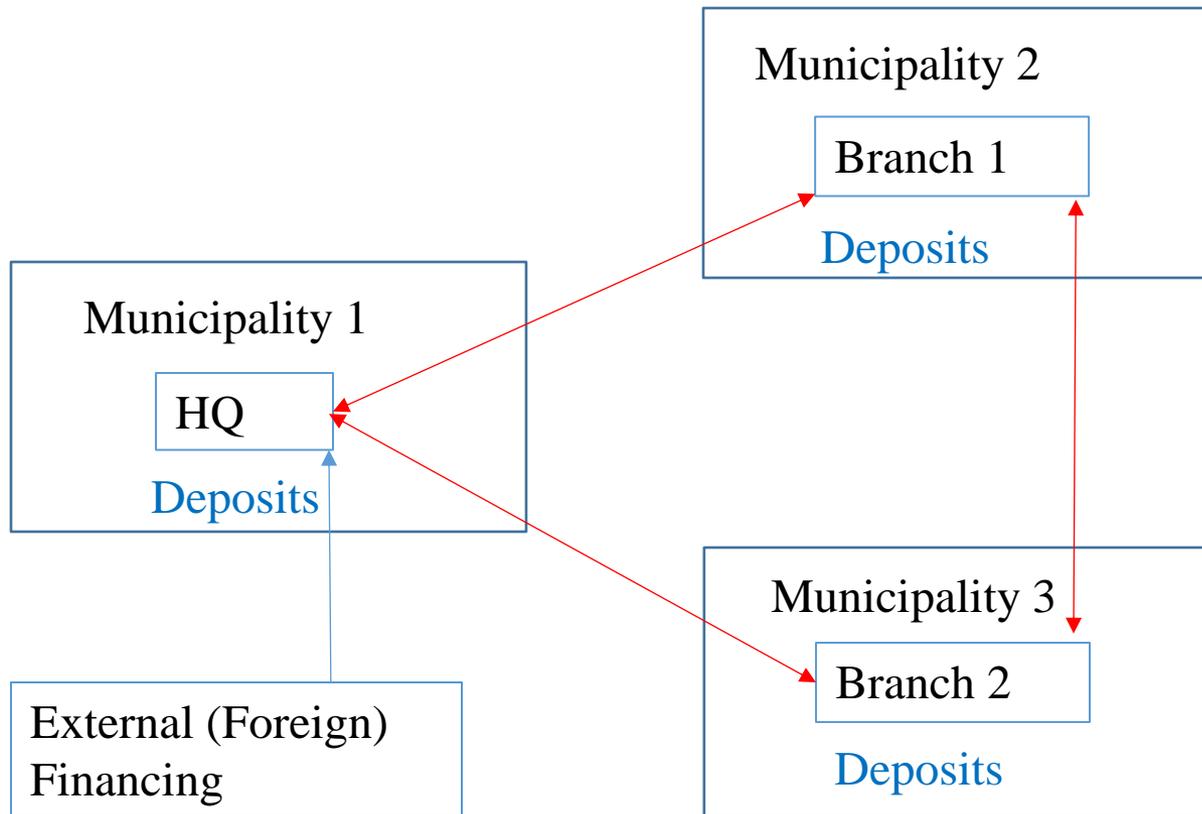
Contributions

- We use micro-level data from Brazil that allows us to track net internal lending for branches of Brazilian banks at the municipality level on a monthly basis.
- We test for the effect of liquidity management on lending at the municipality level. Do banks pick “winners” and “losers”?
- We assess whether banks with different types of owners manage their internal liquidity in different ways.

Contributions

- We use micro-level data from Brazil that allows us to track net internal lending for branches of Brazilian banks at the municipality level on a monthly basis.
- We test for the effect of liquidity management on lending at the municipality level. Do banks pick “winners” and “losers”?
- We assess whether banks with different types of owners manage their internal liquidity in different ways.
- We can also test whether changes in liquidity management lead to heterogeneous real economic outcomes across municipalities.

Internal liquidity management



Internal liquidity management

- Calculate the net due to position for each locality for each bank and month.
- Net due to = $\frac{\text{intrabank liabilities} - \text{intrabank assets}}{\text{total assets}}$

Internal liquidity management

- Calculate the net due to position for each locality for each bank and month.
- Net due to = $\frac{\text{intrabank liabilities} - \text{intrabank assets}}{\text{total assets}}$
- If net due to is positive for a given locality, then:
 - intrabank liabilities > intrabank assets
 - locality is a **net borrower** within the banking organization

Internal liquidity management

- Calculate the net due to position for each locality for each bank and month.
- Net due to = $\frac{\text{intrabank liabilities} - \text{intrabank assets}}{\text{total assets}}$
- If net due to is positive for a given locality, then:
 - intrabank liabilities > intrabank assets
 - locality is a **net borrower** within the banking organization
- If net due to is negative for a given locality, then:
 - intrabank liabilities < intrabank assets
 - locality is a **net lender** within the banking organization

Data

- **Disaggregated locality-level banking data:**
 - Comprehensive balance sheet and income statement information for the universe of bank branches in Brazil.
 - Aggregated across all branches for a single bank in a particular municipality.
 - Available through the Central Bank of Brazil at a monthly frequency between 2011 and 2014.
- **Consolidated banking data:**
 - Comprehensive balance sheet and income statement information for universe of [commercial banks, etc...] in Brazil.
 - Data are available through the Central Bank of Brazil at a monthly frequency between 1994 and 2014.

Sample cut of data:

Bank	Locality	Branches	Month	Year	Full Balance Sheet Data
Banco do Brasil	Rio de Janeiro	30	1	2012	...
Itau	Rio de Janeiro	25	1	2012	...
Banco do Brasil	Sao Paolo	45	1	2012	...
Bradesco	Sao Paolo	32	1	2012	...

Sample selection (size of bank and outliers)

- Time period: 2011Q1-2014Q4.
- Drop certain prominent banks: e.g., BNDES
- Drop observations where the aggregate net due to >1 percent total assets. One would expect these values to net out.
- Other adjustment: Winsorize variables at the 1 and 99 percentiles.

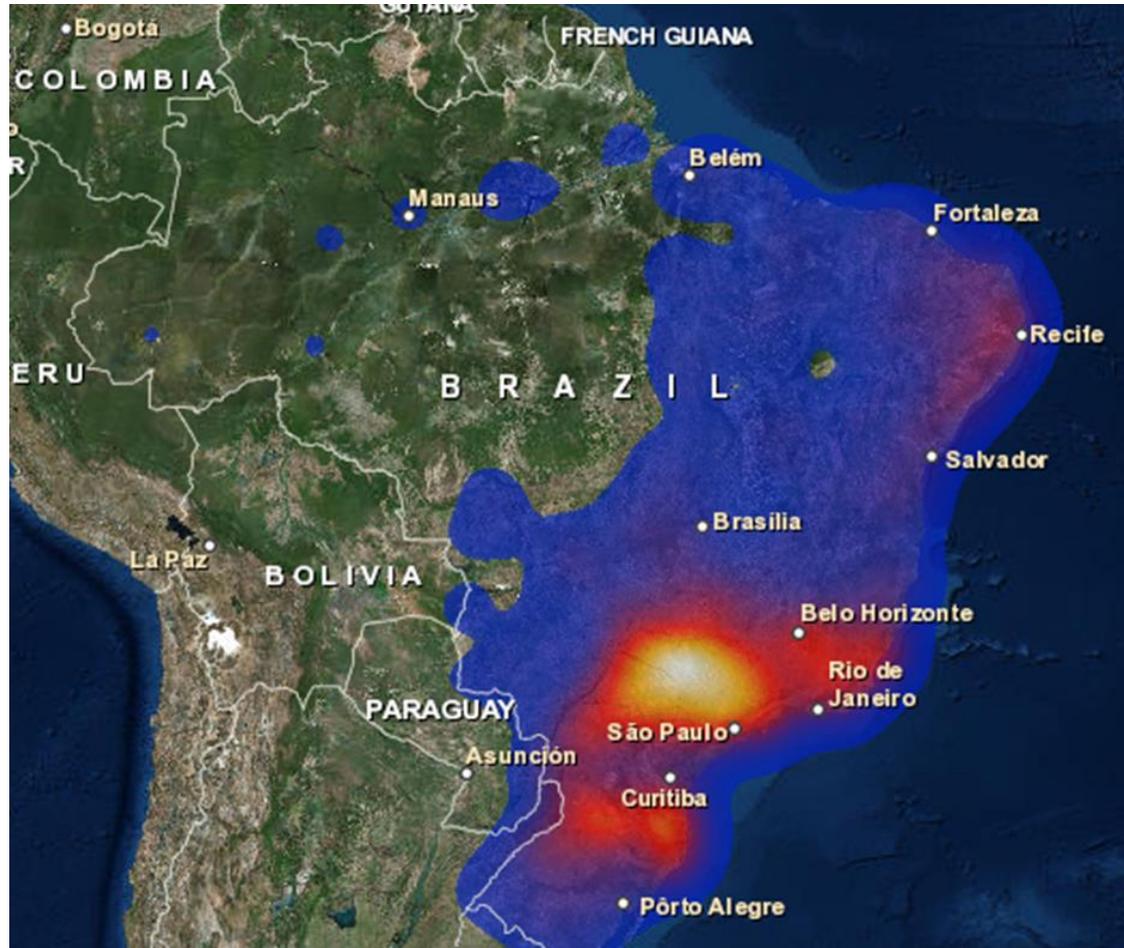
Types of banks

- **Government-owned**: 52% of sample assets, e.g., Banco do Brasil and Caixa Economic Federal.
- **Private domestic**: 29% of sample assets, e.g., Banco Bradesco, Itau/Unibanco.
- **Foreign-owned**: 19% of sample assets, e.g., HSBC Brasil, Santandar Brasil.

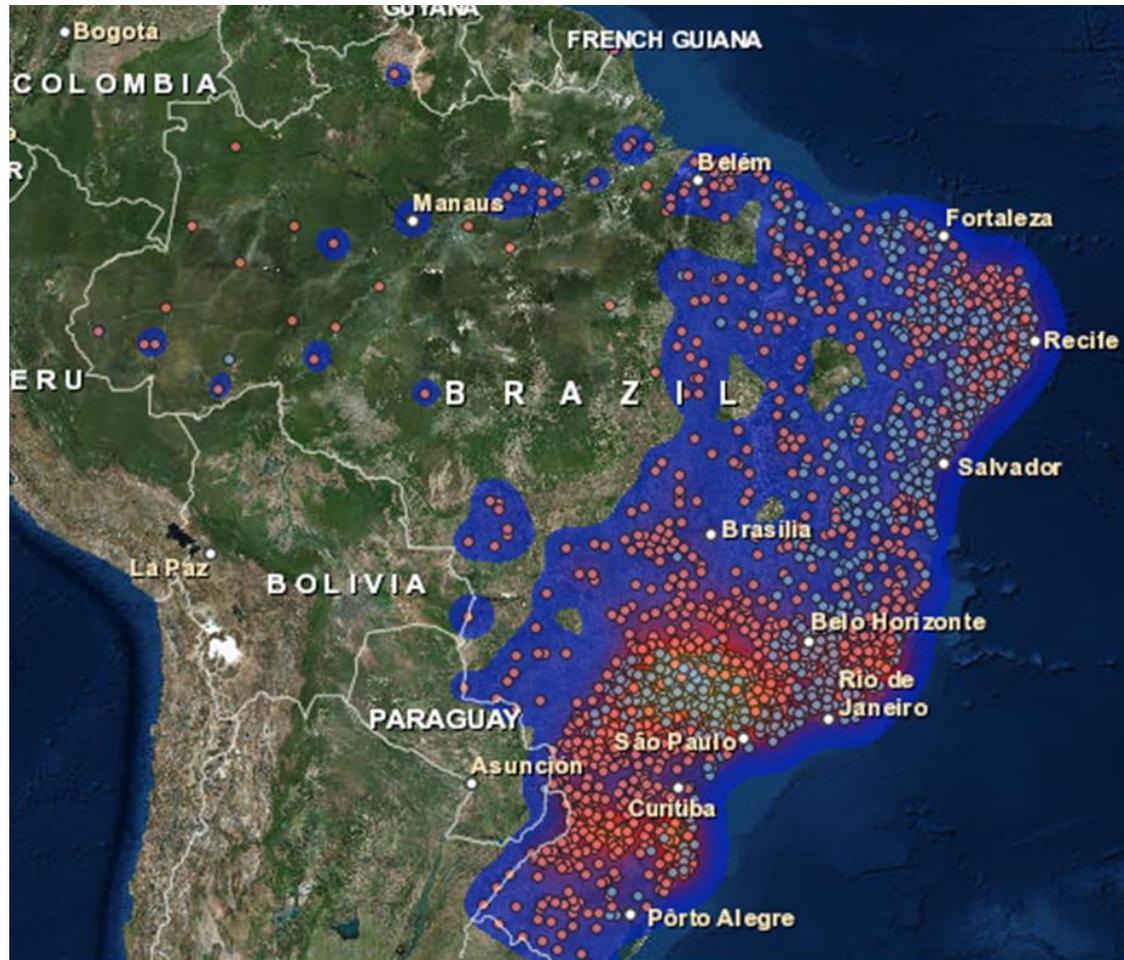
Research questions

1. How do banks manage liquidity within their organizations?
2. Does this change after suffering a liquidity shock?
3. What is the impact of liquidity management within the banking organization on bank lending and the real economy?

Locality per capita GMP

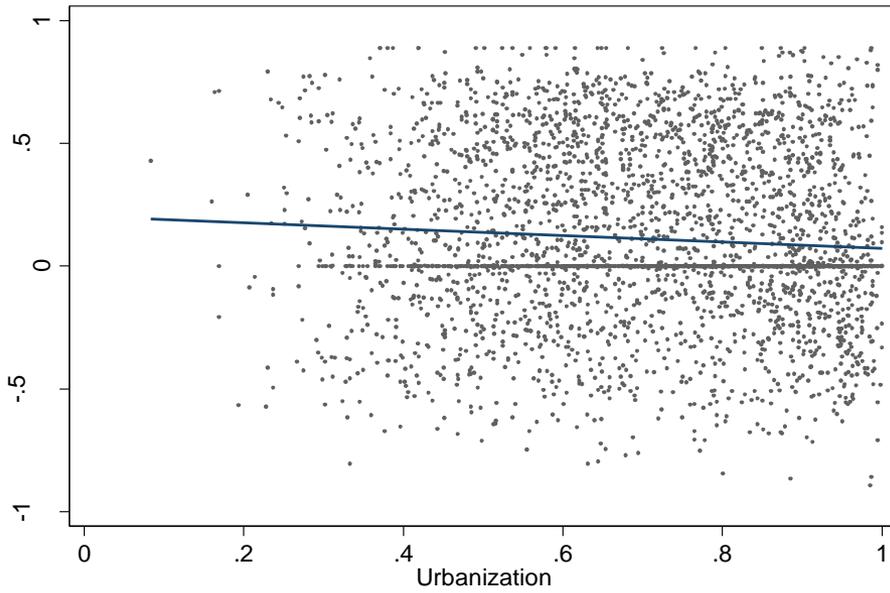


Net Lender vs. Borrower locations of Bank of Brazil branches.

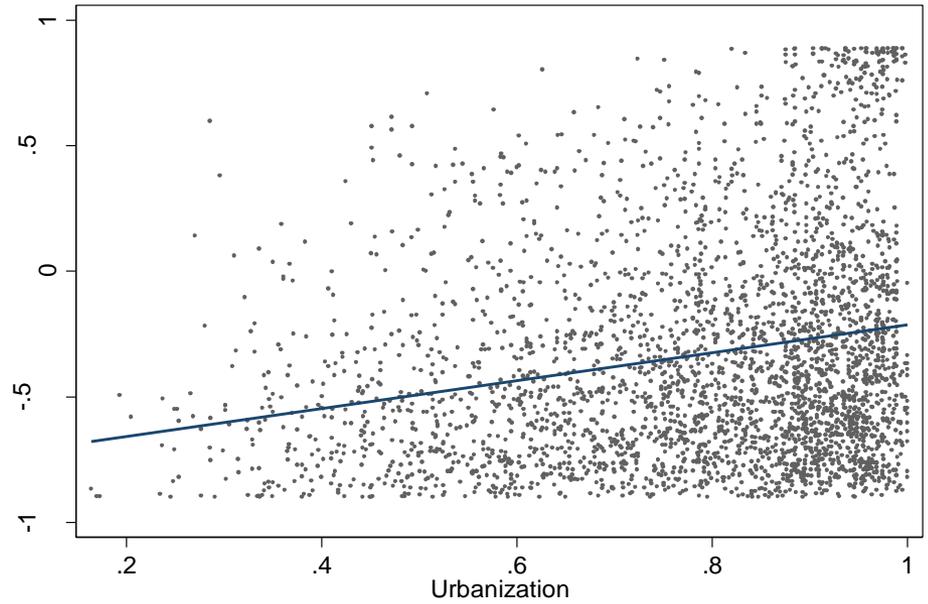


Raw data: Urbanization

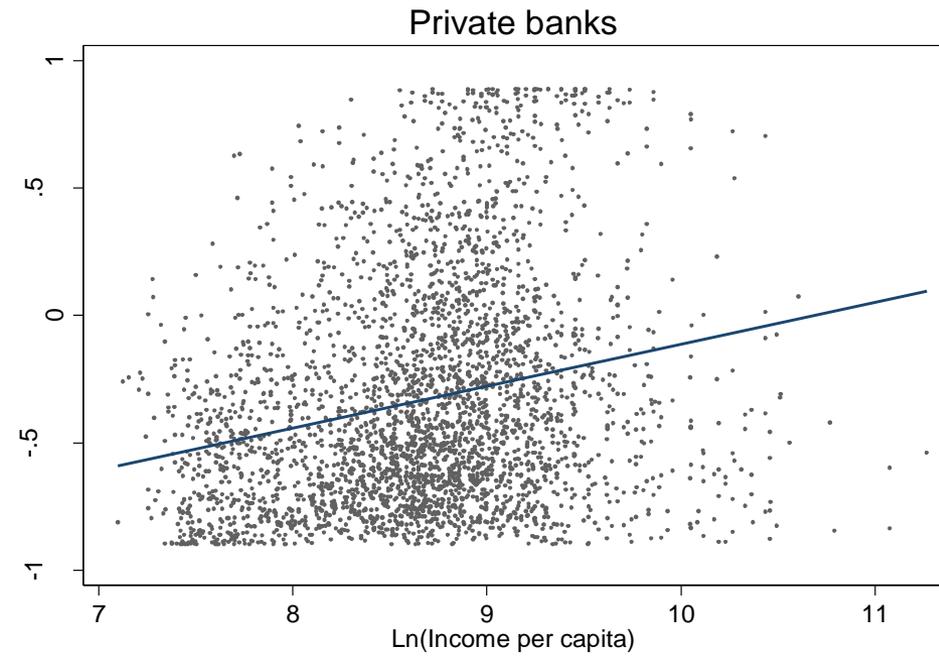
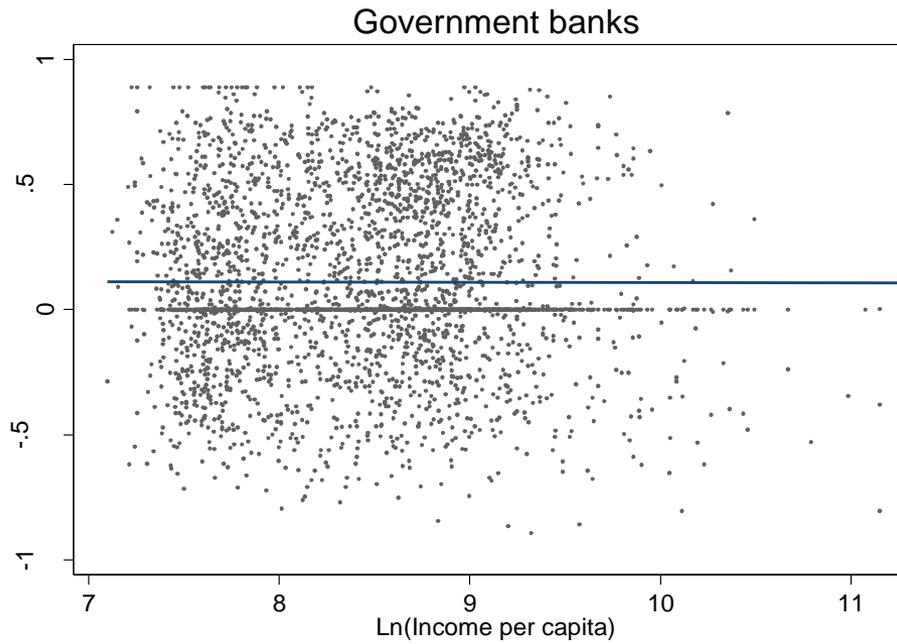
Government banks



Private banks

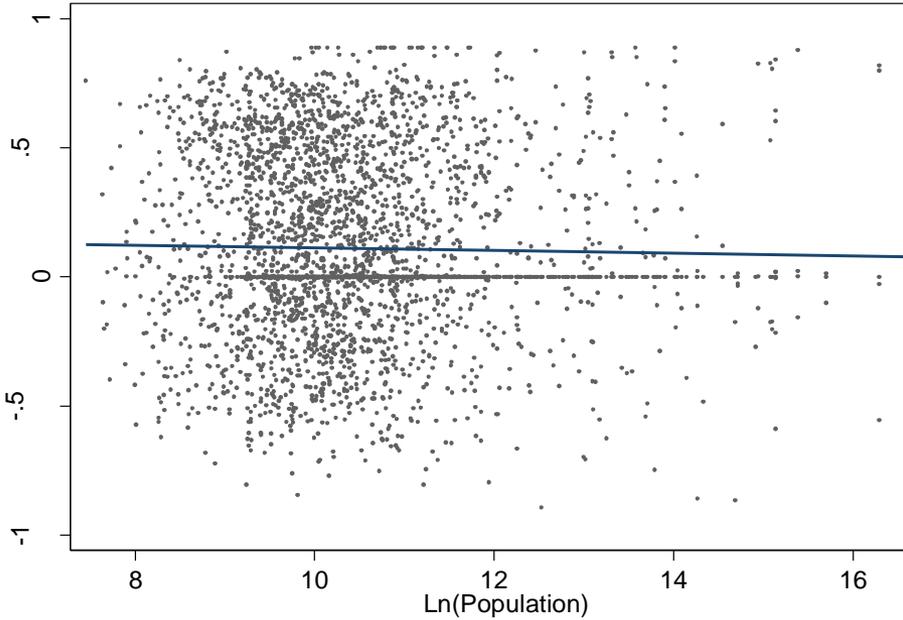


Raw data: Income per capita

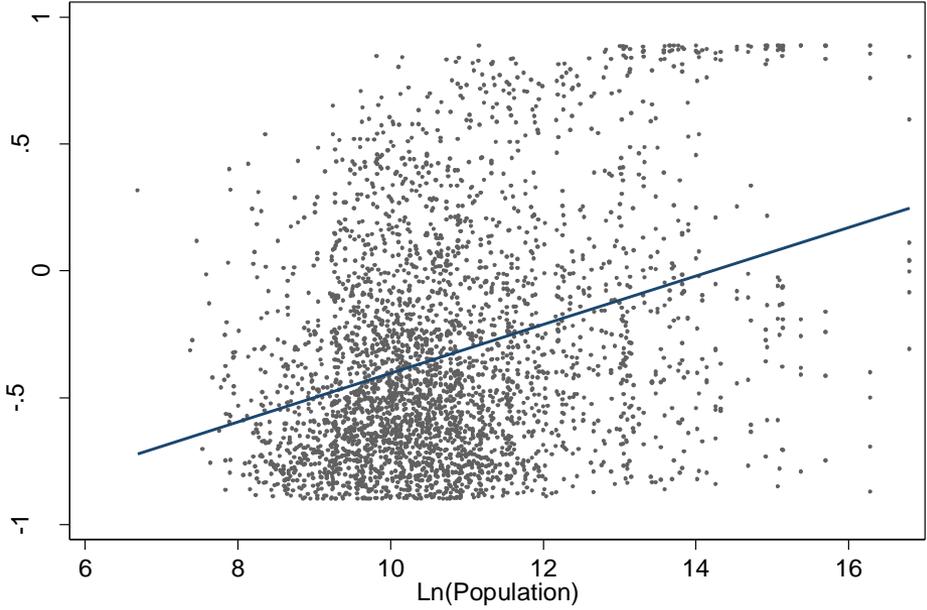


Raw data: Population

Government banks

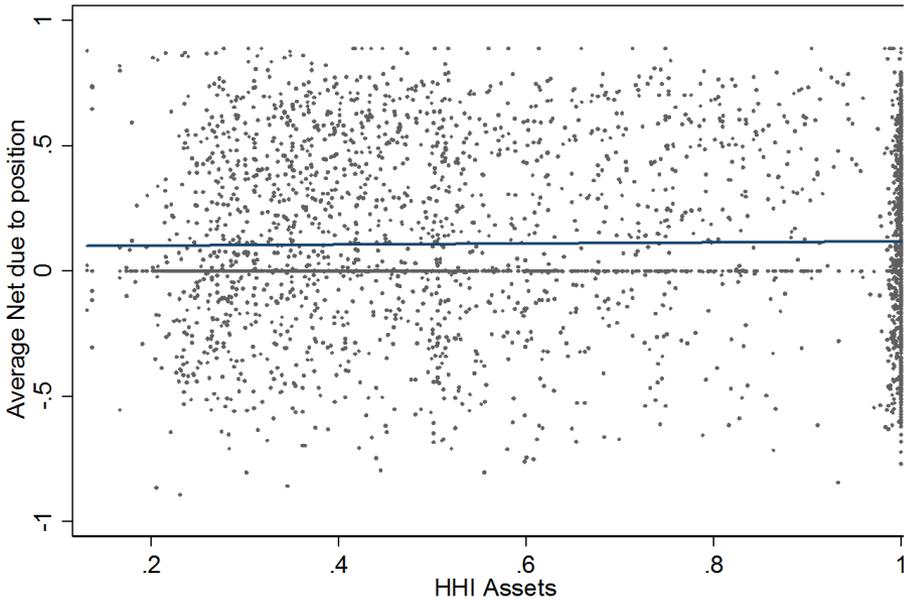


Private banks

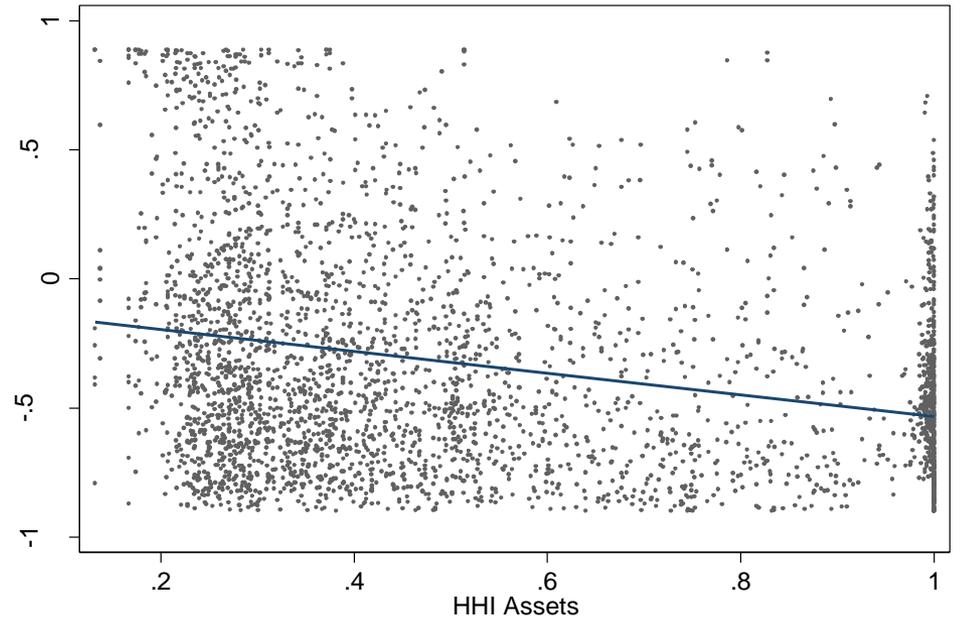


Raw data: Concentration

Government banks

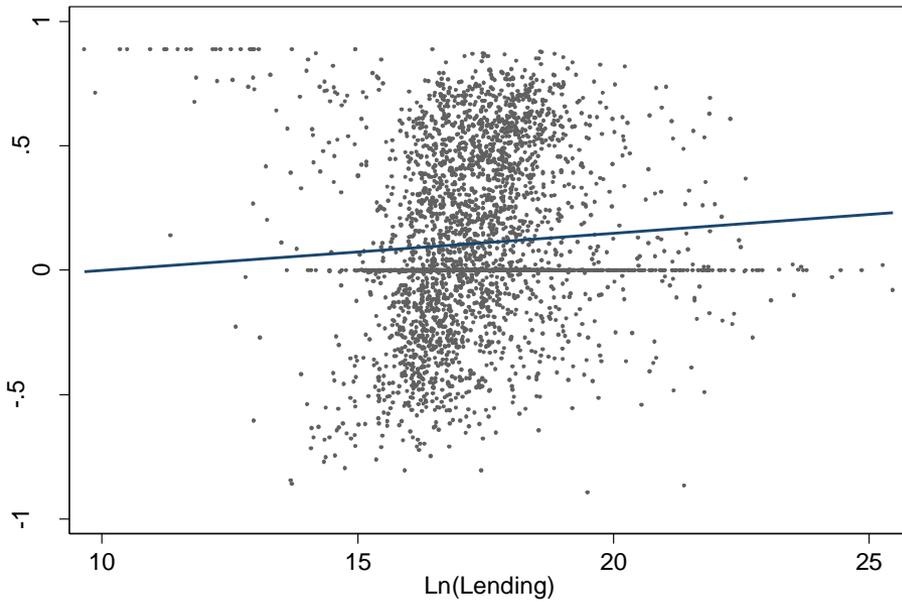


Private banks

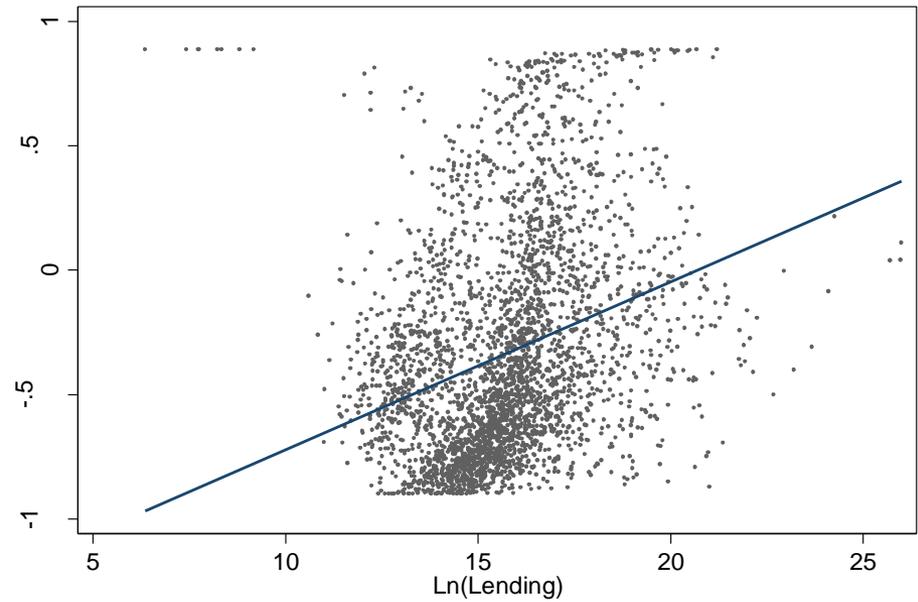


Raw data: Lending

Government banks



Private banks



Results:

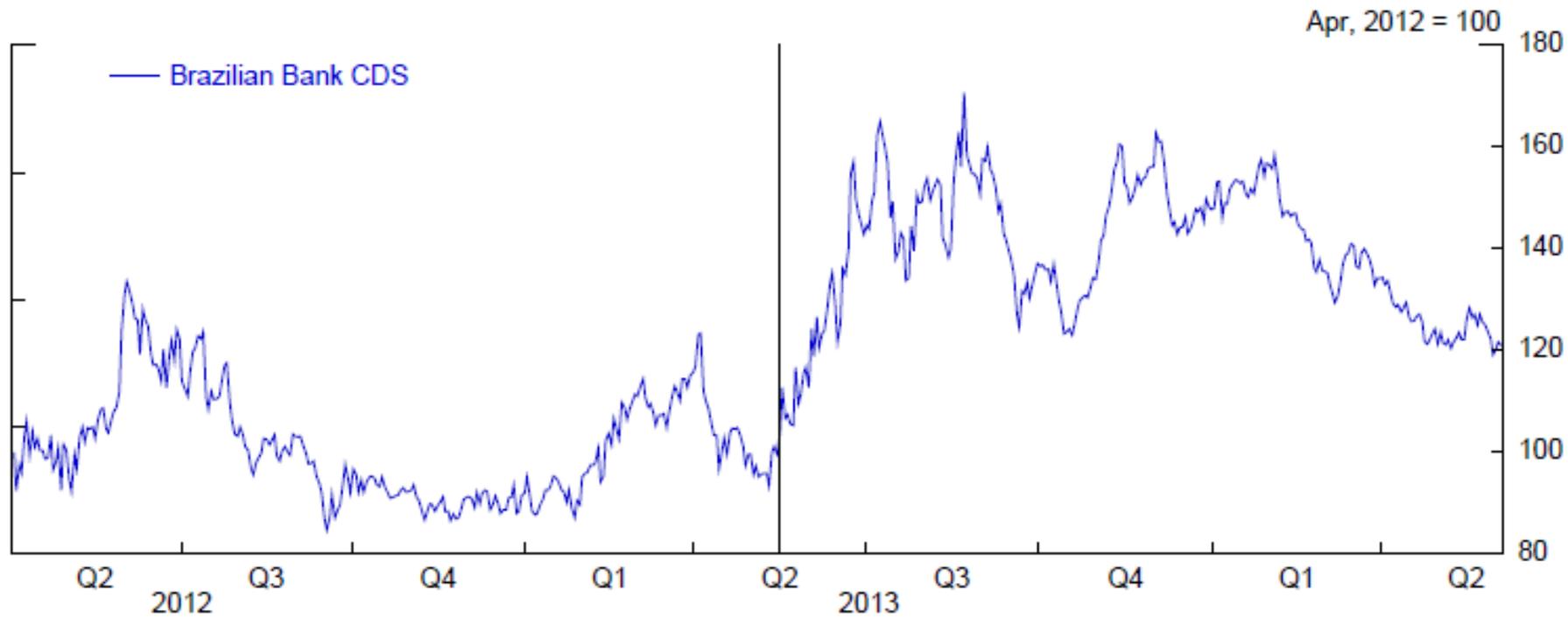
- Private banks allocate internal liquidity to areas that are more urban, rich, populous, and to areas with less banking sector competition whereas government banks do not.
- The relationship between internal liquidity and lending appears to be stronger in private banks than in government banks.

Research questions

1. How do banks manage liquidity within their organizations?
2. Does this change after suffering a liquidity shock?
3. What is the impact of liquidity management within the banking organization on bank lending and the real economy?

Taper Tantrum and Brazilian Bank CDS

Taper Tantrum



Methodology:

What is the effect of bank funding on internal funding flows to (and from) branches in a particular locality during a stress period?

$$y_{ijt} = \alpha + \beta_1 Post_t + \beta_2 Post \times ForeignFunded_{ijt} + \delta_i + \theta_t + \epsilon_{ijt}$$

where y_{ijt} is the net due to, for bank i , in locality t , in quarter t .

	(1)	(2)	(3)	(4)	(5)	(6)
	Net Due To	Net Due To	Net Due To	Net Due To	Net Due To	Net Due To
Post	22.356* (10.855)	29.698*** (6.778)				
Foreign FundedXPost	-49.648** (20.242)		-82.927*** (27.808)		-89.027** (36.244)	
Private BankXPost		-62.322*** (17.939)		-89.068*** (23.392)		-97.863*** (29.181)
R^2	0.83	0.83	0.89	0.89	0.90	0.90
N	103264	103264	103264	103264	103264	103264
<u>Fixed Effects:</u>						
Bank	✓	✓	✓	✓	✓	✓
City			✓	✓		
Quarter	✓	✓				
Time			✓	✓		
CityXTime					✓	✓

	(1)	(2)	(3)	(4)	(5)	(6)
	Net Due To					
Post	-14.696 (15.875)	37.062*** (7.896)	36.980*** (7.911)			
Headquarters	-521.909*** (124.052)	-549.733*** (124.927)	-557.644*** (132.970)	-538.891*** (147.759)	-561.586*** (152.674)	-549.761*** (164.050)
HeadquartersXPost	-33.826 (31.599)	-33.316 (26.847)	-14.886 (35.967)	13.234 (56.195)	2.548 (54.103)	-25.500 (46.012)
Private BankXPost		-70.634*** (18.430)	-70.520*** (18.548)		-97.718*** (29.267)	-98.015*** (29.493)
Private BankXHeadquarters		145.186 (96.465)	161.989 (108.021)		141.174 (121.053)	114.249 (145.667)
Private BankXHQRsXPost			-38.713 (53.685)			61.318 (127.526)
R^2	0.89	0.89	0.89	0.90	0.90	0.90
N	103264	103264	103264	103264	103264	103264
<u>Fixed Effects:</u>						
Bank	✓	✓	✓	✓	✓	✓
City	✓	✓	✓			
Quarter	✓	✓	✓			
CityXTime				✓	✓	✓

Research questions

1. How do banks manage liquidity within their organizations?
2. Does this change after suffering a liquidity shock?
3. What is the impact of liquidity management within the banking organization on bank lending and the real economy?

	(1)	(2)	(3)	(4)	(5)	(6)
	Ln(Lending)	Ln(Lending)	Ln(Lending)	Ln(Lending)	Ln(Lending)	Ln(Lending)
Post	-0.012 (0.038)	-0.025 (0.029)	-1.739 (874.303)	-1.936 (855.795)	-0.333 (325.213)	-0.331 (322.503)
Net Due To	1.659*** (0.181)	1.659*** (0.188)	1.417*** (0.149)	1.427*** (0.143)	1.497*** (0.163)	1.506*** (0.161)
PostXNet Due To	-0.058 (0.060)	-0.088 (0.072)	-0.067 (0.039)	-0.085* (0.047)	-0.097* (0.050)	-0.108** (0.043)
PostXForeign Funded	0.043 (0.074)		0.079 (0.078)		0.098 (0.085)	
PostXPrivate Bank		0.096 (0.084)		0.129 (0.085)		0.154 (0.093)
Net Due ToXForeign Funded	0.301*** (0.079)		0.271*** (0.086)		0.262* (0.140)	
Net Due ToXPrivate Bank		0.274*** (0.079)		0.240*** (0.076)		0.225* (0.124)
PostXNet Due ToXForeign Funded	0.188 (0.132)		0.189* (0.107)		0.204** (0.095)	
PostXNet Due ToXPrivate Bank		0.287* (0.158)		0.271** (0.121)		0.292** (0.101)
<i>N</i>	103118	103118	103118	103118	103118	103118
<u>Fixed Effects:</u>						
Bank	✓	✓	✓	✓	✓	✓
City			✓	✓		
Quarter	✓	✓				
Time			✓	✓		
CityXTime					✓	✓

Results:

1. Private banks allocate internal liquidity to areas that are more urban, rich, populous, and to areas with less banking sector competition whereas government banks do not. The relationship between internal liquidity and lending appears to be stronger in private banks than in government banks.

Results:

1. Private banks allocate internal liquidity to areas that are more urban, rich, populous, and to areas with less banking sector competition whereas government banks do not. The relationship between internal liquidity and lending appears to be stronger in private banks than in government banks.
2. Net due to positions increase during times of financial stress, but this increase is driven by domestically-funded banks, in other words, by banks that are relatively isolated from the stress.

Results:

1. Private banks allocate internal liquidity to areas that are more urban, rich, populous, and to areas with less banking sector competition whereas government banks do not. The relationship between internal liquidity and lending appears to be stronger in private banks than in government banks.
2. Net due to positions increase during times of financial stress, but this increase is driven by domestically-funded banks, in other words, by banks that are relatively isolated from the stress.
3. Private banks shift their internal funds during a stress period to richer areas. Lastly, we find that internal liquidity management plays an important role for banks' ability to lend, especially for those exposed to financial stress.