The Rise of Shadow Banking: Evidence from Capital Regulation

Irani, Iyer, Meisenzahl and Peydro

Amit Seru
Stanford GSB, Hoover and NBER

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Dramatic Δ in Lending Landscape in last Decade

- Shadow banks have increased across segments around the world
- A 10 Trillion $ market in the US
  - The Rise of “Shadow Banks”

**Figure 1: Rise of Shadow Banks**
This Paper

- Why the Rise?
  - Regulation
  - Less-capitalized banks reduce loan retention; loans with higher capital requirements and at times when capital is scarce.
  - Non-banks step in following the sale of loans from less-capitalized banks.

- Why do we care?
  - Stability
  - Loans by nonbanks experience greater sales and price volatility during the 2008 crisis

- Discussion
  - Mechanisms
  - Questions
  - Broader Issues
Mechanisms

- How much of the growth driven by Regulation? And how much by Technology?
  - Regulation: capital costs, scrutiny/supervision burden
  - Technology: lower costs, better/higher quality products

Figure 2A: Increased Regulation?

Figure 2B: Better Technology?
Regulation?

- Assess bank responses to increases in regulatory burden
  - Shocks to Regulatory Burden (BMPS 2017)
  - Banks retreated and shadow banks entered in markets where regulatory burden increased
  - Substitution less than 1 for 1? (more later)

Figure 3: Role of Regulation

\[
\Delta \text{Shadow Bank Lending Share}_c = \beta_0 + \beta_1 \Delta \text{Regulatory Burden}_c + X'_c \Gamma + \epsilon_c
\]
Discussion

Technology?

- Interest Rates
  - Higher interest rates, all else equal → premium for convenience
  - Different Models: How much do residuals explain interest rates? \( R_i = \beta_0 + \beta_1 X_i + \epsilon_i \)

- Faster Loan Sale (16 days), Flexibility to adjust (BMPS, Fuster et al.)

**Figure 4: Role of Technology**

<table>
<thead>
<tr>
<th>Sample</th>
<th>(1) Interest Rate</th>
<th>(2) Interest Rate</th>
<th>(3) Interest Rate</th>
<th>(4) Interest Rate</th>
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<tbody>
<tr>
<td>Shadow Bank</td>
<td>0.00665***</td>
<td>0.00714***</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>(5.19)</td>
<td>(8.33)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Fintech Shadow Bank</td>
<td>-</td>
<td>-</td>
<td>-0.0281***</td>
<td>-0.0242***</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(-20.48)</td>
<td>(-27.42)</td>
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<tr>
<td>Fintech Shadow Bank</td>
<td>-</td>
<td>-</td>
<td>0.143***</td>
<td>0.129***</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>(87.68)</td>
<td>(101.99)</td>
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<table>
<thead>
<tr>
<th>Borrower and Loan Controls</th>
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<th>Yes</th>
<th>No</th>
<th>Yes</th>
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<tbody>
<tr>
<td>Zip x Quarter FE</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
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<tr>
<td>Quarter FE</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
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<tr>
<th>( N )</th>
<th>8,485,573</th>
<th>8,480,376</th>
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<tr>
<td>( R^2 )</td>
<td>0.598</td>
<td>0.808</td>
<td>0.601</td>
<td>0.811</td>
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Who finances?

- Monetary policy pass through deposits (DSS 2017/18; Xiao 2017)
- Liquidity of OTD (BMPS 2018)
Discussion

Questions

- Stability results due to fire sales or riskier loans?
  - Non banks could be acquiring worse loans
  - …and then forced to sell them

Figure 5: Fire Sales?
Discussion

Questions

- Where does the non bank funding come from?
  - Where does the risk reside?
    - Banks? (Acharya et al.), GSEs? (BMPS 2017)
  - What policies shape shadow banks?
    - Households/Deposits/Capital Constraints/OTD...

**Figure 6: Funding?**

**Banking the Nonbanks**
The biggest U.S. banks have made billions of dollars in loans to nonbank lenders.

Source: FDIC Dec. 2017 Call Reports

<table>
<thead>
<tr>
<th>Bank</th>
<th>0 billion</th>
<th>$25</th>
<th>$50</th>
<th>$75</th>
<th>$100</th>
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<td>Wells Fargo</td>
<td></td>
<td></td>
<td></td>
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<td>Citigroup</td>
<td></td>
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<td>Bank of America</td>
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<td>JPMorgan</td>
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<tr>
<td>Chase</td>
<td></td>
<td></td>
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<tr>
<td>Goldman Sachs</td>
<td></td>
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</table>

**Big Banks Find a Back Door to Finance Subprime Loans**
Lending to nonbank financial firms surges to record as banks avoid direct exposure

**Shadow Banks**

Fed Funds Rates

SB Deposit Growth Rates
Discussion

Broader Connection

- Market structure impacts liquidity of OTD, which shapes where SB operate (BMPS 2018)
  - Conforming liquid OTD
  - Jumbo needs to be retained on balance-sheet

Figure 7: Heterogeneous Penetration
Discussion

Broader Connection

- Market structure impacts liquidity of OTD, which shapes where SB operate (BMPS 2018)
  - Conforming liquid OTD
  - Jumbo needs to be retained on balance-sheet

- Capital position of banks and regulation impacts price and quantity

**Figure 8: Spread and Market Share**
Discussion

Broader Connection

- Market structure impacts liquidity of OTD, which shapes where SB operate (BMPS 2018)
  - Conforming liquid OTD
  - Jumbo needs to be retained on balance-sheet

- Capital position of banks and regulation impacts "pass-through"

Figure 9A: Bank Market Share

Figure 9B: Balance Sheet Financing
Market structure impacts liquidity of OTD, which shapes where SB operate (BMPS 2018)
- Conforming liquid OTD
- Jumbo needs to be retained on balance-sheet

Capital position of banks and regulation impacts "pass-through"

**Figure 10: Capitalization and Balance Sheet Lending**
Discussion

Broader Connection

**Capital Requirements 6% → 7.5%**

<table>
<thead>
<tr>
<th>Lender</th>
<th>Loan Type</th>
<th>Financing Source</th>
<th>Change</th>
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<tbody>
<tr>
<td>Total</td>
<td>-</td>
<td>-</td>
<td>-$52b</td>
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<tr>
<td>Bank</td>
<td>Jumbo</td>
<td>Portfolio</td>
<td>-$79b</td>
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<tr>
<td>Bank</td>
<td>Conforming</td>
<td>Portfolio</td>
<td>-$201b</td>
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<tr>
<td>Bank</td>
<td>Conforming</td>
<td>GSE</td>
<td>+$211b</td>
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<tr>
<td>Shadow Bank</td>
<td>Conforming</td>
<td>GSE</td>
<td>+$16b</td>
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</table>

- Substitution not 1 for 1
- Differential effects across income distribution

**Lending Volumes ($B)**
Conclusion

- Very interesting paper that establishes regulation an important force in expansion of SB

- Some questions remain
  - Other factors?
  - Bad quality or fire sales?...important for stability
  - Who funds shadow banks?...where does the risk reside?

- Broader Implications
  - Aggregate bank capitalization can change relative prices/quantities and penetration across segments
  - Policies such as bank capital regulation, credit subsidies, and QE interventions can push lending into shadows in non-obvious ways and impact policy “pass-through”