Financial Intermediation and the Post-Crisis Financial System

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Outline

• Lessons on financial system architecture from global financial crisis

• Implications for
  – Size of financial sector relative to real economy
  – Securitization
  – Financial regulation
  – Accounting standards
  – Monetary policy
Stylized Financial System

**ultimate borrowers**

- Households
- Non-financial firms
- govt

**ultimate claim holders**

- Households
- Pension funds
- Insurance companies
- Rest of world

**direct credit**

- Treasury & municipal bonds
- Corporate bonds
Stylized Financial System

**Ultimate Borrowers**
- Households
- Non-financial firms
- Govt

**Banking (intermediary) sector**
- Intermediated credit: mortgages, corporate credit...
- Direct credit
- Debt claims: deposits, financial paper, MBS, ABS...
- Equity

**Ultimate Claim Holders**
- Households
- Pension funds
- Insurance companies
- Rest of world

**Direct Credit**
- Treasury & municipal bonds
- Corporate bonds
US Financial Intermediaries
Total Assets (2007Q2)

Market-Based
- ABS Issuers 4.1
- Broker Dealers 2.9
- GSE Mortgage Pools 4.5
- Finance Co. 1.9

Bank-Based
- Savings Inst. 1.9
- Commercial Banks 10.1
- GSE 3.2
- Credit Unions 0.8
Holding of US Home Mortgages by Type of Financial Institution

- Agency and GSE mortgage pools
- ABS issuers
- Savings institutions
- GSEs
- Credit unions
- Commercial banks

$ Trillion

Market-Based and Bank-Based Holding of Home Mortgages
Short Intermediation Chain

households <-> mortgage bank <-> households

mortgage

deposits
Long Intermediation Chain

- **Households**
- **Mortgage Pool**
  - Mortgage
  - MBS
- **ABS Issuer**
  - ABS
- **Securities Firm**
  - Repo
- **Commercial Bank**
  - MMF Shares
  - Short-term Paper

**ABS**

**Money Market Fund**
What Are the Advantages of the Long Intermediation Chain?

• “Securitization enables dispersion of credit risk”

• “Long chains promote more efficient maturity transformation”
  – “Households want short, liquid claims”
  – “Shadow banking system gives them what they want”
But Evidence in this Crisis Points the Other Way

• Securitization has *concentrated risks* in leveraged sector

• Biggest growth in short-term debt was *between* financial intermediaries

• Financial intermediaries have become more intertwined
  – “CoVaR” Adrian and Brunnermeier (2009)
## Exposure to Subprime

<table>
<thead>
<tr>
<th></th>
<th>Total reported sub-prime exposure (US$bn)</th>
<th>Percent of reported exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Investment Banks</td>
<td>75</td>
<td>5%</td>
</tr>
<tr>
<td>Commercial Banks</td>
<td>418</td>
<td>31%</td>
</tr>
<tr>
<td>GSEs</td>
<td>112</td>
<td>8%</td>
</tr>
<tr>
<td>Hedge Funds</td>
<td>291</td>
<td>21%</td>
</tr>
<tr>
<td>Insurance Companies</td>
<td>319</td>
<td>23%</td>
</tr>
<tr>
<td>Finance Companies</td>
<td>95</td>
<td>7%</td>
</tr>
<tr>
<td>Mutual and Pension Funds</td>
<td>57</td>
<td>4%</td>
</tr>
<tr>
<td>Leveraged Sector</td>
<td>896</td>
<td>66%</td>
</tr>
<tr>
<td>Unleveraged Sector</td>
<td>472</td>
<td>34%</td>
</tr>
<tr>
<td>Total</td>
<td>1,368</td>
<td>100%</td>
</tr>
</tbody>
</table>

Source: Greenlaw, Hatzius, Kashyap and Shin (2008)
Overnight repos, Financial CP and M2  
(weekly, July 6 1994 as base date)
Repos and Financial CP as Fraction of M2 (weekly)

Source: Adrian and Shin (2009)
US Institutions’ CoVaR
IMF Co-Risk Measures (March 2008)

Source: IMF GFSR (April 2009)
Multi-layered Financial System

Source: Haldane (2009)
Global Interconnectedness

Source: Haldane (2009)
Relative Size of Intermediary Sector
Total Assets of Four Sectors

[March 1954 = 1]

(Source: Federal Reserve, Flow of Funds)
Total Assets (Log Scale)

[March 1954 =1]

(Source: Federal Reserve, Flow of Funds)
Procyclical Leverage of Five US Investment Banks

Source: Adrian and Shin (2007)
US Primary Dealer Mean Leverage
All Primary Dealer Mean Leverage
New Issuance of Asset Backed Securities in Previous Three Months

Source: JP Morgan
Biggest Damage is Done in Contractions

- Ultimate borrowers
  - Households
  - Non-financial firms
  - Govt

- Ultimate claim holders
  - Households
  - Pension funds
  - Insurance companies
  - Rest of world

Banking (intermediary) sector
But Seeds of Crises Are Sown in Expansions

Banking (intermediary) sector

ultimate borrowers

- Households
- Non-financial firms
- govt

ultimate claim holders

- Households
- Pension funds
- Insurance companies
- Rest of world
How To Moderate Balance Sheet Boom/Bust Cycles?
## Individual Bank Balance Sheet

<table>
<thead>
<tr>
<th>Assets</th>
<th>Liabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loans to firms, households</td>
<td>Liabilities to non-banks (e.g. deposits)</td>
</tr>
<tr>
<td>Claims on other banks</td>
<td>Liabilities to other banks</td>
</tr>
<tr>
<td></td>
<td>Equity</td>
</tr>
</tbody>
</table>

**Individual bank**
Balance Sheet for Banking Sector

<table>
<thead>
<tr>
<th>Assets</th>
<th>Liabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total lending to ultimate borrowers (firms, households, govt)</td>
<td>Total debt liabilities to non-banks</td>
</tr>
<tr>
<td></td>
<td>Total equity</td>
</tr>
</tbody>
</table>

Banking sector

Slow moving: increases in line with household wealth
Aggregate Balance Sheet Identity

\[ \sum_{i=1}^{n} y_i = \sum_{i=1}^{n} e_i z_i (\lambda_i - 1) + \sum_{i=1}^{n} e_i \]

- Total lending to ultimate borrowers
- Total debt liabilities to non-banks
- Total equity of intermediaries
Booms

• Higher leverage of financial intermediaries

• Larger balance sheets of intermediaries

• Greater intertwining of intermediaries
  – Longer chains
  – Maturity mismatch to sustain longer chains
**Architectural Analogy**

- Adding extra capacity (more rooms) to a house when constrained by limited footprint
  - The only way is to build up (like a Manhattan skyscraper)
  - Except that Manhattan skyscraper is planned ahead, as a coherent whole
  - Better analogy is adding extra floors to a building without anticipating future floors on top
Sutyagin House in Archangel
Busts

• Deleveraging

• Shrinking balance sheets

• Unraveling of interbank lending
  – Runs
  – Retrenchment
Composition of Northern Rock's Liabilities
(June 1998 - June 2007)

- Billion pounds

Key:
- Equity
- Other Liabilities
- Securitized notes
- Retail Deposits
Northern Rock's Leverage

June 1998 - December 2007

Leverage on total equity
Leverage on shareholder equity
Leverage on common equity
What Prescriptions for Better Functioning Intermediary Sector?
Approach 1: Moderate Fluctuations in Leverage through Countercyclical Capital Regulation

\[
\sum_{i=1}^{n} y_i = \sum_{i=1}^{n} e_i z_i (\lambda_i - 1) + \sum_{i=1}^{n} e_i
\]

- Leverage cap (e.g. Switzerland)
- Countercyclical capital targets (Geneva Report)
Approach 2: Moderate Fluctuations in Equity through Forward-looking Provisioning

\[ \sum_{i=1}^{n} y_i = \sum_{i=1}^{n} e_i z_i (\lambda_i - 1) + \sum_{i=1}^{n} e_i \]

- Spanish Statistical Provisioning
- Pigovian Tax (Geneva Report)
**Approach 3:** Shortening Intermediation Chains through Development of New Instruments

\[ \sum_{i=1}^{n} y_i = \sum_{i=1}^{n} e_i z_i (\lambda_i - 1) + \sum_{i=1}^{n} e_i \]

**Covered bonds**
- Danish mortgage bonds
- German pfandbrief bonds
households

mortgage bank

ABS

mortgage pool

mortgage

ABS issuer

MBS

money market fund

MMF shares

Short-term paper

commercial bank

securities firm

Repo

mortgage

covered bonds
Investors in Covered Bonds

- Asset management: 47%
- Intermediary Sector: 34%
- Retail/Commercial Bank: 9%
- Private Bank: 6%
- Broker/Dealer: 17%
- Central Bank & Treasury: 8%
- Insurance: 2%
- Pension Fund: 9%

Source: SIFMA (2009)
Hurdles to be Overcome

• Seniority of depositors (and hence deposit insurance agency)
  – In the United States, FDIC policy is to restrict covered bonds to 4% or less of total liabilities
  – An alternative is to develop specialist “narrow” covered bond banks who do not take deposits and only issue covered bonds
    • Model provided by mortgage banks in Denmark
Some Features of Possible Future Financial System

• Smaller intermediary sector
  – Especially securities sector
• Shorter intermediation chains
  – Less profitable
  – Less maturity transformation
• With regulatory brakes
• Monetary policy?
• Accounting standards?