Mobile Collateral versus Immobile Collateral

Gary Gorton, Yale and NBER
Tyler Muir, Yale
The Transformation of the Financial System

• Over the last 30 years prior to the crisis, the architecture of the financial system changed.

• **Immobile collateral** bank loans→ became **mobile collateral** in the form of MBS and ABS—can be traded, posted in derivative positions, collateral for repo and ABCP, rehypothecated.
The Financial Crisis Regulatory Aftermath

• New money vulnerable to runs.
• Since the financial crisis, “reform” aimed to return to the system of *immobile collateral*.
  – Must post collateral to CCPs, but CCPs do not post back.
  – On-balance sheet derivatives require collateral, and it cannot be rehypothecated.
  – The LCR requires essentially that all repo be backed dollar for dollar with Treasuries—a kind of narrow banking. One kind of money backs another kind of money.
Policy Evaluation

• How can we understand the possible effects of the LCR?
  – Lucas Critique → need a GE model
  – Without such a model, what should policy makers do?

• We tried this system before: the U.S. National Banking Era. Intended to end banking panics.

• Private bank notes had to be backed by Treasuries—didn’t go well.
Agenda

• Examine the transformation to a system of mobile collateral.
• Provide some new evidence on the scarcity of Treasuries now and prior to the crisis.
• Examine National Banking Era
  – Evidence of a convenience yield on Treasuries
  – Rise of a shadow banking system: demand deposits
  – Conceptual confusion
  – Banking panics
• Implications for the future
Components of Privately-Produced Safe Debt as a Fraction of Total Privately-Produced Safe Debt (U.S.)

- Deposits
- Money-like debt
- MBS/ABS Debt
- Corporate Bonds and Loans
- Other Liabilities

Shadow Banking

Traditional Banking
Ratio of Total Private Securitization to Total Bank Loans

Source: Flow of Funds.
Growth of Assets in Four Financial Sectors (March 1954=1)

Source: Flow of Funds.

Yale School of Management
Treasuries have a Convenience Yield


Source: Krishnamurthy and Vissing-Jorgensen JPE 2012
Private Response to Scarcity of Treasuries

• Lei (2012): Examines *daily* issuance data on 20,000 MBS/ABS deals with 300,000 tranches from 1978-2011.

• Finds that MBS/ABS issuance occurs when convenience yield rises.

• Sunderam (2014) finds the same phenomenon with weekly data on ABCP.
More Evidence of Scarcity

• Repo fails
  – Occur when one side of the contract “fails to deliver” or “fails to receive”

• Question: Are fails due to a shortage of safe debt?
Primary Dealer MBS Fails

$ Millions

- MBS Receive
- MBS Deliver

Yale SCHOOL OF MANAGEMENT
A Measure of Scarcity

- GC Repo minus Treasury (1 month)
  - 36 bps average over 1978-2011
Pressure in Repo Market Spreads
Stresses amplify price swings in government bonds

By KATY BURNE
April 2, 2015 6:23 p.m. ET

A shortage of high-quality bonds is disrupting the $2.6 trillion U.S. market for short-term loans known as repurchase agreements, or “repos,” creating bottlenecks for a key source of liquidity in the financial system and sending ripples through short-term debt markets.
Regressions

- Repo fails related to a rise in the scarcity premium or convenience yield (GC repo spread).

- When Treasuries are scarce, there are more repo fails.
<table>
<thead>
<tr>
<th></th>
<th>Δ Fails</th>
<th>Rec</th>
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<tbody>
<tr>
<td>GC Repo-1m T-bill</td>
<td>6.963***</td>
<td>(5.57)</td>
<td>0.695</td>
<td>(0.41)</td>
<td>7.303***</td>
<td>(5.78)</td>
<td>0.640</td>
<td>(0.38)</td>
<td>7.509***</td>
<td>(5.91)</td>
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<tr>
<td>L1.GC Repo-1m T-bill</td>
<td>2.609*</td>
<td>(2.07)</td>
<td>0.818</td>
<td>(0.48)</td>
<td>2.951*</td>
<td>(2.31)</td>
<td>0.648</td>
<td>(0.38)</td>
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<tr>
<td>L2.GC Repo-1m T-bill</td>
<td>2.495*</td>
<td>(1.96)</td>
<td>0.316</td>
<td>(0.19)</td>
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<tr>
<td>GC Repo-1m T-bill x Break 1</td>
<td>13.35***</td>
<td>(5.14)</td>
<td></td>
<td></td>
<td>13.96***</td>
<td>(5.26)</td>
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<td>13.35***</td>
<td>(5.03)</td>
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<td>L1.GC Repo-1m T-bill x Break 1</td>
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<td></td>
<td>2.492</td>
<td>(0.95)</td>
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<td>1.894</td>
<td>(0.71)</td>
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<td>L2.GC Repo-1m T-bill x Break 1</td>
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<td>-2.164</td>
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<tr>
<td>GC Repo-1m T-bill x Break 2</td>
<td>39.57***</td>
<td>(7.36)</td>
<td></td>
<td></td>
<td>45.66***</td>
<td>(8.46)</td>
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<td>44.08***</td>
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<td>L1.GC Repo-1m T-bill x Break 2</td>
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<td>33.27***</td>
<td>(6.55)</td>
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<td></td>
<td>37.98***</td>
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<td>32.26***</td>
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<td>GC Repo-1m T-bill x Break 3</td>
<td>-1.485</td>
<td>(-0.13)</td>
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<td>-1.878</td>
<td>(-0.16)</td>
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<td>-1.185</td>
<td>(-0.10)</td>
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<td>L1.GC Repo-1m T-bill x Break 3</td>
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<td>4.103</td>
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<td>4.818</td>
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<td>3.120</td>
<td>(0.27)</td>
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Bank Runs

- This new money—repo, ABCP-- was vulnerable to bank runs, just as in most of U.S. history.
The National Banking Era

• National Banking Act passed in 1863 to finance Civil War.
  – Set up a new system of National Banks
  – These banks could issue bank-specific national bank notes by depositing US Treasuries with the Treasury Dept.
  – Expected to end banking panics.
The Under-Issuance Puzzle

• Too little money was issued, the “under-issuance puzzle” -- a puzzle for over a century!
Riskless Arbitrage?

- It was profitable to buy Treasuries, deposit them, and issue bank notes.
- \[ r \approx \frac{(0.04)(1.10) - (0.017)(0.9)}{1.10 - 0.9} \approx 14.4\% \]
  - Bond price=$1.10 with yield of 4%
  - 0.017 is issuance cost
  - 0.9 is the fraction of the bond that can be issued as notes
  - Denominator is leverage that can be obtained.
Profit Series (shaded areas = recessions)
But . . .

• There was no arbitrage opportunity. “Profit” due to:
  – a convenience yield on Treasuries
  – and costly bank capital.

• Treasuries were scarce. Costly to borrow, hard to find.
  – “The rate is 1.5 to 2 percent for borrowing bonds”
  – “The real trouble is to find the bonds”
“Arb Profits” Reflect Convenience Yield?

• Measures/Proxies for convenience yield:
  – Follow Krish and V-J: outstanding Treasuries to GDP
  – Also look at “available Treasuries”
  – Muni spreads

• No proxies for bank capital (though likely more costly in recessions).
“Arb Profits” Reflect Convenience Yield?

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<th>(1)</th>
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<th>(3)</th>
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<th>(5)</th>
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<tr>
<td>( \ln(\text{Debt/GDP}) )</td>
<td>-1.78</td>
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<td></td>
<td>[-2.35]</td>
<td></td>
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<tr>
<td>( \ln(\text{Avail/GDP}) )</td>
<td>-1.18</td>
<td>-1.03</td>
<td>-0.81</td>
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<td></td>
<td>[-4.85]</td>
<td>[-6.81]</td>
<td>[-5.49]</td>
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<tr>
<td>Muni spread</td>
<td>1.81</td>
<td>0.44</td>
<td>0.38</td>
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<tr>
<td></td>
<td>[3.83]</td>
<td>[4.49]</td>
<td>[2.05]</td>
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<td>Adj(R^2)</td>
<td>0.36</td>
<td>0.67</td>
<td>0.48</td>
<td>0.74</td>
<td>0.54</td>
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<tr>
<td>(N)</td>
<td>34</td>
<td>34</td>
<td>137</td>
<td>34</td>
<td>34</td>
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</table>
Results

• “Arb profits” explained by scarcity of Treasuries (and costs of bank capital).
  – Banks had other uses for Treasuries
  – Insurance companies also demanded Treasuries
  – Arb profits also related to recession when cost of bank capital likely higher
Meanwhile --

• - - - the shadow banking system grew---

• Scarcity of Treasuries / limited note issuance encouraged deposits to grow
Ratio of Notes to Deposits and Treasury Debt to GDP
Correlation = 0.96
Analogous to shadow banking growth recently

- Deposits
- Money-like debt
- MBS/ABS Debt
- Corporate Bonds and Loans
- Other Liabilities

Yale School of Management
Demand Deposits not Understood

• Bray Hammond (1957), in his Pulitzer Prize-winning book *Banks and Politics in America*, wrote: “. . . the importance of deposits was not realized by most American economists . . . till after 1900” (p. 80).

• Russell C. Leffingwell, the Assistant Secretary of the Treasury wrote as late as 1919: “All of these people who believe in the quantity theory of money . . . choose to call bank deposits money, but bank deposits are not money.”
Summary timeline

• Before 1863: Panics were a run on bank notes
• After 1863: National Banking Era
  – Notes backed by Treasuries, encouraged shadow money (uninsured deposits) to grow.
  – Deposits not understood as money
  – Panic = run on deposits: 1873, 1884, 1893, 1896, 1907
• Recently (2008): Panic was run on repo / shadow money
  – Deposit insurance was limited, after 1980’s not sufficient for large amounts of funds. Shadow banking grows
  – Shadow money (repo / ABCP, etc) not understood as money
  – LCR: short term obligations backed by Treasuries, just like 1863!
  – Problematic if Treasuries scarce, repo fails suggests they are
Conclusions

• Design of Nat’l Banking System led to the rise of demand deposits—”shadow banking.”

• Five major banking panics (1873, 1884, 1893, 1896, 1907).

• Same problems now:
  – Unintended consequences
  – Conceptual issues
“Those who ignore history are entitled to repeat it.”
Table 1: We present summary statistics on fails and rehypothecation. Sources: Panels A & B, Federal Reserve Bank of New York. Panel C, ISDA.

**Panel A: Fails, $ Millions**

<table>
<thead>
<tr>
<th></th>
<th>Fail to Receive</th>
<th>Fail to Deliver</th>
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<tbody>
<tr>
<td>Mean</td>
<td>31,676 154,600</td>
<td>11,812 122,363</td>
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<tr>
<td>Std Dev</td>
<td>3,771 6,372</td>
<td>4,105 163,564</td>
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</table>

**Panel B: Receive fails minus deliver fails, $ Millions**

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</thead>
<tbody>
<tr>
<td>Mean</td>
<td>5,169 16,624</td>
<td>-123 338</td>
<td>207 -8,073</td>
</tr>
<tr>
<td>Std Dev</td>
<td>3,947 18,268</td>
<td>739 3,696</td>
<td>2,615 22,283</td>
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</tbody>
</table>

**Panel C: Amount of collateral received eligible vs actually rehypothecated (12/31/2013)**

<table>
<thead>
<tr>
<th></th>
<th>Treasuries</th>
<th>Other</th>
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<tbody>
<tr>
<td>Total Received ($ Millions)</td>
<td>179,366</td>
<td>123,915</td>
</tr>
<tr>
<td>Eligible for Rehypothecation</td>
<td>85%</td>
<td>55%</td>
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<tr>
<td>Actually Rehypothecated</td>
<td>55%</td>
<td>30%</td>
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