Asymmetric transmission of a bank liquidity shock

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Asymmetric transmission of a bank liquidity shock

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Motivation

• Financial crises usually entail shocks to the funding of banks
• Prior studies show that negative shocks to liquidity harm the supply of loans [Khwaja and Mian (AER, 08); Schnabl (JF, 12); Iyer et al (RFS, 14)]
• Paravisini (JF, 08) shows that financially constrained banks increase the supply of loans when they receive a positive shock to liquidity.
• Our study looks at the effects of a shock that transferred liquidity across banks:
  – Do changes in bank liquidity affect the loan supply? At the intensive or extensive margin? Or both?
  – If so, does the direction of the shock matter?
  – Are borrowing firms able to quickly switch across banks?
Related Literature

• **Transmission of liquidity shocks - empirical:** Khwaja and Mian (AER, 08); Paravisini (JF, 08); Imai and Takarabe (JJIE, 11); Schnabl (JF, 12); DeHaas and Van Horen (RFS, 13); Iyer et al. (RFS, forth); Ongena et al. (WP, 13).

• **Relationship banking:** Petersen and Rajan (JF, 94); Berger and Udell (JB, 95); Ongena (WP, 98); Bharath et al. (JFE, 08); Santikian (JFI, 14).

• **Too-big-to-fail:** O’Hara and Shaw (JF, 90); Brewer and Jagtiani (JFSR, 11); Gropp et al. (RFS, 11); Dam and Koetter (RFS, 12); Acharya et al. (WP, 13).

• **International transmission mechanisms:** Peek and Rosengreen (AER, 00); Cetorelli and Goldberg (JF, 2012); Popov and Udell (JIE, 2012).

• **The bank lending channel:** Bernanke and Blinder (AER, 92); Kashyap and Stein (AER, 00); Campello (JFE, 02); Ashcraft (JMCB, 06).
Preview of the Results

• A decrease in bank liquidity reduces lending supply [old]
  – 1% reduction in deposits causes a 0.4 - 0.8% decrease in lending supply;

• Passive (exogenous) increase in bank liquidity does not increase lending supply [NEW]
  – Firms are not able to readily switch from constrained to unconstrained banks [NEW]
  – Other financial constraints (e.g. bank capital) do not seem to play a role;

• Decrease in lending is more pronounced for small firms [old]
  – (not able to disentangle supply x demand)
Why Brazil?

• The international financial crisis triggered a depositor run in which small and medium banks lost deposits to the systemically important banks

• Oliveira et al. (RoF, forthcoming) find evidence that the run is better explained by the perception of a too-big-to-fail policy than by bank fundamentals (capital ratio, asset liquidity, FX exposure, geographic location, AND to the pre-crisis credit portfolio - type and maturity of loans, NPL ratio, delinquency, collateral)

• The run transferred liquidity across banks and allows the investigation of differential effects on the supply of loans

• Unique dataset provided by the Central Bank of Brazil, with detailed loan-level information
  - Bank to industry-size loans
Deposits and lending

Change in regular deposits

Months relative to the liquidity shock (September/08)

Change in loans

Positive liquidity shock
Negative liquidity shock

(ΔDeposits Jun to Dec/08)
Other markets

Domestic capital markets

- Primary equity issuance (blue)
- Primary bonds issuance (red)

BRL billions

Chart shows primary equity and bonds issuance from Jan-07 to Nov-09.
Other markets

Foreign funding rollover rate (nonfinancial firms)

Rollover rate = \( \frac{\text{Debt issued}}{\text{Debt amortization}} \)
Data

• Period: Dec/2007 to Dec/2009 (quarterly)
• Public information: banks’ financial statements
• Private data: Credit Info System (SCR)
  – All loans to nonfinancial firms above BRL 5,000 (~2,500 USD)
  – Aggregated at the industry-size level in each quarter (1,100+ industries, according to the Brazilian Institute for Statistics classification)
• 33,000+ observations / Loans to 1.0+ million firms in 1,100+ industries / 340+ billion BRL (~170 bil USD) in loans as of June/08
  – 98.5% of all non-earmarked loans to nonfinancial firms
  – 98.0% of all deposits in the Brazilian Financial System
Asymmetric effect

- Theory suggests that the direction and magnitude of the shock matters if:
  - Holding up to liquidity has larger benefits than increasing loans or establishing new lending relationships especially in times when aggregate risk is high
  - Borrowers face costs to find new banks; banks face costs to screen new borrowers

![Graph showing change in loans against change in liquidity with correct specification and misspecification lines.](image)
Model Specification

\[ \Delta \text{Loans}_{ij} = \sum \eta_j + \beta_1 \Delta \text{Deposits}_i + \omega \Delta \text{Deposits}_i \times \text{Increase}_i + \gamma' \text{Controls}_{ij} + \varepsilon_{ij} \]

- \( \Delta \text{Loans}_{ij} \): log change in freely allocated loans of bank \( i \) to industry-size \( j \) between the pre-crisis (collapse Dec/07, Mar/08, and Jun/08) and post-crisis (collapse Dec/08, Mar/09, and Jun/09) periods
- \( \eta_j \) are industry-size fixed effects (capture demand effects at the industry-size level);
- \( \Delta \text{Deposits}_i \) is the log change in total deposits from Jun to Dec/08
- Increase is a dummy equal to 1 if \( \Delta \text{Deposits}_i > 0 \)
- Controls (as of Jun/08, pre-crisis):
  - Loan type % (Export/import; working capital; revolving lines; others) at the loan-industry-size level
  - Bank size; Ownership (state-owned/foreign/private); Capital Ratio; ROA; Loans/Assets;
  - SE clustered at the bank level
## Results

<table>
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<tr>
<th></th>
<th>% Change in Loans</th>
<th>% Change in the number of borrowers</th>
</tr>
</thead>
<tbody>
<tr>
<td>%ΔDeposits</td>
<td>0.816***</td>
<td>0.617***</td>
</tr>
<tr>
<td></td>
<td>(0.186)</td>
<td>(0.176)</td>
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<tr>
<td>%ΔDeposits x Increase</td>
<td>-0.758*</td>
<td>-0.626**</td>
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<tr>
<td></td>
<td>(0.385)</td>
<td>(0.27)</td>
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<tr>
<td>SMEs dummy</td>
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<td>-0.163***</td>
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<tr>
<td></td>
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<td>(0.043)</td>
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<td>Fixed effects</td>
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<td>Observations</td>
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<td>Number of FE</td>
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<td>1383</td>
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<tr>
<td>Number of clusters</td>
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<td>102</td>
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</table>
Robustness checks

• Firm size

• Alternative time windows for measuring the change in deposits

• Using regular (no interbank) instead of total deposits;

• Alternative “kinks” for the asymmetric effect;
  – Terciles and quartiles of the $\Delta Deposits$ distribution;
  – Using more than 1 kink (increase “curvature”);
  – Quadratic version;
Take away

• A **negative liquidity shock affects lending supply**
  
  1% decrease in deposits ➔ 0.4-0.8% reduction in lending supply

• A **positive liquidity shock** has a much **smaller (if any) effect** on lending supply

• Effect seems more relevant at the extensive margin

• **State-owned banks increase lending supply** relative to private banks during crisis

• **Lending to SMEs is reduced** relative to large firms
  
  – Effect seems **stronger in constrained banks**
• Use FE at the borrower level to further mitigate concerns on the unbiasedness of Beta