Shadow Banking: The “Money” View

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Liquidity Creation by Financial Sector

- Financial sector transforms illiquid assets into liquid assets
  - Liquid asset = promise of cash redemption
  - Profit = “liquidity premium”

- “Shadow liabilities”

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<thead>
<tr>
<th>Assets</th>
<th>Liabilities</th>
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<tbody>
<tr>
<td>Illiquid Long-term Loans</td>
<td>Equity + Long-term Debt</td>
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<td>Treasury bonds, cash</td>
<td>Short-term debt</td>
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<td>Contingent credit lines</td>
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<td>Derivatives’ liquidity call</td>
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Liquidity Mismatch 2002 - 2013

• From Bai, Krishnamurthy and Weymuller (2013)
Liquidity Creation: 1914-2012

From Krishnamurthy and Vissing-Jorgensen (2013)
Outline

• Why was there so much liquidity creation 2002-2007?

• Theory: The “money” view
  – Gorton, and others

• Evidence for the money view historically

• Interpreting 2002-2007 movements in the money view
Model and Notation

- **Liquidity demanders** (money-market investors, non-financial corporates, households, foreign investors):

  \[ \max U(L) - PL \]
  \[ L = L_{\text{private}} + L_{\text{public}} \]
  \[ P = \text{Price of liquidity} \]

- **Private liquidity supply** (banks + shadow banks):

  \[ \max P L_{\text{private}} - F(L_{\text{private}}) \]
  \[ F(L) \text{ is private cost of running a liquidity mismatch} \]

- **Government supplied liquidity**: \( L_{\text{public}} \).
# Private supply of liquidity

## Liquidity demanders:

\[
\max U(L) - P \cdot L \\
L = L_{\text{private}} + L_{\text{public}} \\
P = \text{Price of liquidity}
\]

## Liquidity supply:

\[
\max P \cdot L_{\text{private}} - F(L_{\text{private}}) \\
F(L) \text{ is private cost of running a liquidity mismatch}
\]

**Government supplied liquidity:** \( L_{\text{public}} \)

## Equilibrium:

\[
U'(L_{\text{private}} + L_{\text{public}}) = P = F'(L_{\text{private}}).
\]

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*demand*  

*supply*
graphically

\[ F^{-1}(P) + L_{\text{public}} \downarrow \]

\[ L_{\text{public}} \downarrow \Rightarrow P \uparrow \]

and \[ L_{\text{private}} \uparrow \]
Liquidity premium and public supply

- Aaa-Treasury is proxy for $P$
- The graph measures liquidity demand,

$$U'(L_{private} + L_{public}) = P$$

Based on variation in $L_{public} = \text{Debt/GDP}$

- From Krishnamurthy and Vissing-Jorgensen (2012)
Private and public supply of liquidity

\[ L_{\text{private}} = \text{Short-term Debt} \]

*Banks + Shadow banks (broker/dealers, securitization, repo, MMFs)*

After netting inter-bank and shadow bank sector claims

Graph measures variation in \( L_{\text{private}} \) based on variation in \( L_{\text{public}} \)

- From Krishnamurthy and Vissing-Jorgensen (2013)
Crisis Build-up: 2002 - 2007

Spread between 3M OIS and T-Bills measures liquidity premium ($P$)

Short-Debt rises by $5.4$ trillion from 2002Q2 to 2007Q2
Money Demand Shock

Demand shock: Foreign demand for US safe assets
Caballero and Krishnamurthy (2008)
Demand Shock ($B$) + Supply Shift ($C$)

Supply shift: Financial innovation, regulatory arbitrage, implicit bailout promises, TBTF
Decomposition 1: Structural Approach

Based on data from 1920-2001, we can estimate the slope of $F^{-1}(P)$:

- We find: Per 10 basis point increase in $P$, financial sector supplies 0.026 more short-term debt/GDP
- From first-half 2002 to first-half 2007, average $P$ increases by 32 basis points
- Pure demand shift explains $0.08 = (3.2 \times 0.026)$ increase in short-term debt/GDP
- Actual increase is 0.19
- Supply factors responsible for 0.11

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1This comes from regressing Short-term Debt/GDP on the spread between CP and T-Bills, instrumented by Debt/GDP and $(\text{Debt/GDP})^2$
Decomposition 2: Reduced Form Approach

- Regress short-term debt on $L^{\text{public}}$ and Foreign Holdings of US Treasury bonds (as proxy for demand factors)
- Fitted values increase by 0.10
Summary: Money and Bank Growth

- Banks and Shadow Banks run a liquidity mismatch
  - This mismatch grew substantially from 2002 to 2007
- Two factors:
  1. Money demand shock
     - Foreign demand for safe/liquid assets rose
  2. Money supply shock
     - Banking sector found it cheaper to run a liquidity mismatched book
- Roughly equal contribution to growth of liquidity mismatch
References


