Lecture 5
Post-Crisis Financial System

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"Global Financial Crisis of 2007 – 2009:
Theoretical and Empirical Perspectives"

Summer Economics at SNU 2009 and Korea Economic Association

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

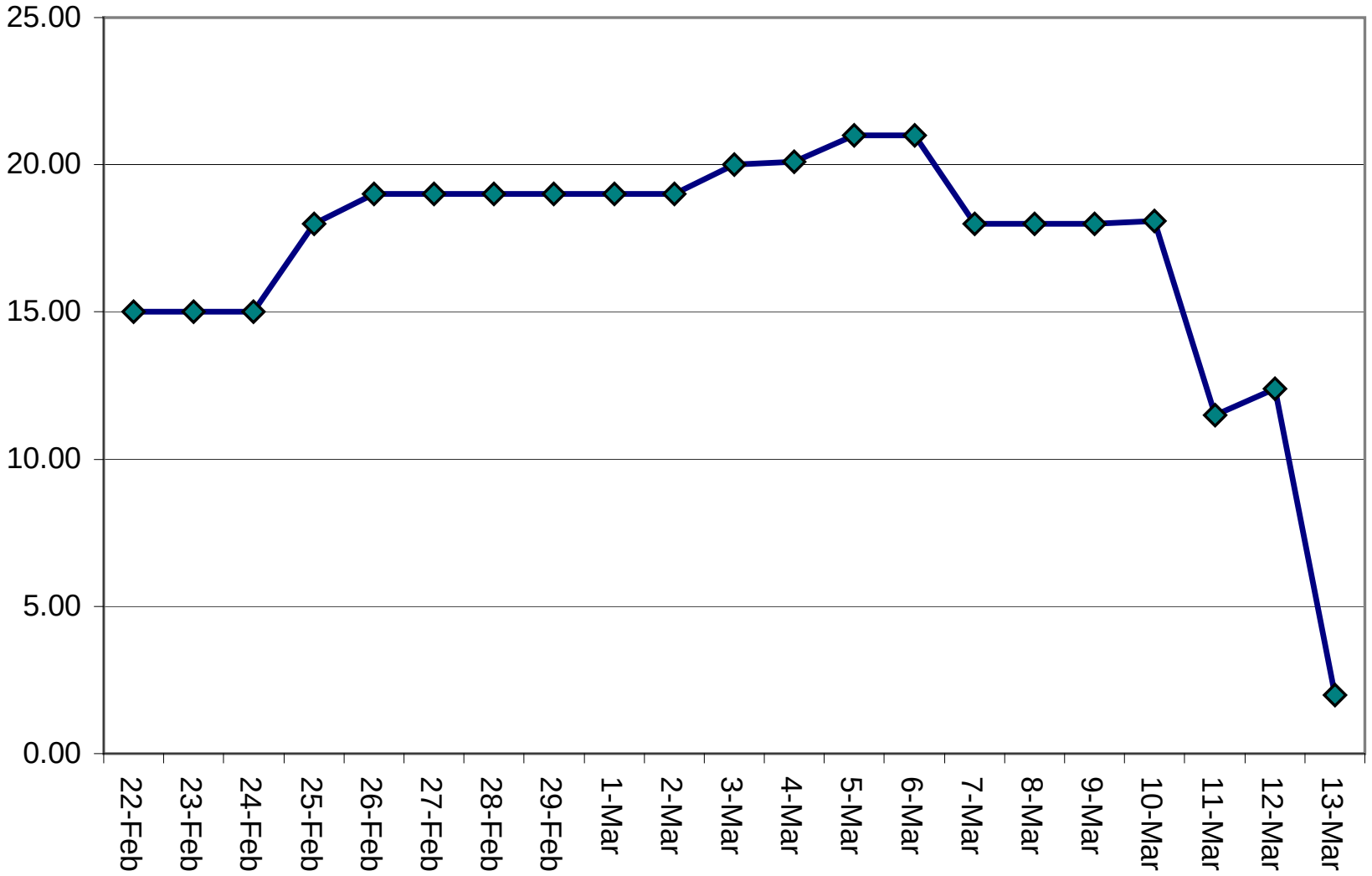
Basel-style Capital Standards

- Problem is default by borrowers
  - Focus on asset side of balance sheet
- Capital is buffer to protect creditors
  - Especially retail depositors
- Preferred shares and subordinated debt are capital

Bear Stearns

- Bear Stearns failed because of run by creditors, not defaults by borrowers
- (Immediate) problem was on *liabilities side* of balance sheet

Bear Stearns Liquidity Pool (US$ billions)
(Source: SEC)

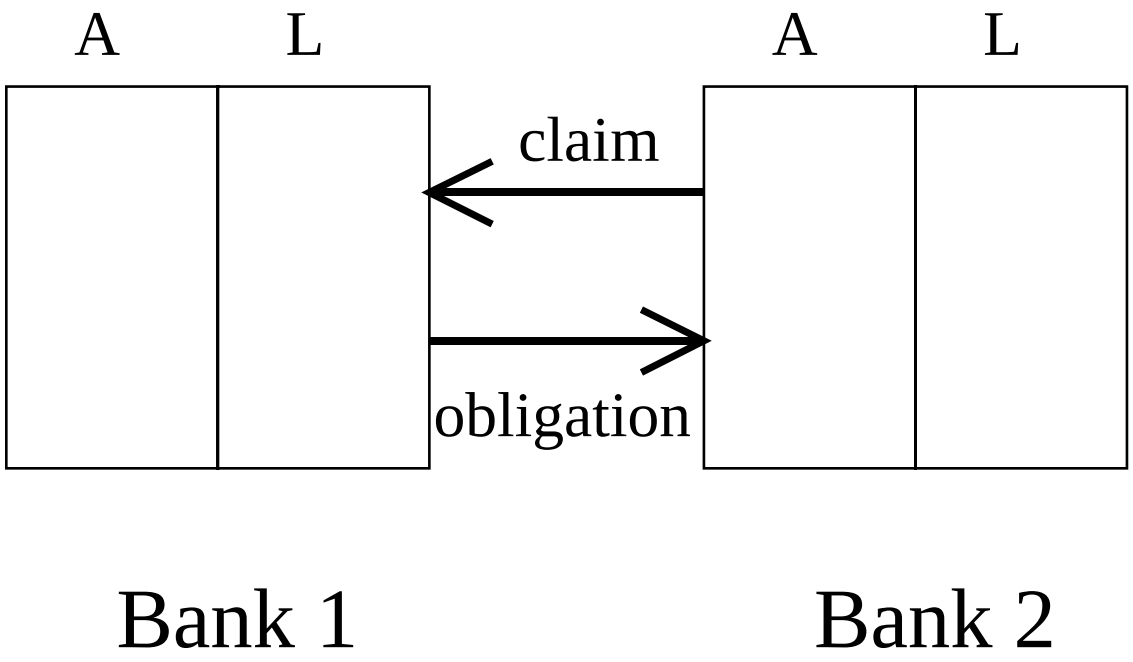


Micro- and Macro-prudential Perspective

"*Ensuring the soundness of each individual institution ensures soundness of system as a whole*"

- Can this serve as the basis for a prescriptive rule?
- Yes, if following micro-prudential imperative invariably promotes overall stability
- But…

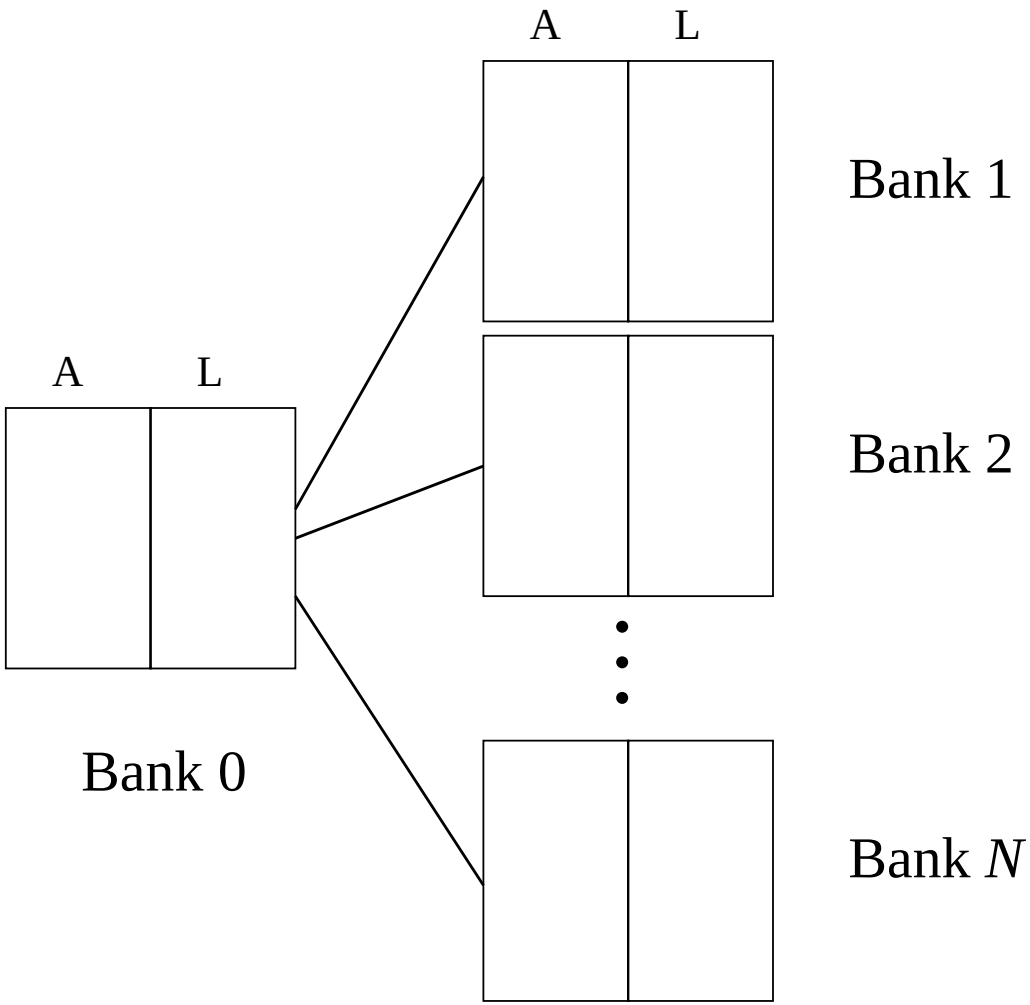
Figure 1



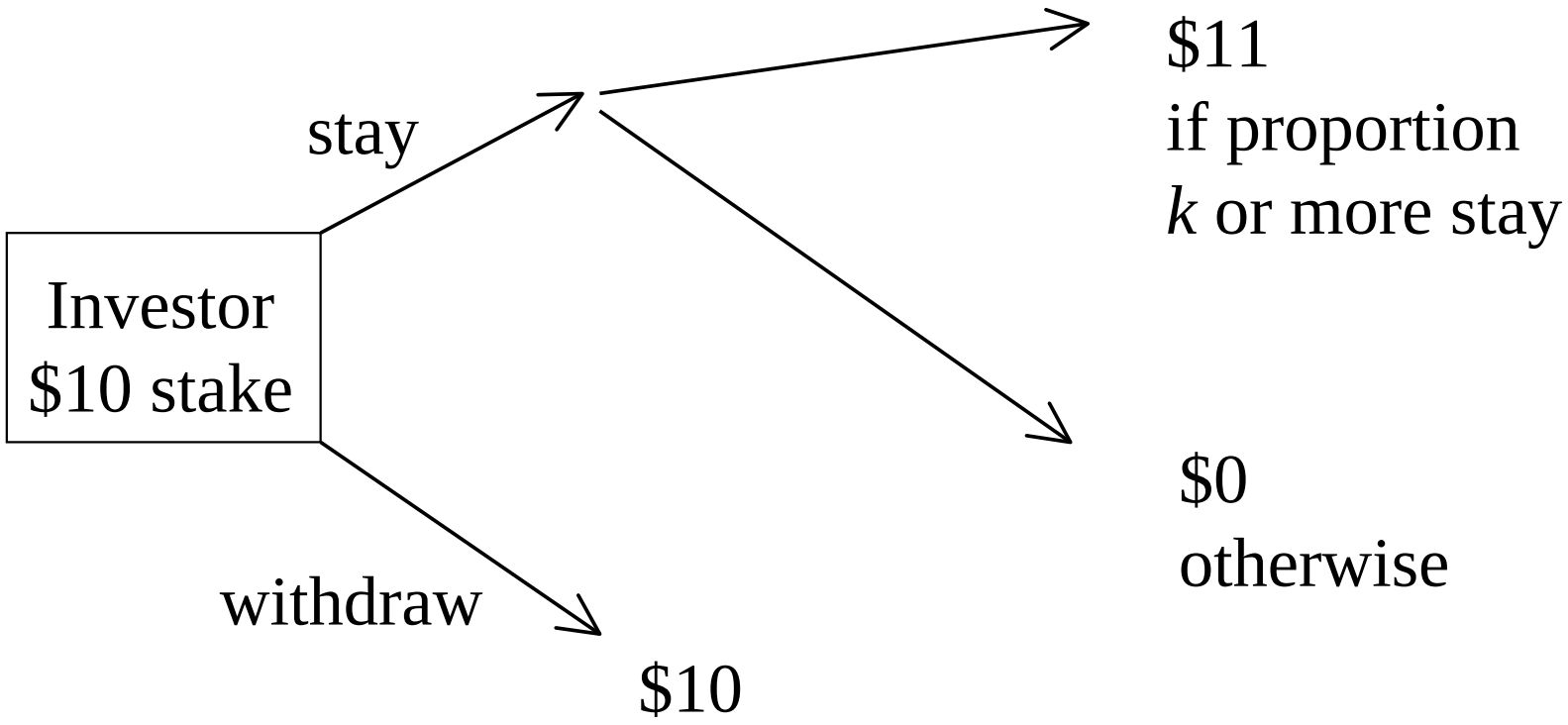
Proposition 1

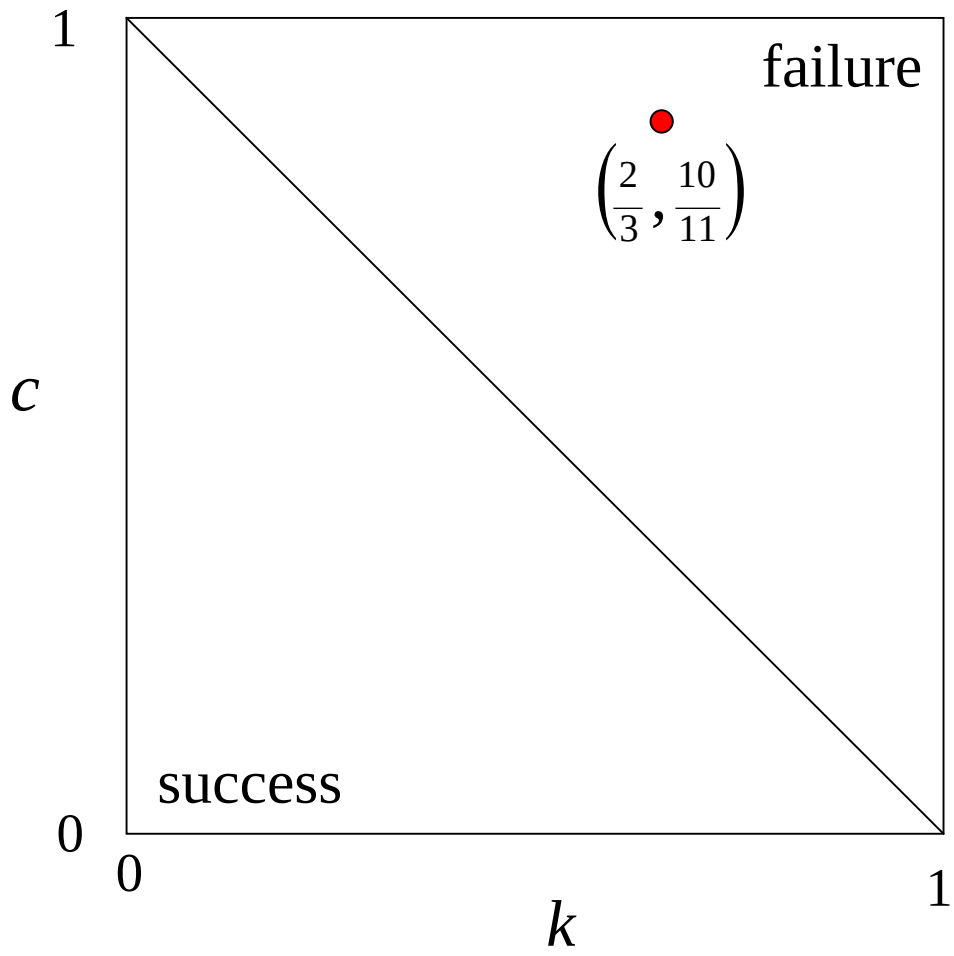
It is possible that actions that enhance the soundness of an individual financial institution undermine the stability of the system as a whole.

Figure 2



Summers (2000)



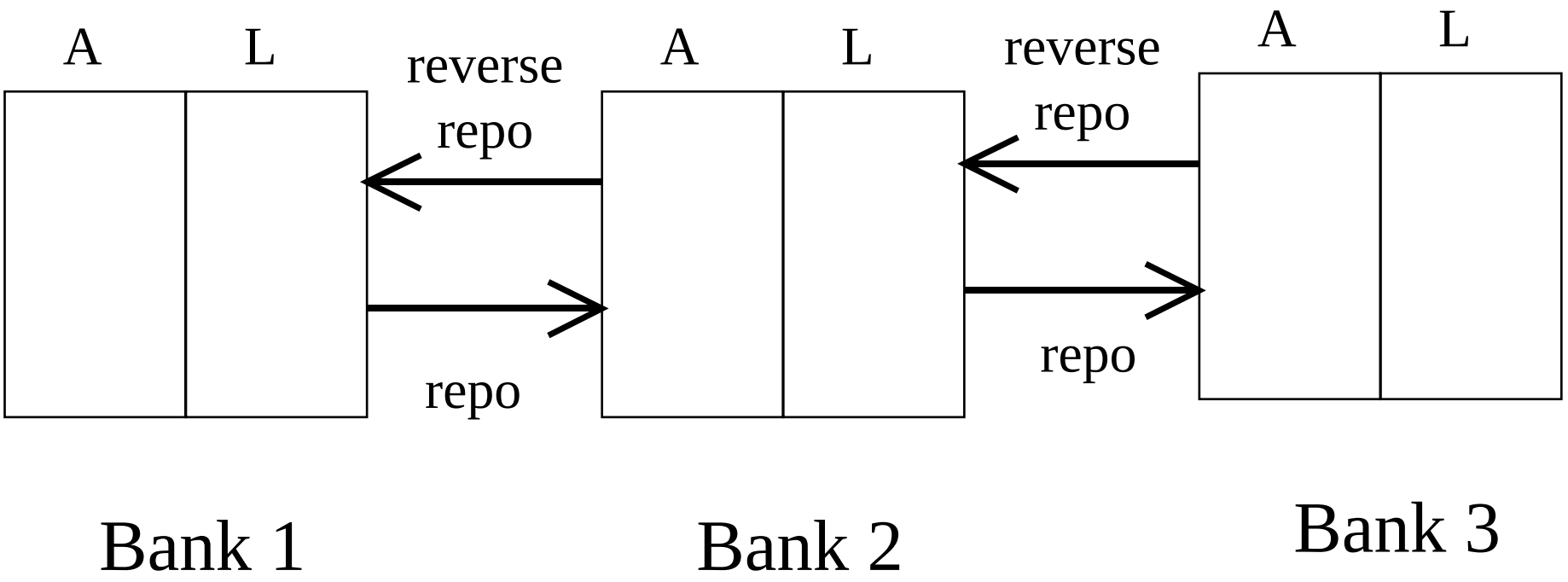


c is cost of miscoordination as fraction of good payoff

Proposition 2

A creditor run is more likely if the coordination threshold is high or when the cost of miscoordination is high. Policies that lower the coordination threshold and the cost of miscoordination are likely to promote system stability.

Figure 4


A
L
reverse
repo
repo
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reverse
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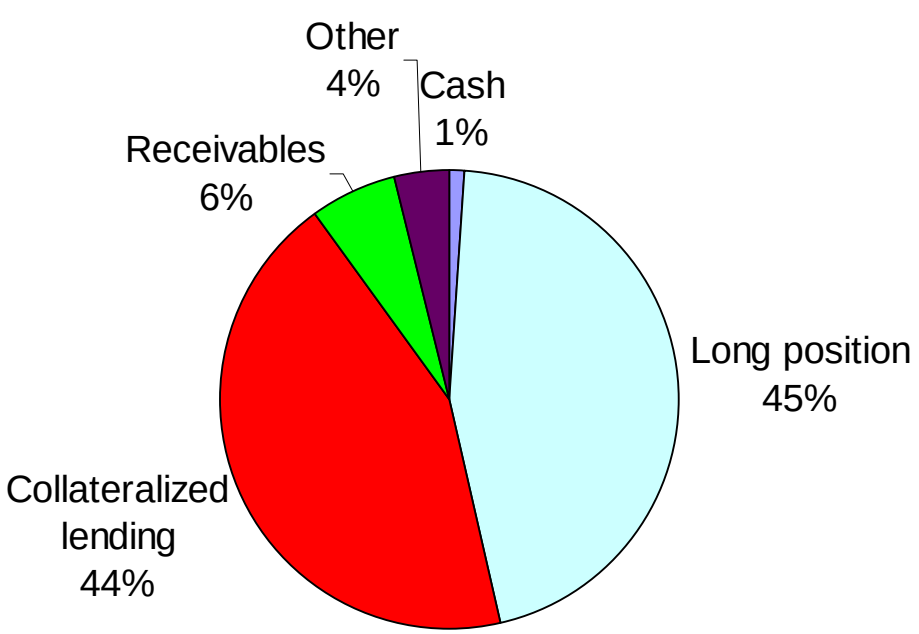
Bank 1
Bank 2
Bank 3

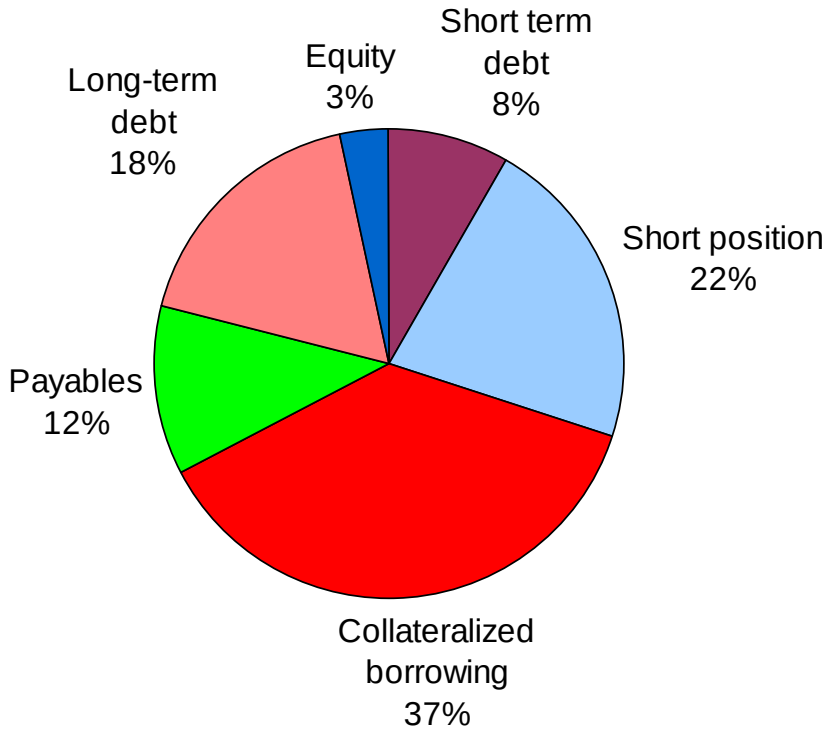
Proposition 3

There is a distinction between risky assets and systemically important assets. Safe assets can be systemically important.

Lehman Balance Sheet (2007)

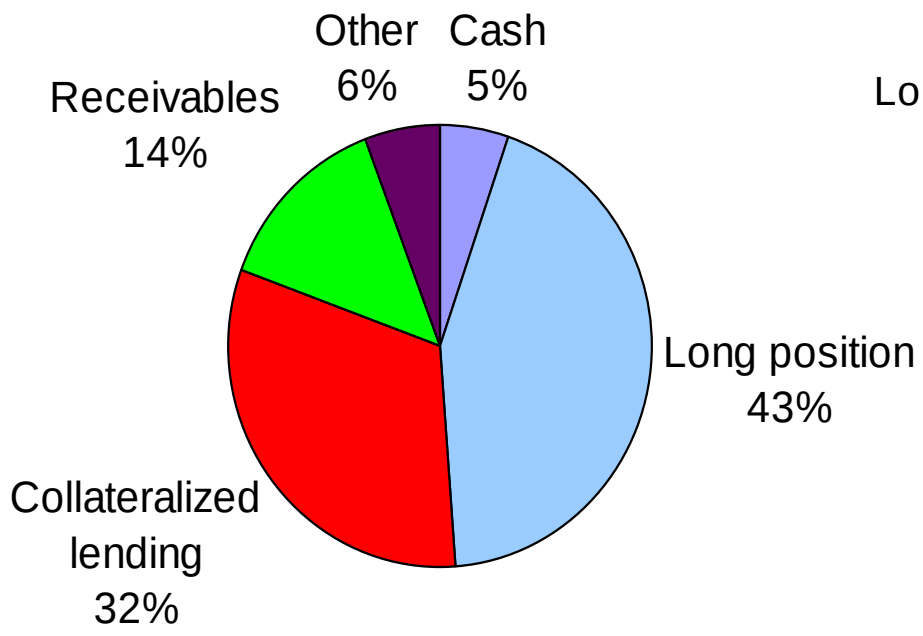


Assets

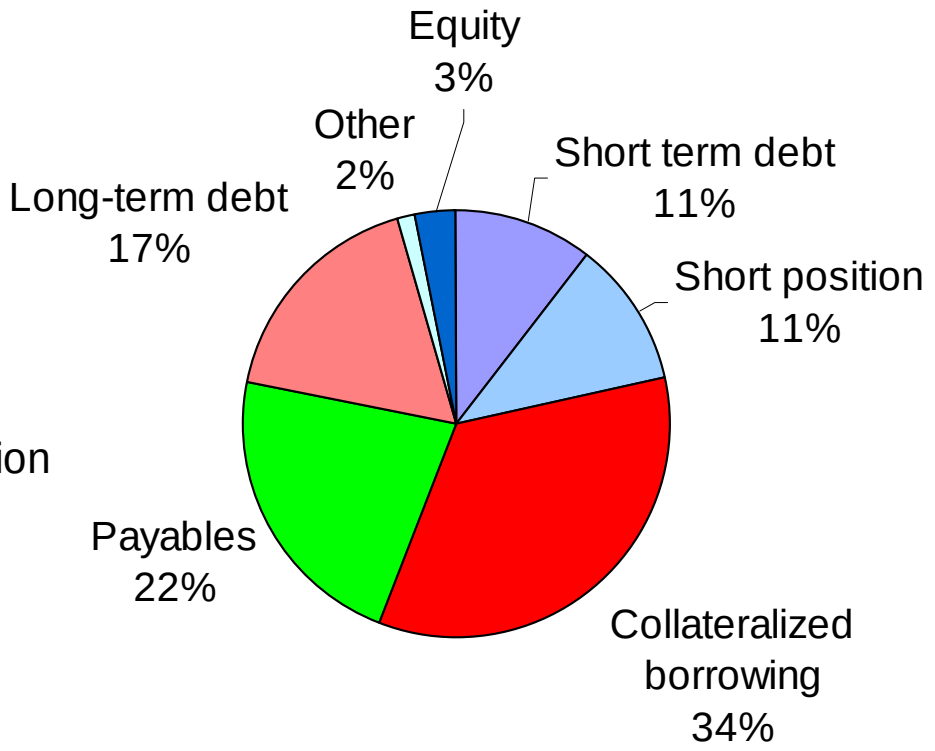


Liabilities

Bear Stearns Balance Sheet (2007)

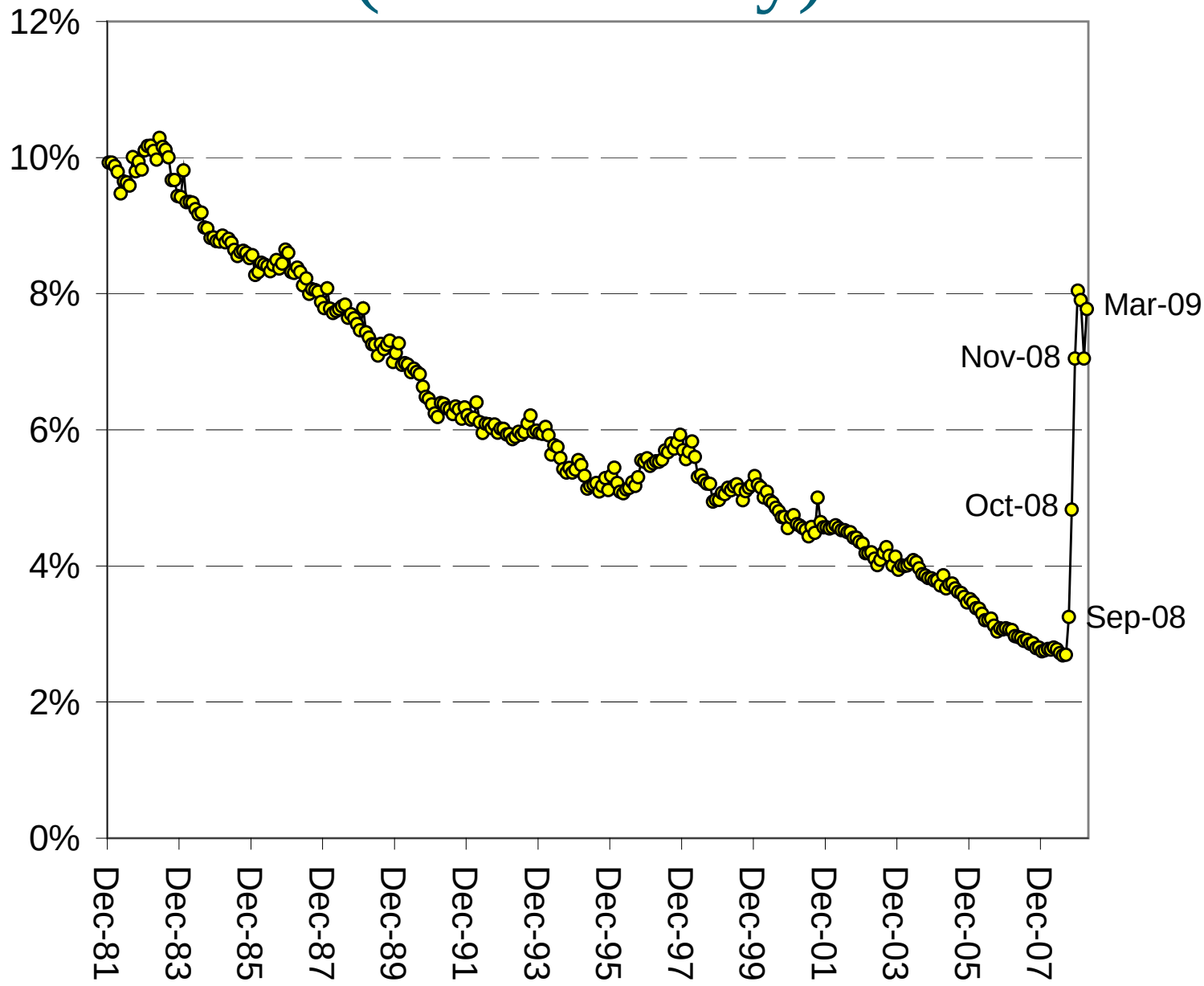


Assets

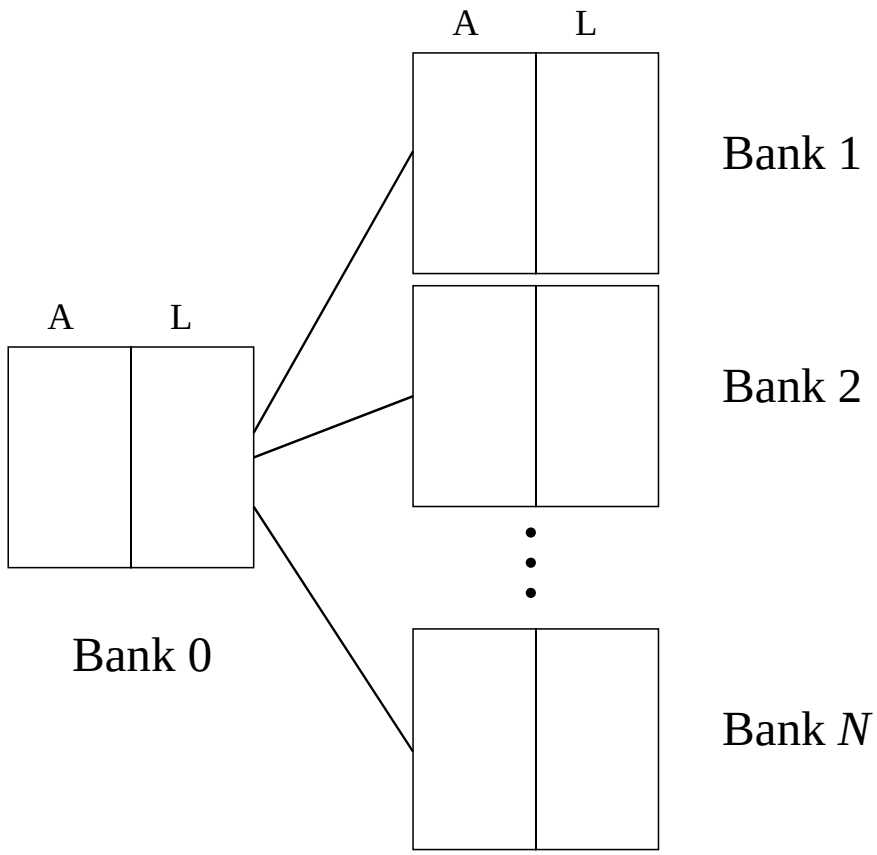


Liabilities

US Commercial Bank Cash/Assets Ratio (H8 Monthly)



Liquidity Regulation



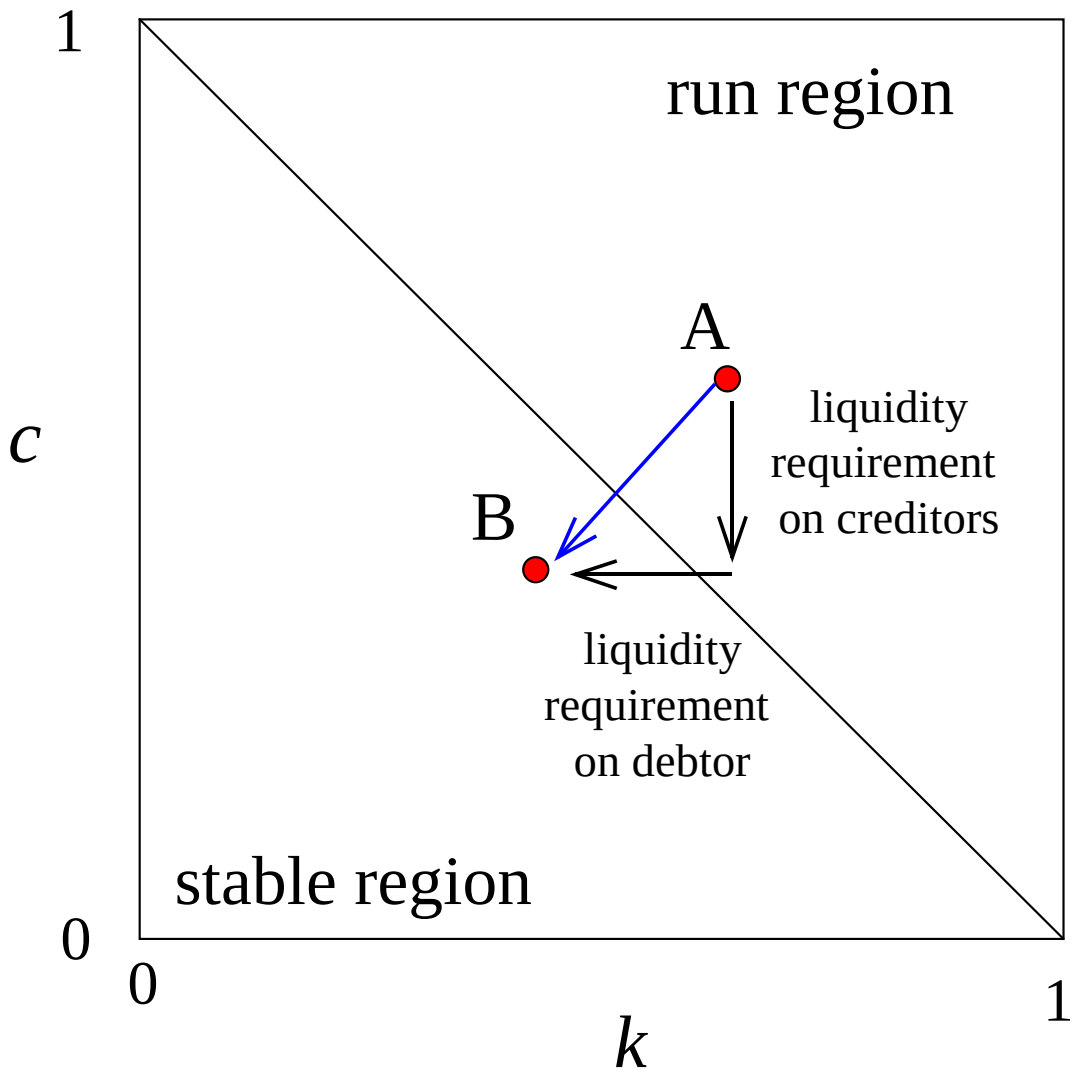
Make Bank 0 more resilient

Make creditor banks less trigger-happy

Liquidity Regulation

- Vicious circle of reasoning leads to run
- Harness the same externalities to promote virtuous circle of reasoning
  - More robust debtor and more relaxed creditors
- Required liquidity levels may not be so onerous if distributed well in the system

Liquidity Regulation



Secured Funding

- If haircuts rise from 2% to 4%, permitted leverage falls from 50 to 25
- Evidence suggests bulk of adjustment happens through shrinking of assets
  - Bank 2 can adjust down flexibly
  - Bank 1 suffers a run

“Lump of Liquidity” Fallacy

- “Liquidity” suggests stock that can be reallocated
- But liquidity is better understood as *growth* of balance sheets – as a flow
- Liquidity doesn’t get reallocated – it disappears altogether
- Secured funding is less secure for the system than cash

Leverage Regulation

- Leverage regulation aims to prevent excessive erosion of haircuts in peak of the financial cycle
  - "reaching for yield" is especially precarious
- Leverage regulation is non-risk-weighted capital requirement
  - safe assets $\neq$ systemically unimportant

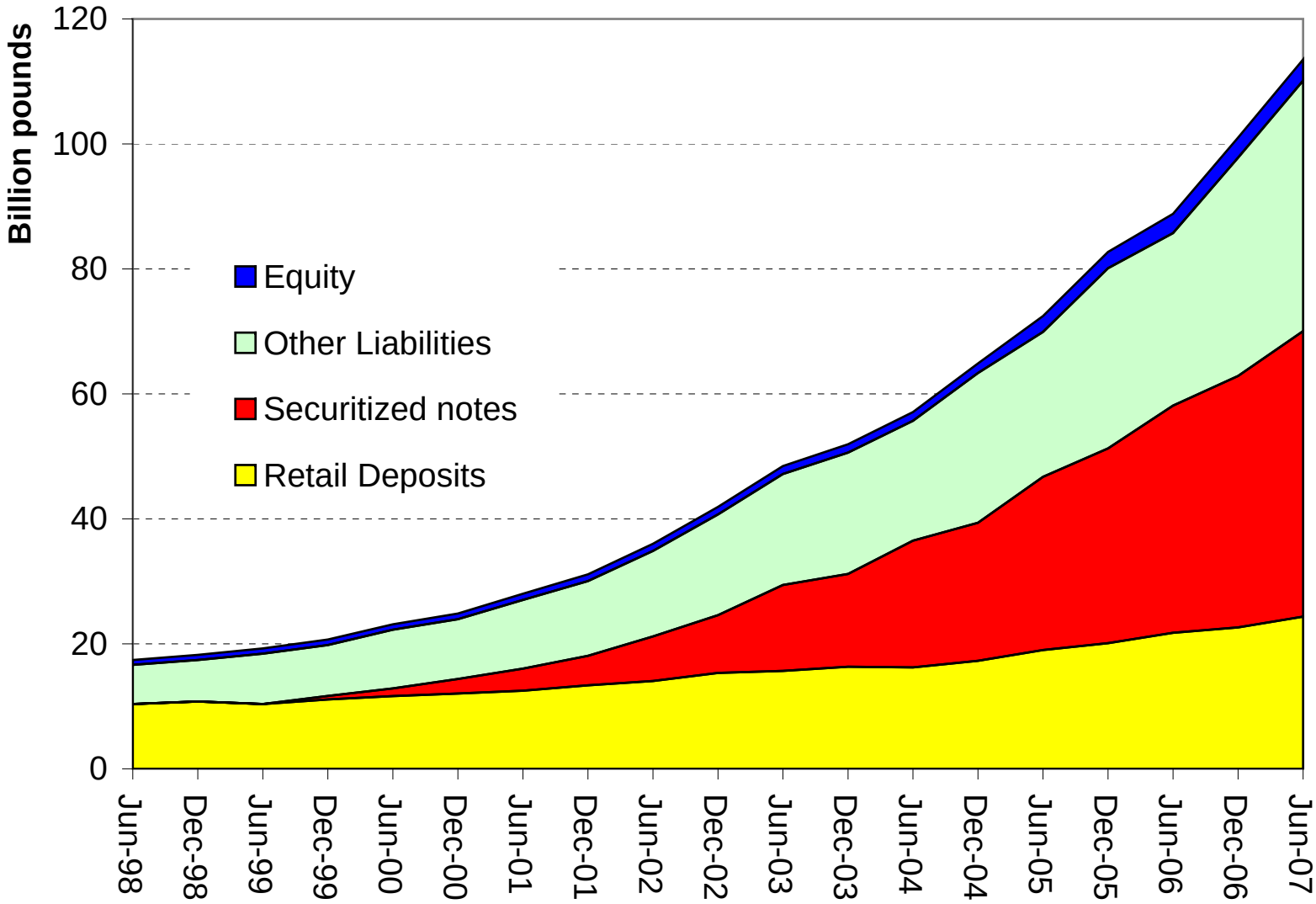
Measuring Leverage

- Numerator (Assets)
  - securitized assets
  - derivatives hedges
- Denominator (Equity)
  - common equity
  - common equity + preferred shares
  - common equity + preferred shares + sub debt

Northern Rock

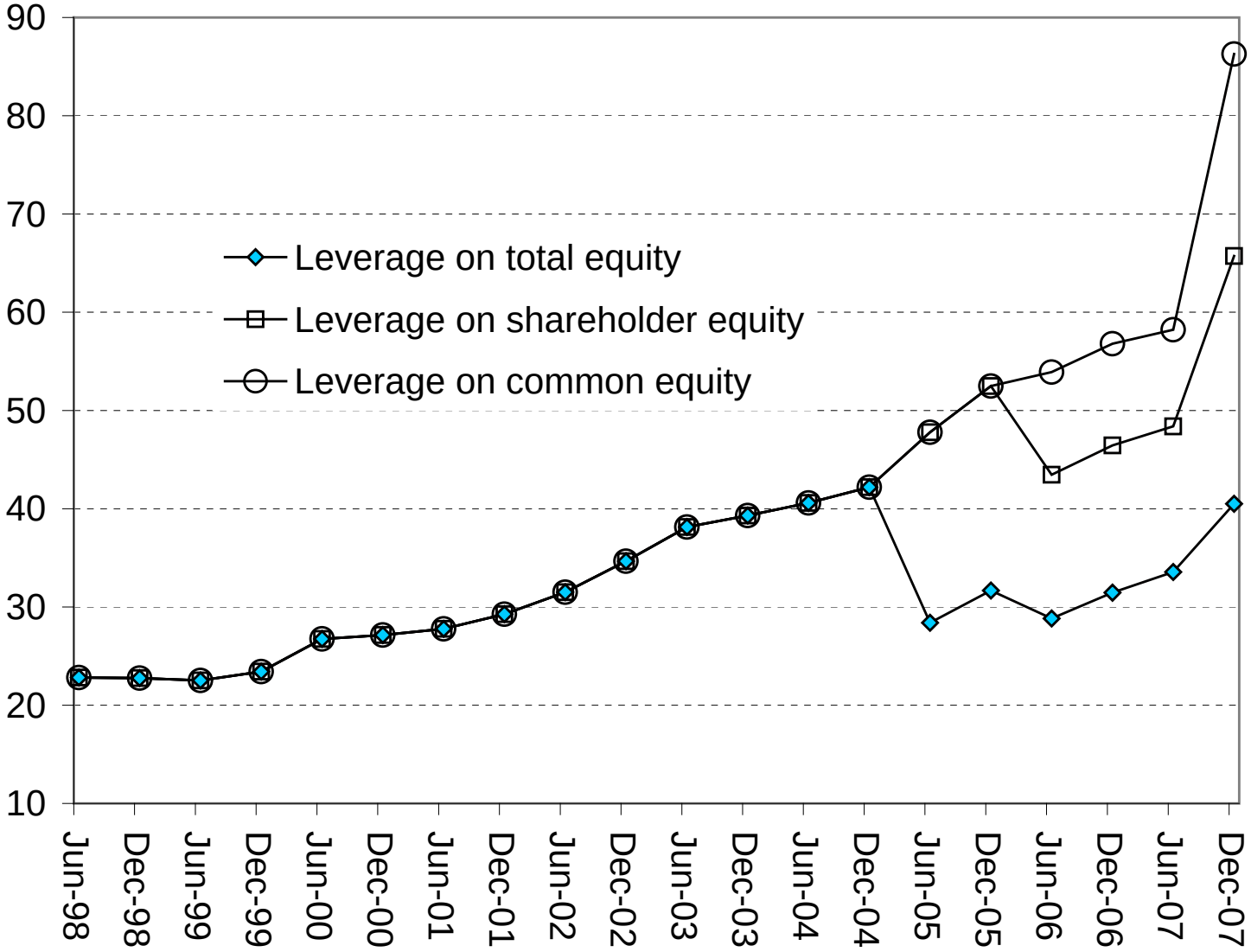
Composition of Northern Rock's Liabilities

(June 1998 - June 2007)



Northern Rock's Leverage

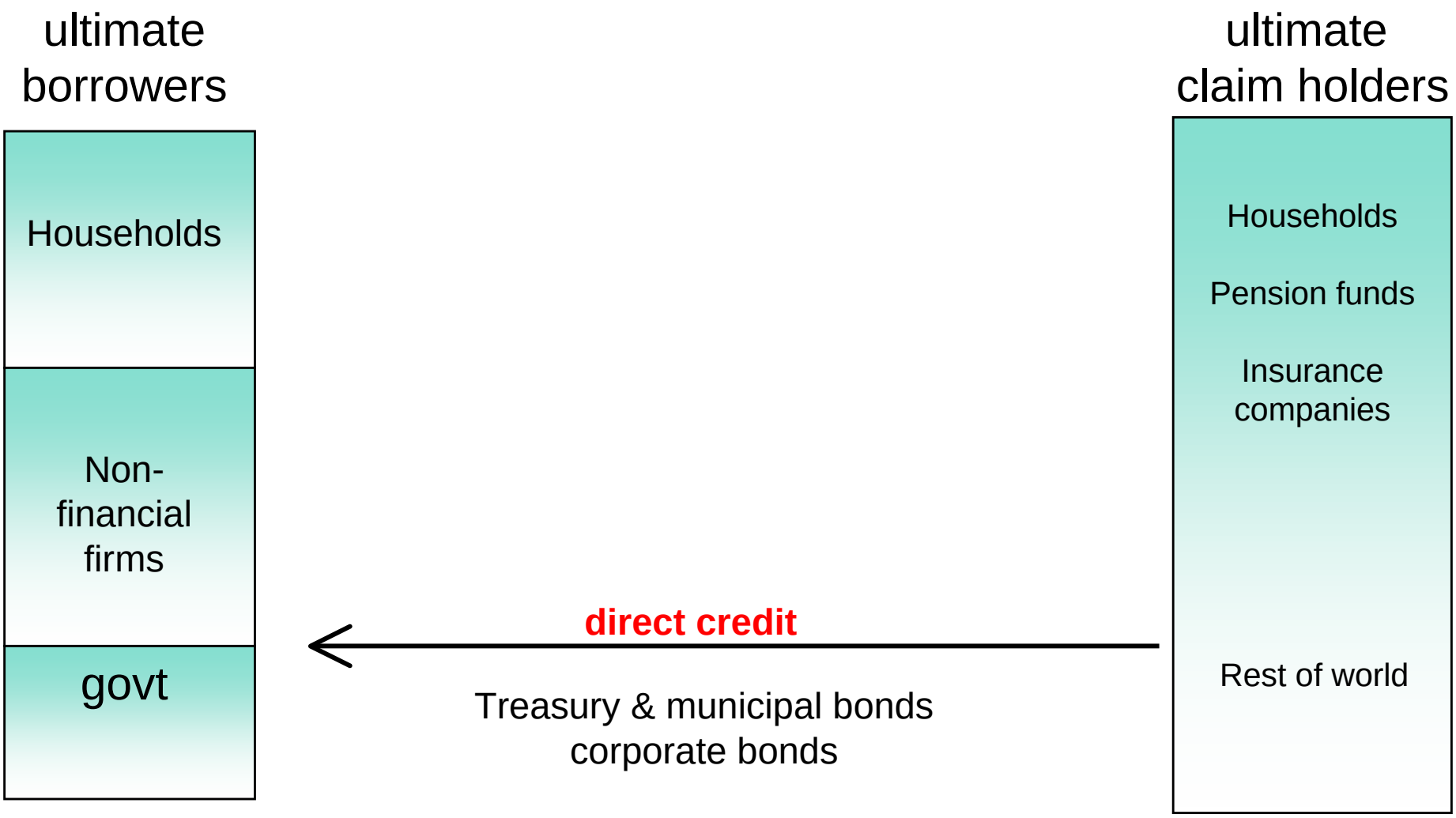
June 1998 - December 2007



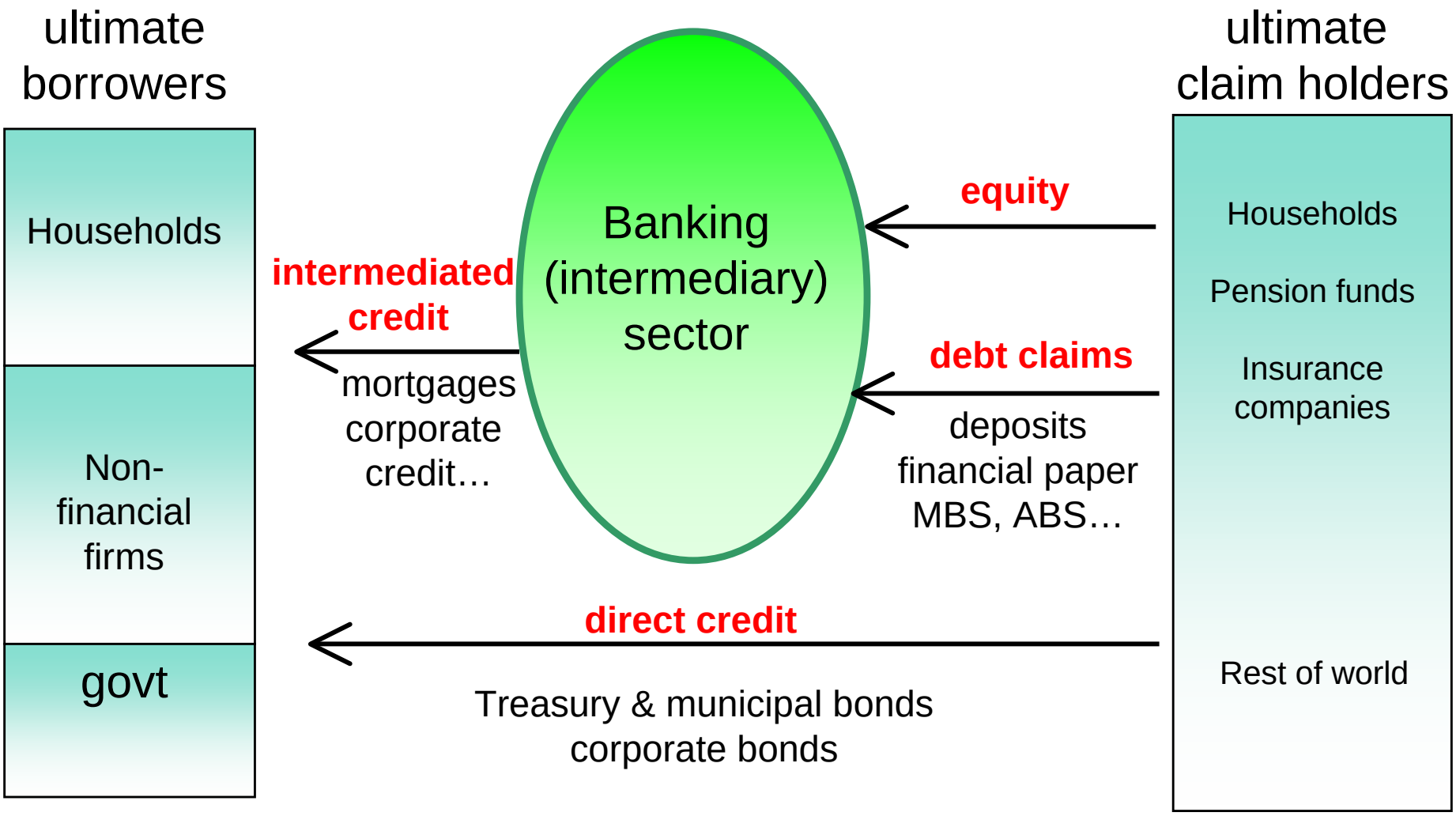
System Risk-weighted Capital Requirements

- Bank that lends to high system-weighted banks has high system weight
  - fixed point calculation
  - but infeasible without simplifying further
- Traditional regulatory segregation can sometimes be along natural boundaries

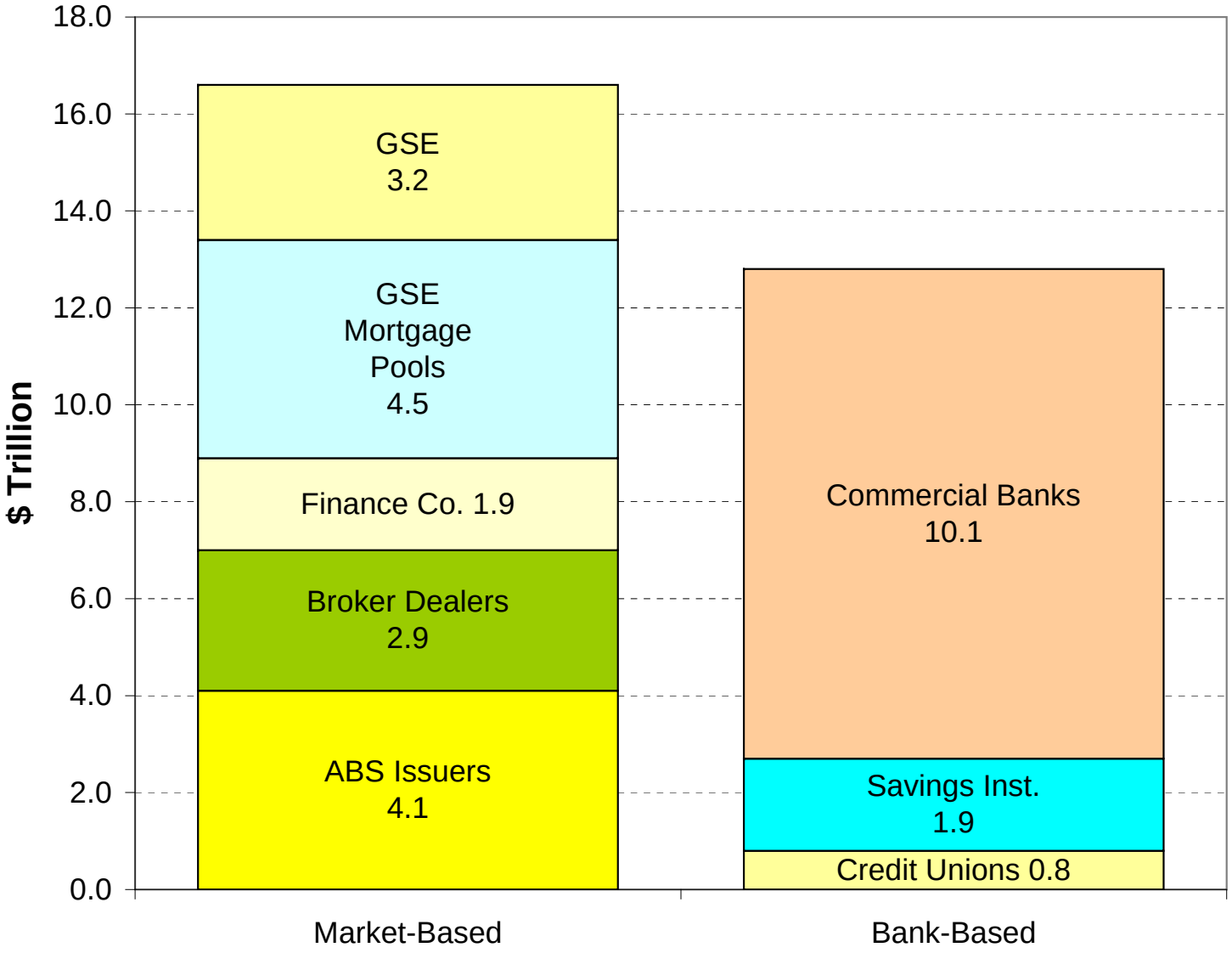
Stylized Financial System



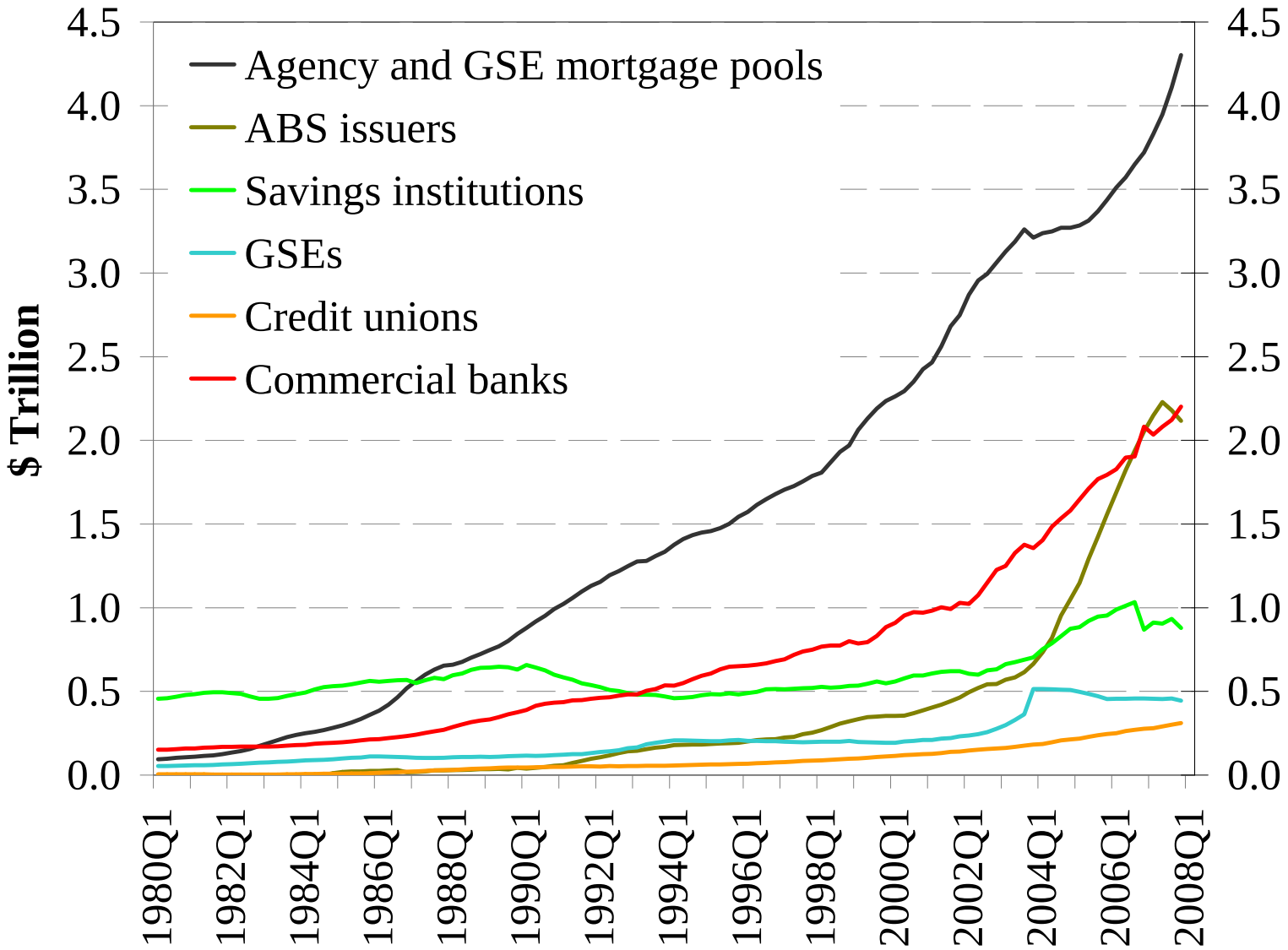
Stylized Financial System



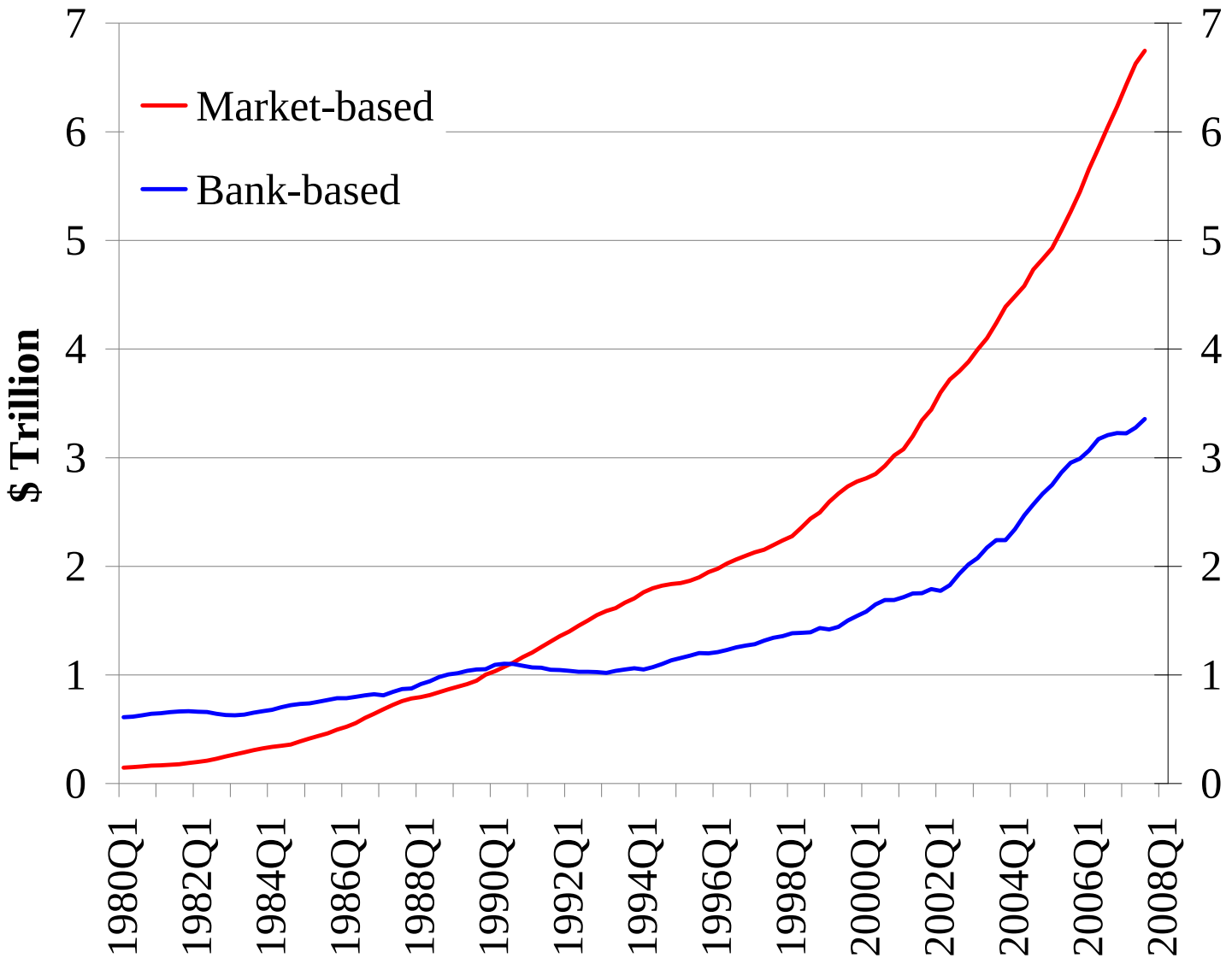
US Financial Intermediaries Total Assets (2007Q2)



Holding of US Home Mortgages by Type of Financial Institution

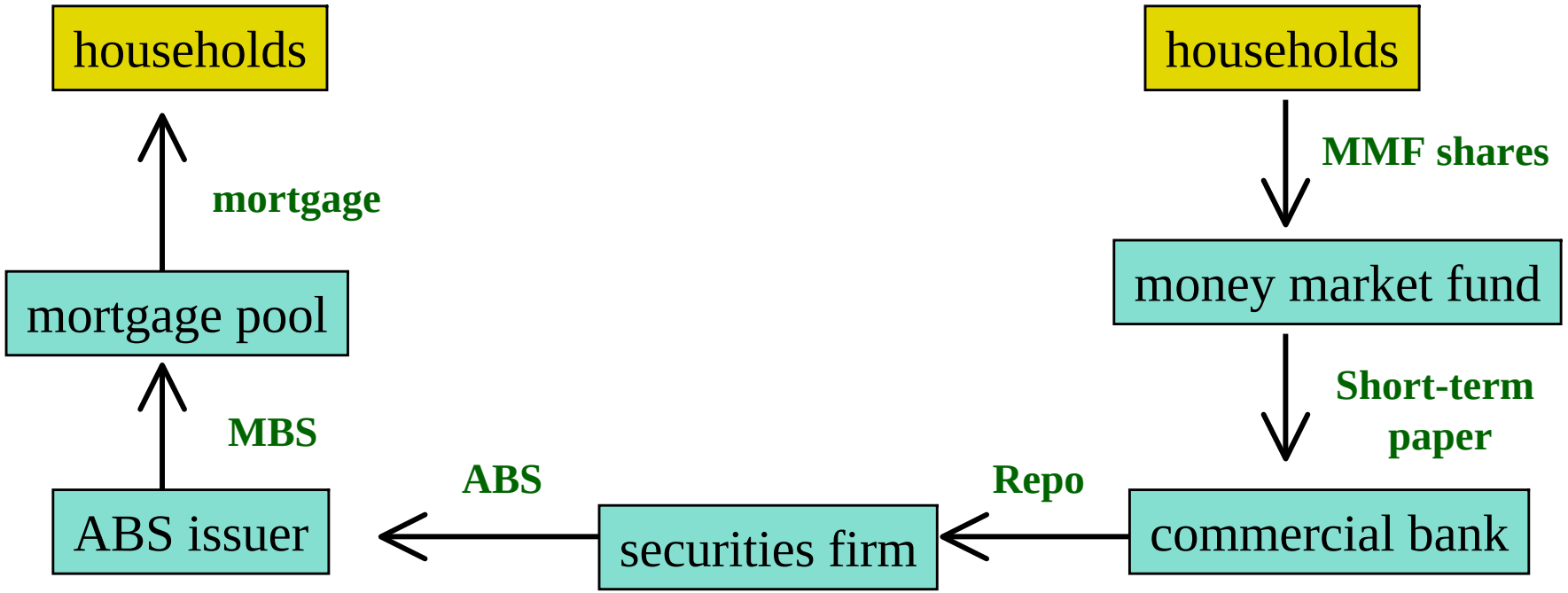


Market-Based and Bank-Based Holding of Home Mortgages



Short Intermediation Chain

Long Intermediation Chain



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

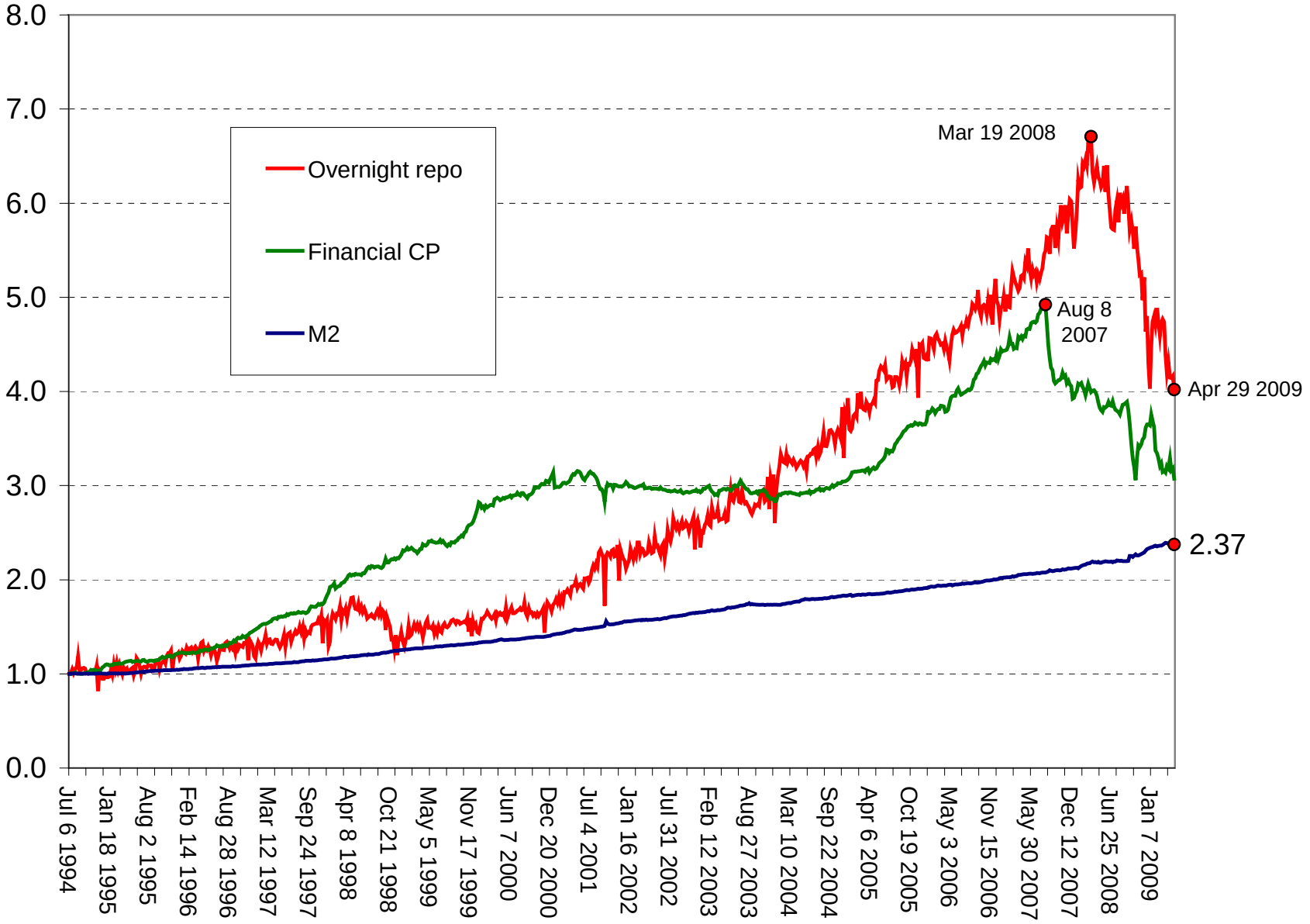
- Securitization has *concentrated risks* in leveraged sector
- Biggest growth in short-term debt was *between* financial intermediaries
- Financial intermediaries have become more *intertwined*
  - "CoVaR" Adrian and Brunnermeier (2009)

Exposure to Subprime

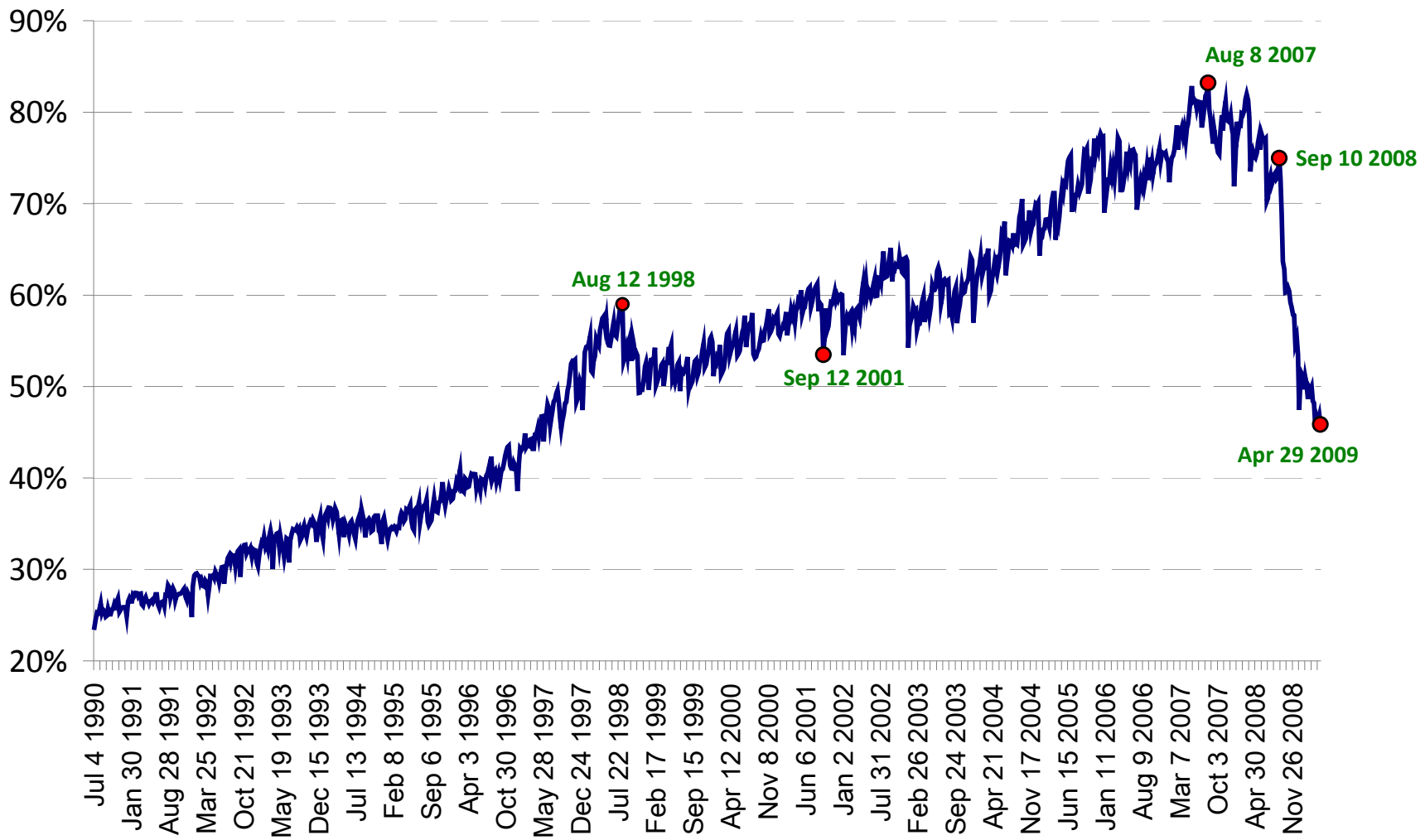
	Total reported sub-prime exposure (US$bn)	Percent of reported exposure
Investment Banks	75	5%
Commercial Banks	418	31%
GSEs	112	8%
Hedge Funds	291	21%
Insurance Companies	319	23%
Finance Companies	95	7%
Mutual and Pension Funds	57	4%
Leveraged Sector	896	66%
Unleveraged Sector	472	34%
Total	1,368	100%

Source: Greenlaw, Hatzius, Kashyap and Shin (2008)

Overnight repos, Financial CP and M2 (weekly, July 6 1994 as base date)



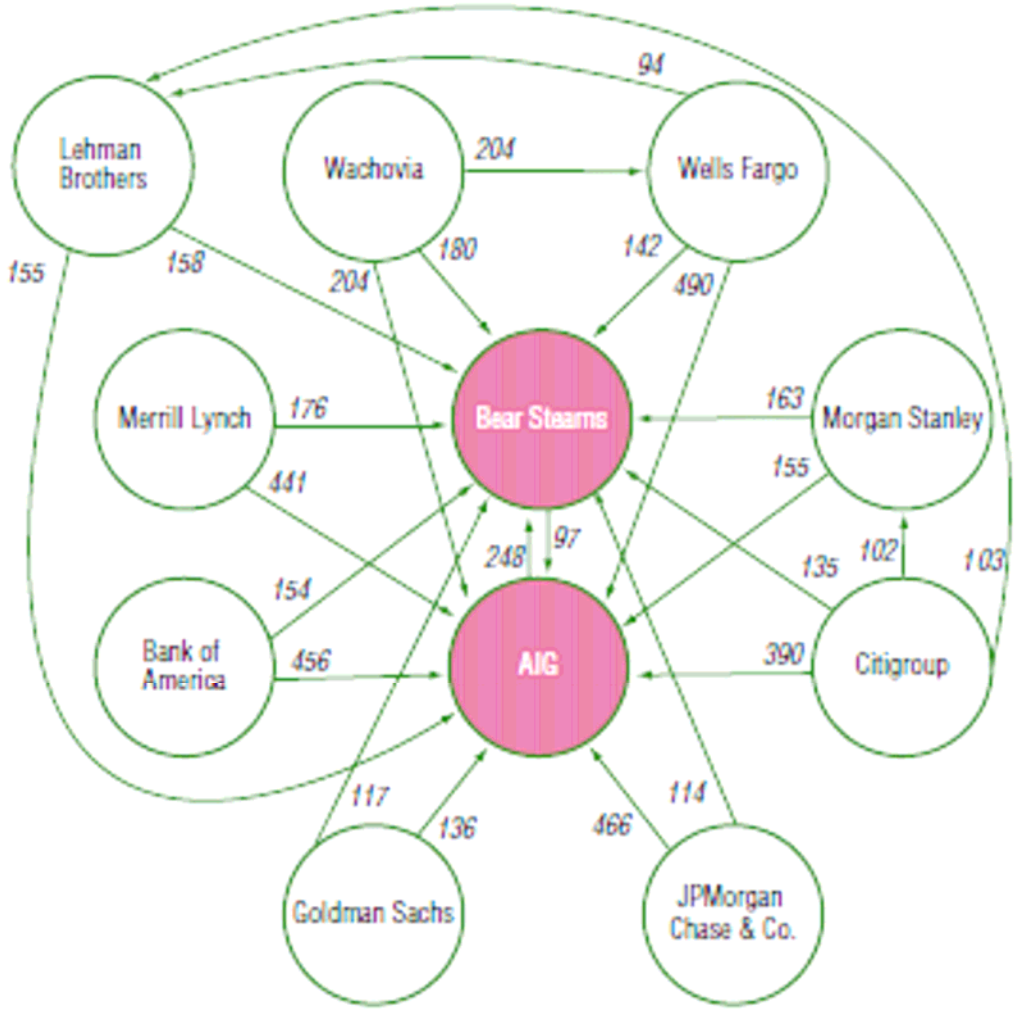
Repos and Financial CP as Fraction of M2 (weekly)



Source: Adrian and Shin (2009)

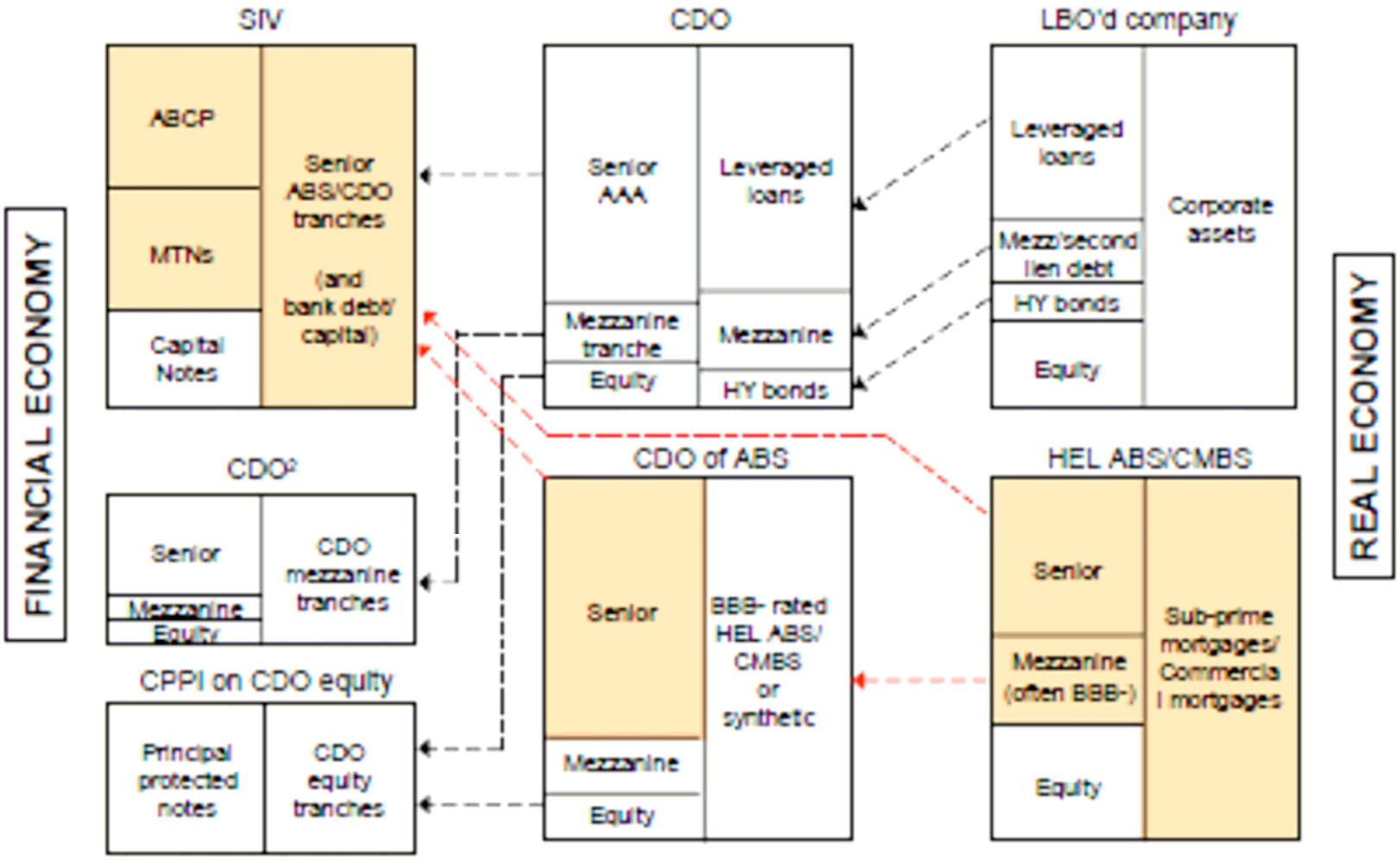
US Institutions' CoVaR

IMF Co-Risk Measures (March 2008)



Source: IMF GFSR (April 2009)

Multi-layered Financial System



Source: Haldane (2009)

Global Interconnectedness

Chart 2: Global Financial Network: 1995

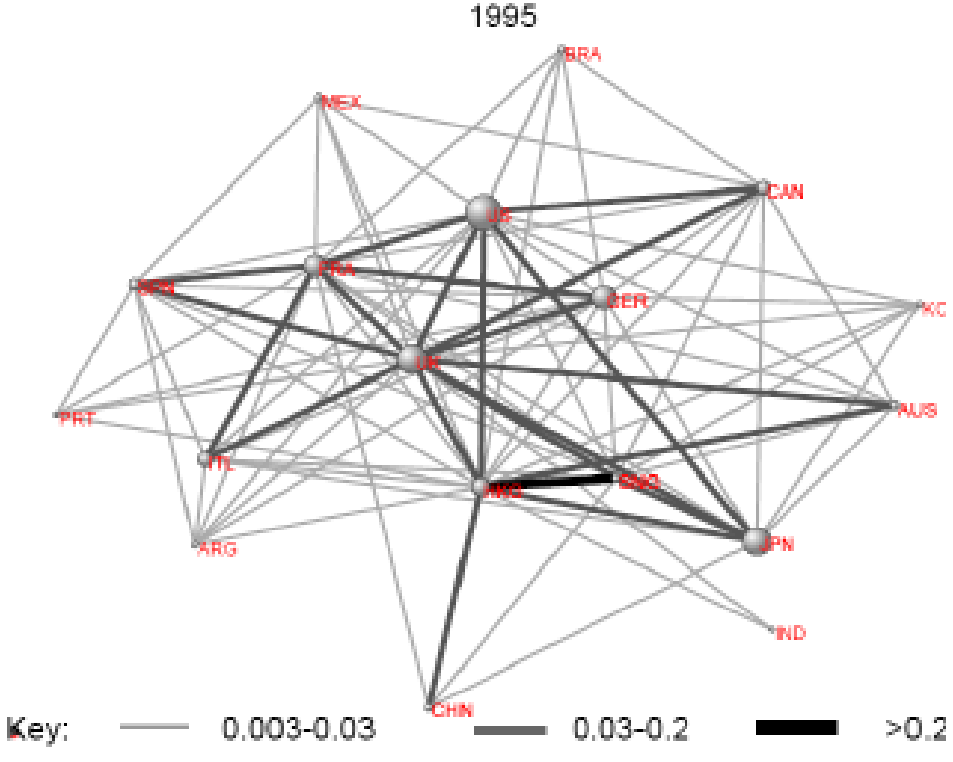
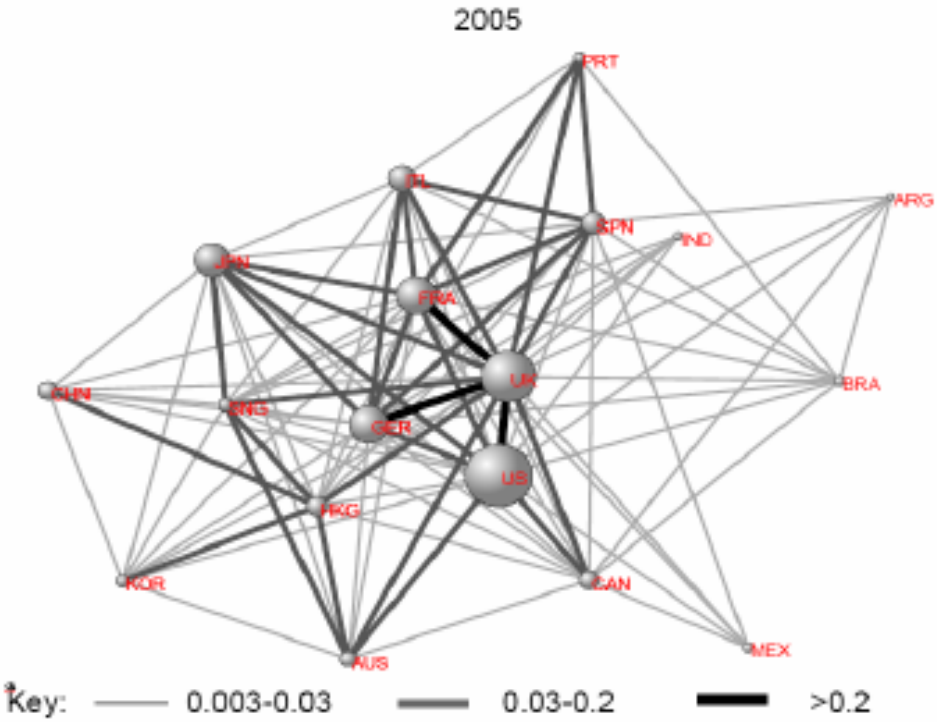


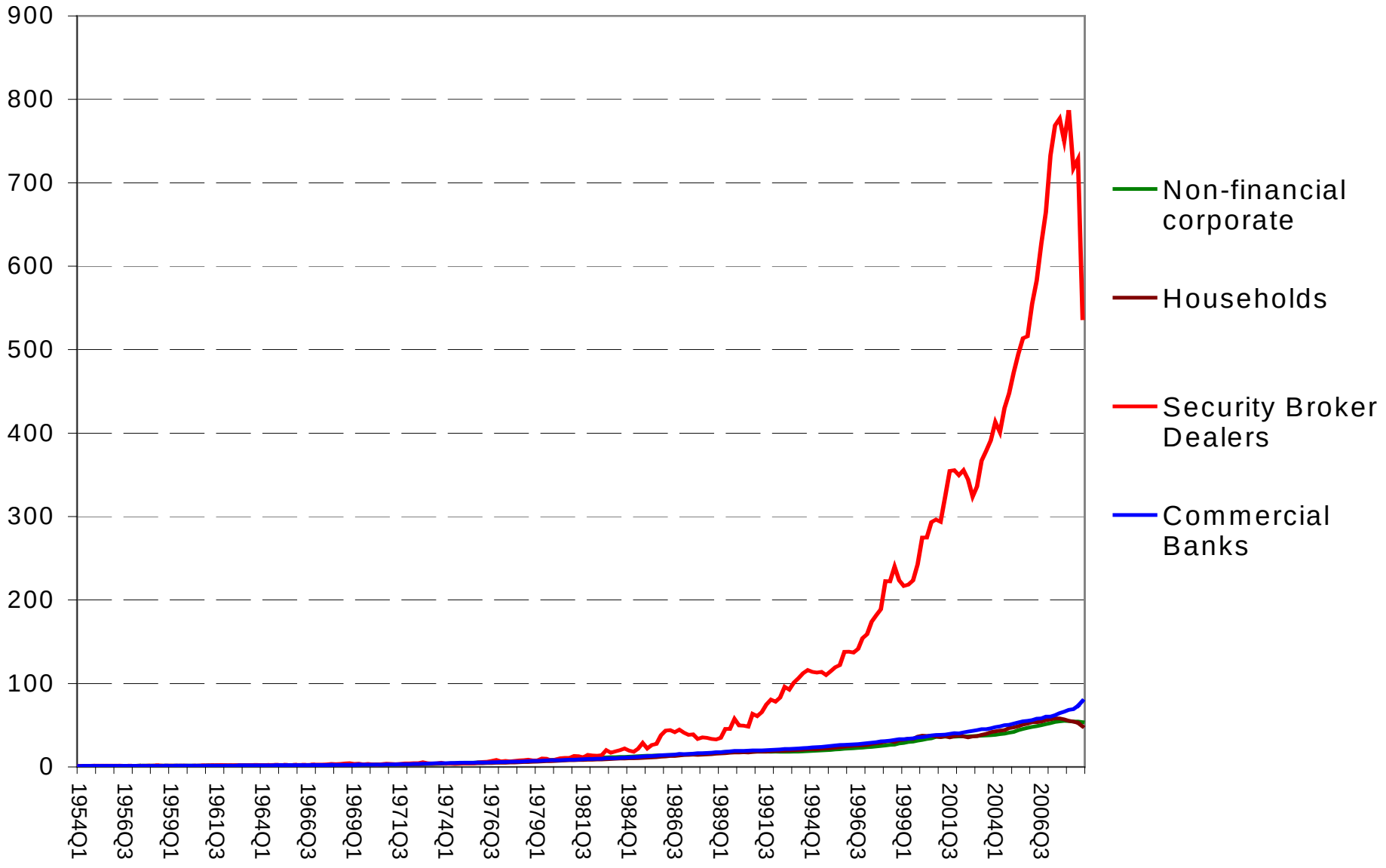
Chart 3: Global Financial Network: 2005



Source: Haldane (2009)

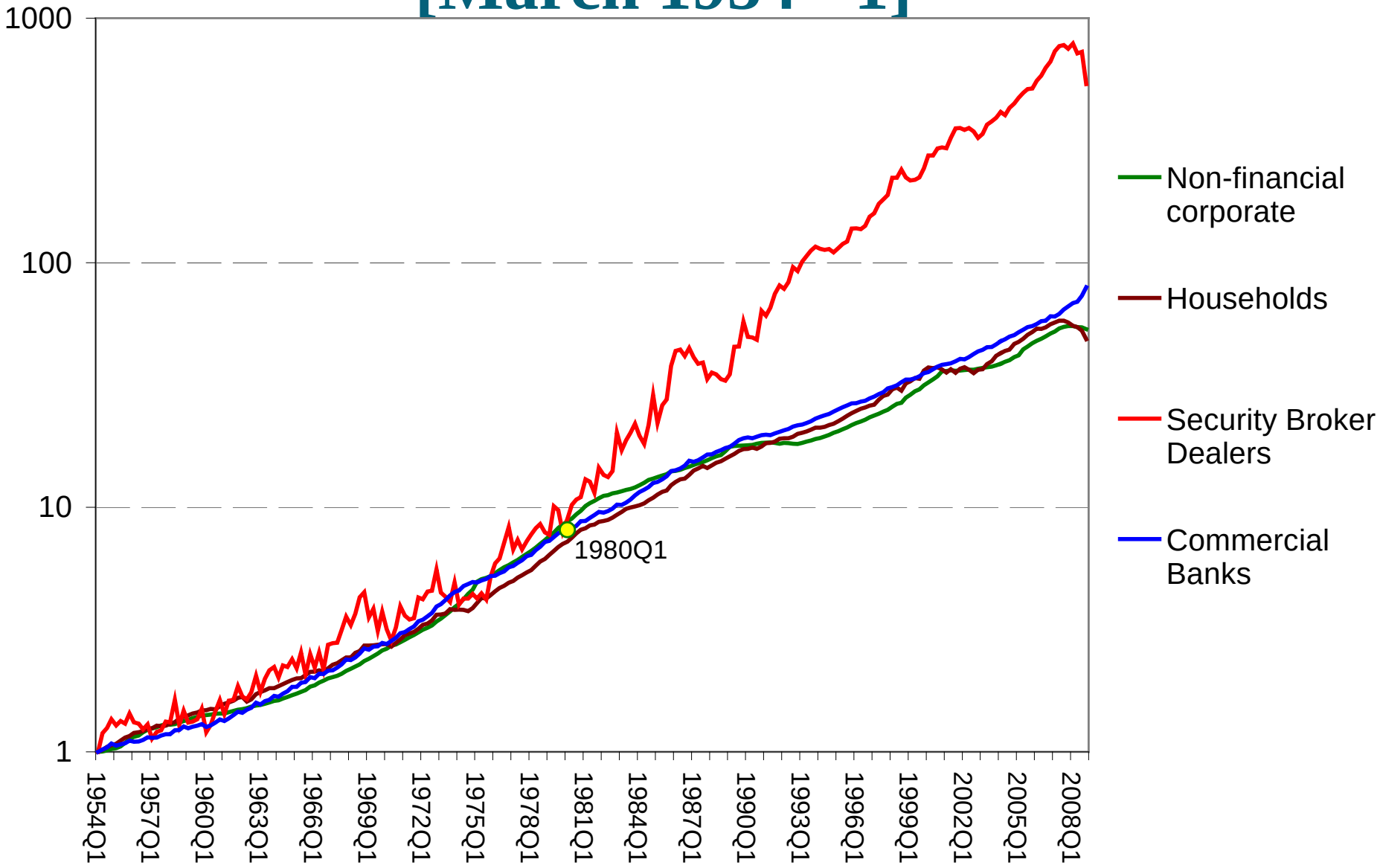
Relative Size of Intermediary Sector

Total Assets of Four Sectors [March 1954 =1]



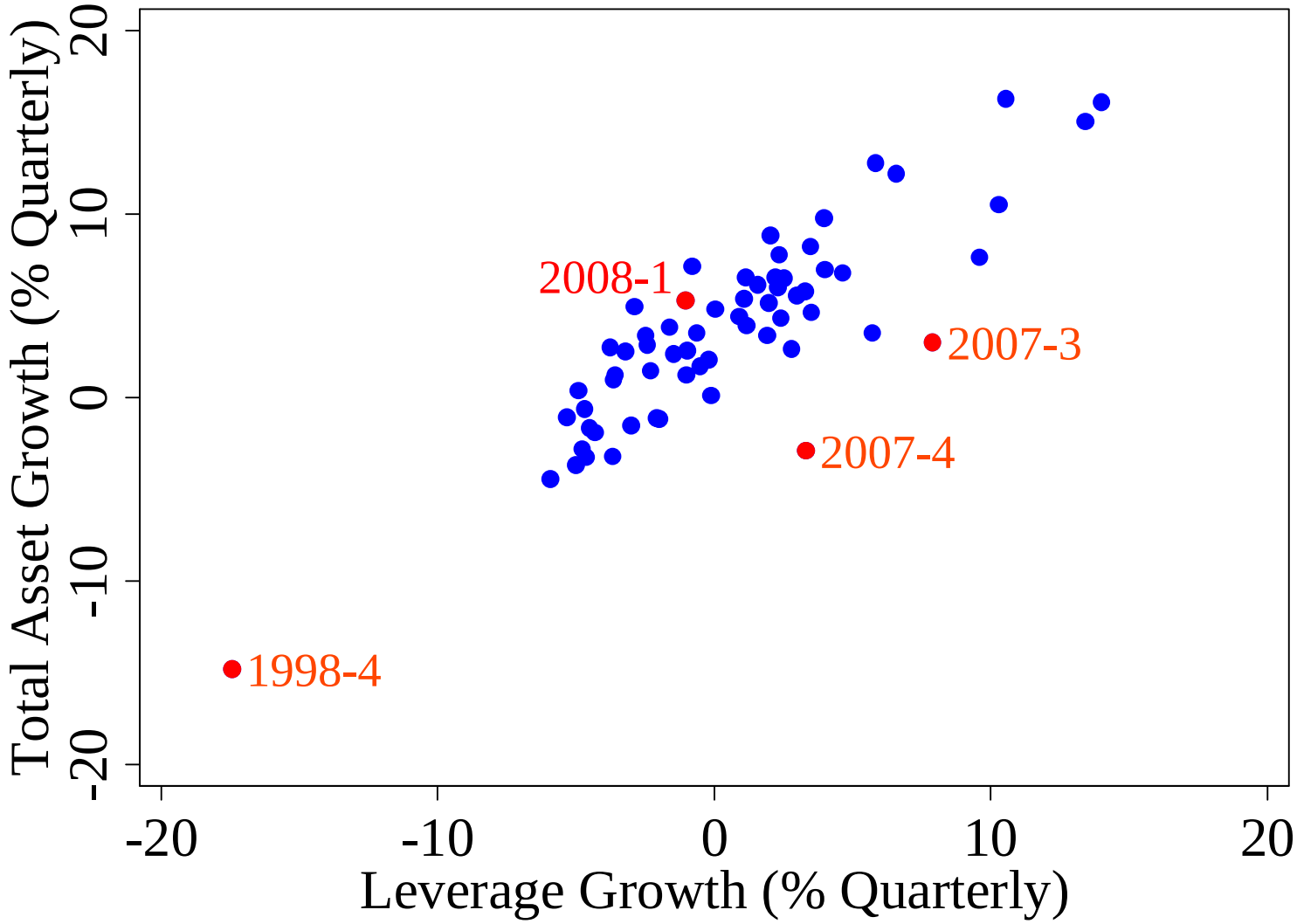
(Source: Federal Reserve, Flow of Funds)

Total Assets (Log Scale)
[March 1954 =1]



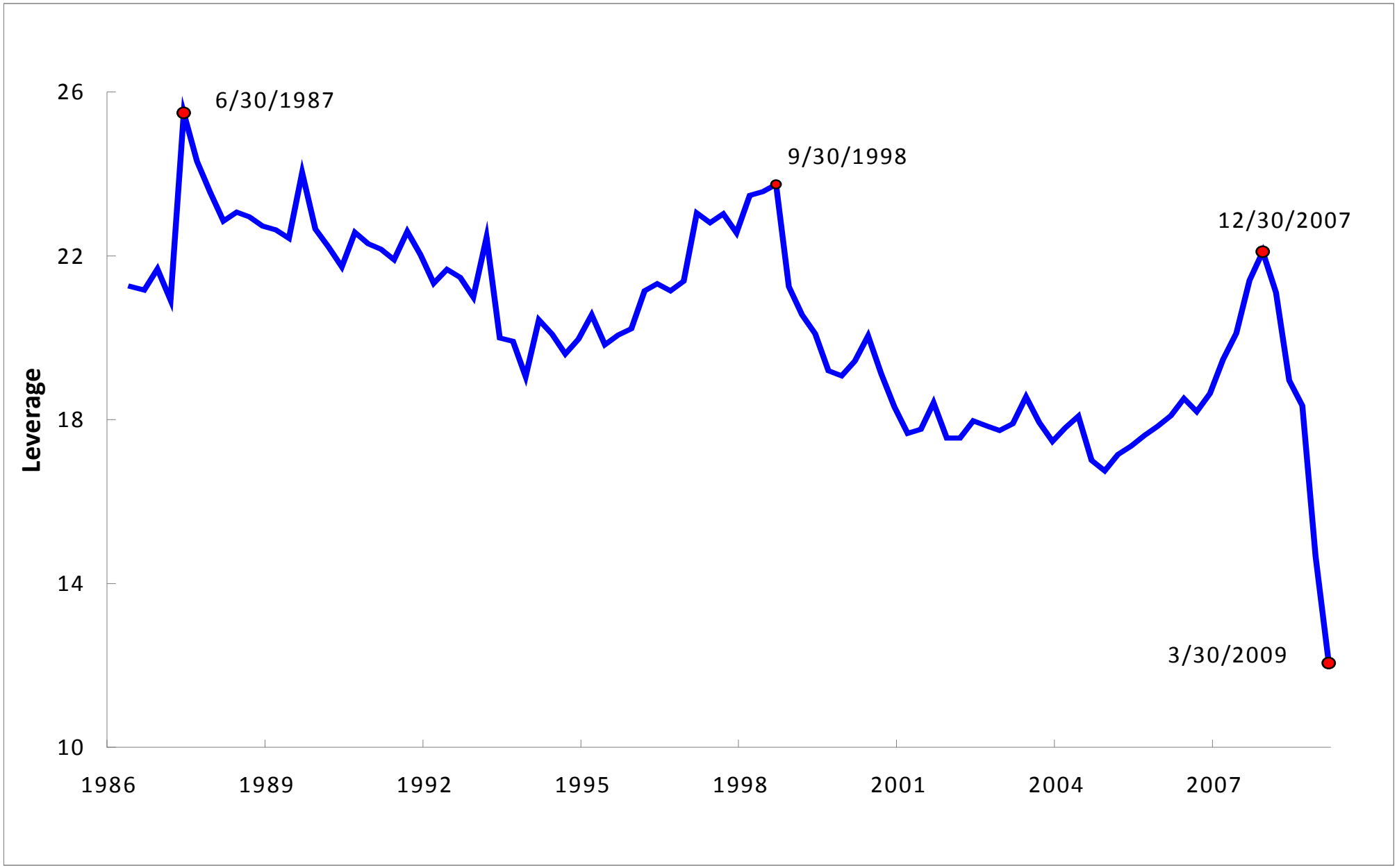
(Source: Federal Reserve, Flow of Funds)

Procyclical Leverage of Five US Investment Banks

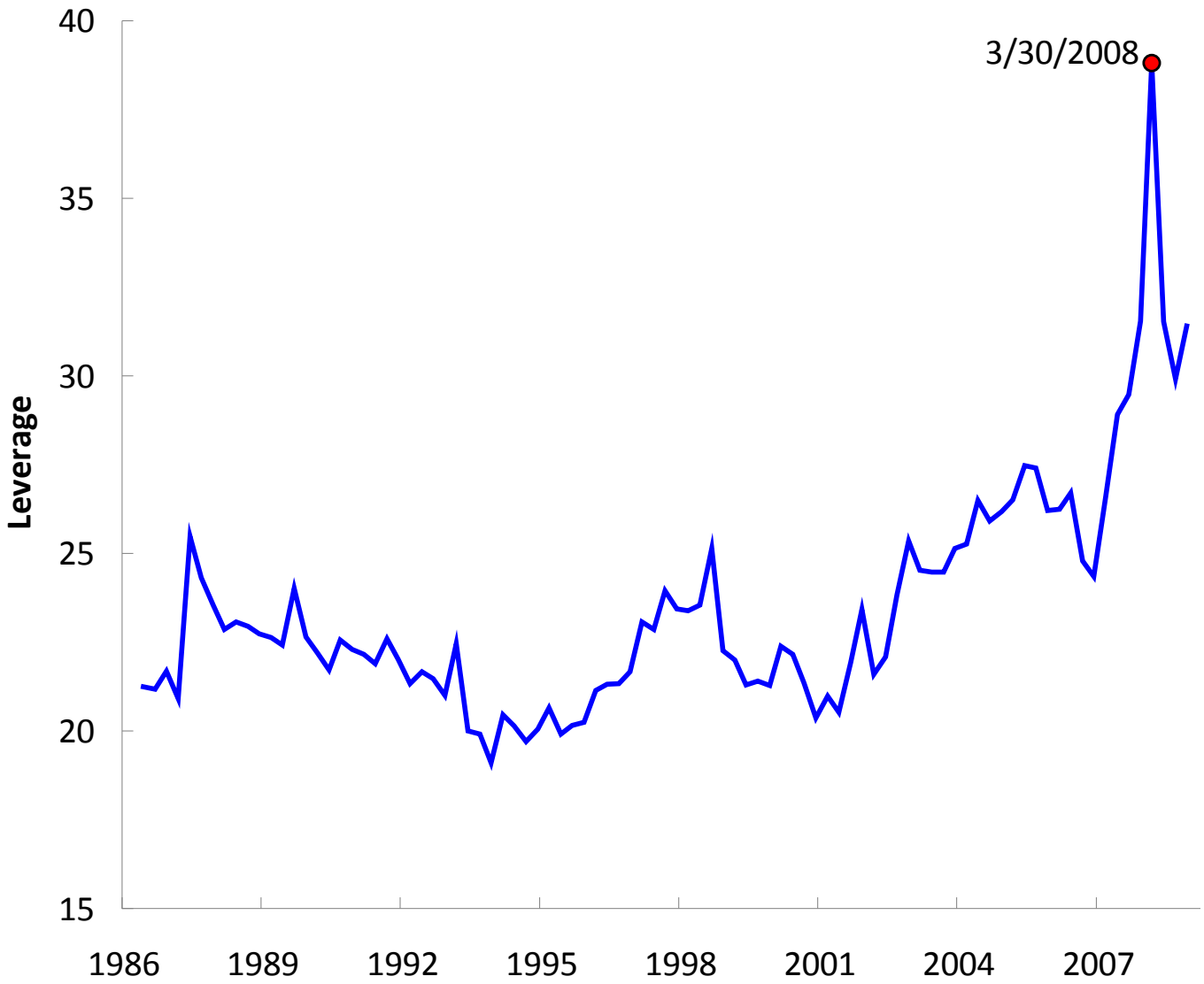


Source: Adrian and Shin (2007)

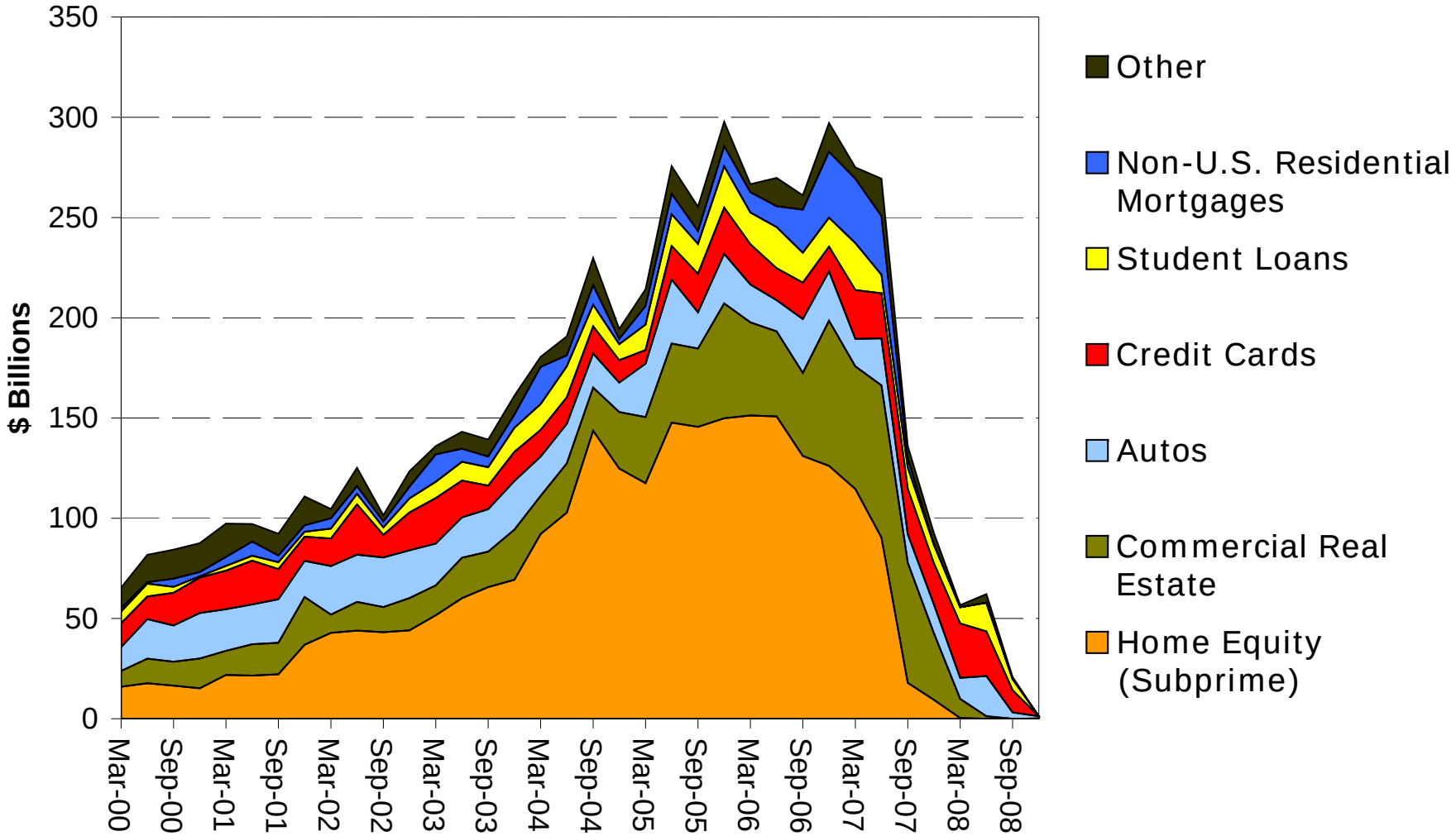
US Primary Dealer Mean Leverage



All Primary Dealer Mean Leverage

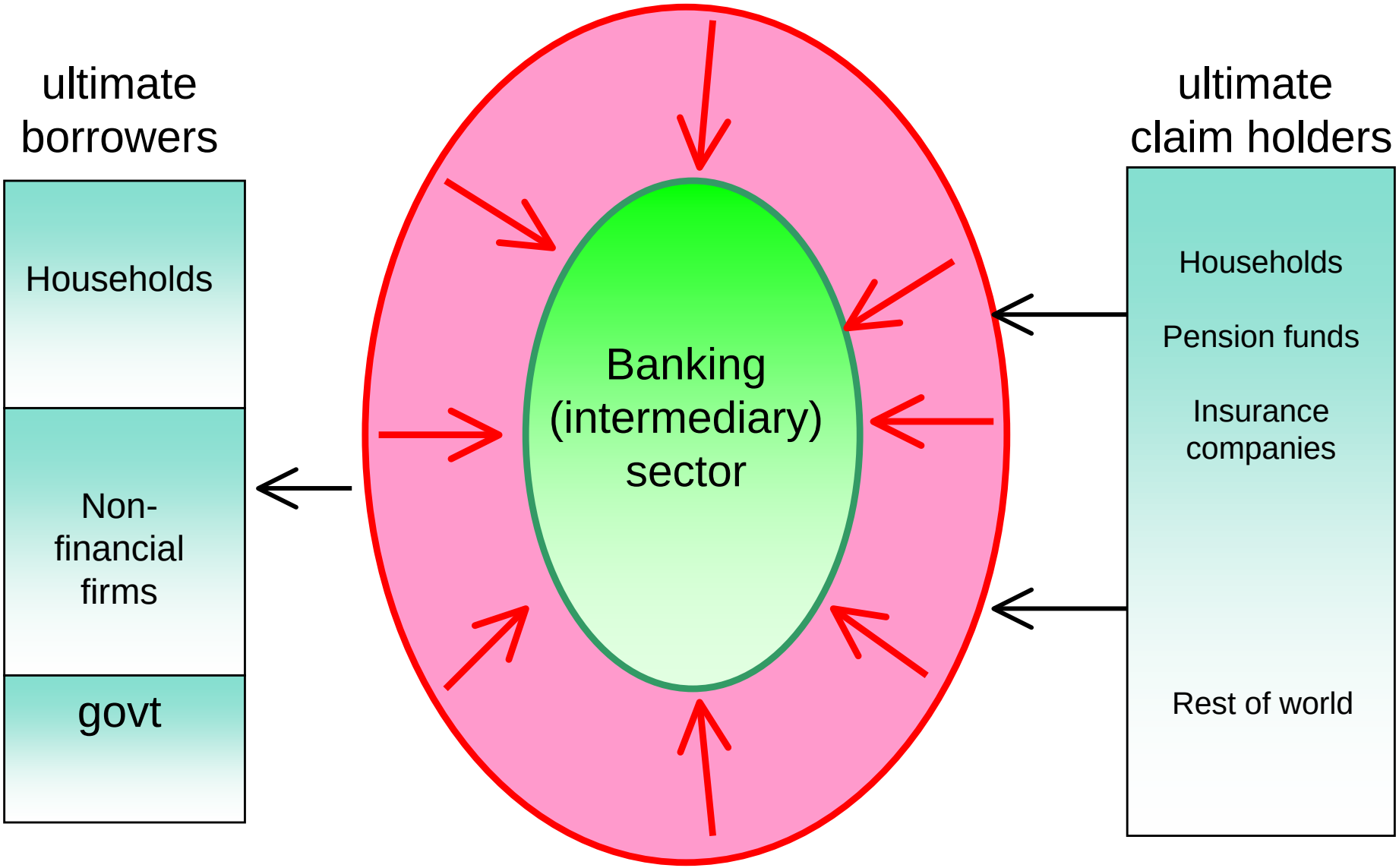


New Issuance of Asset Backed Securities in Previous Three Months

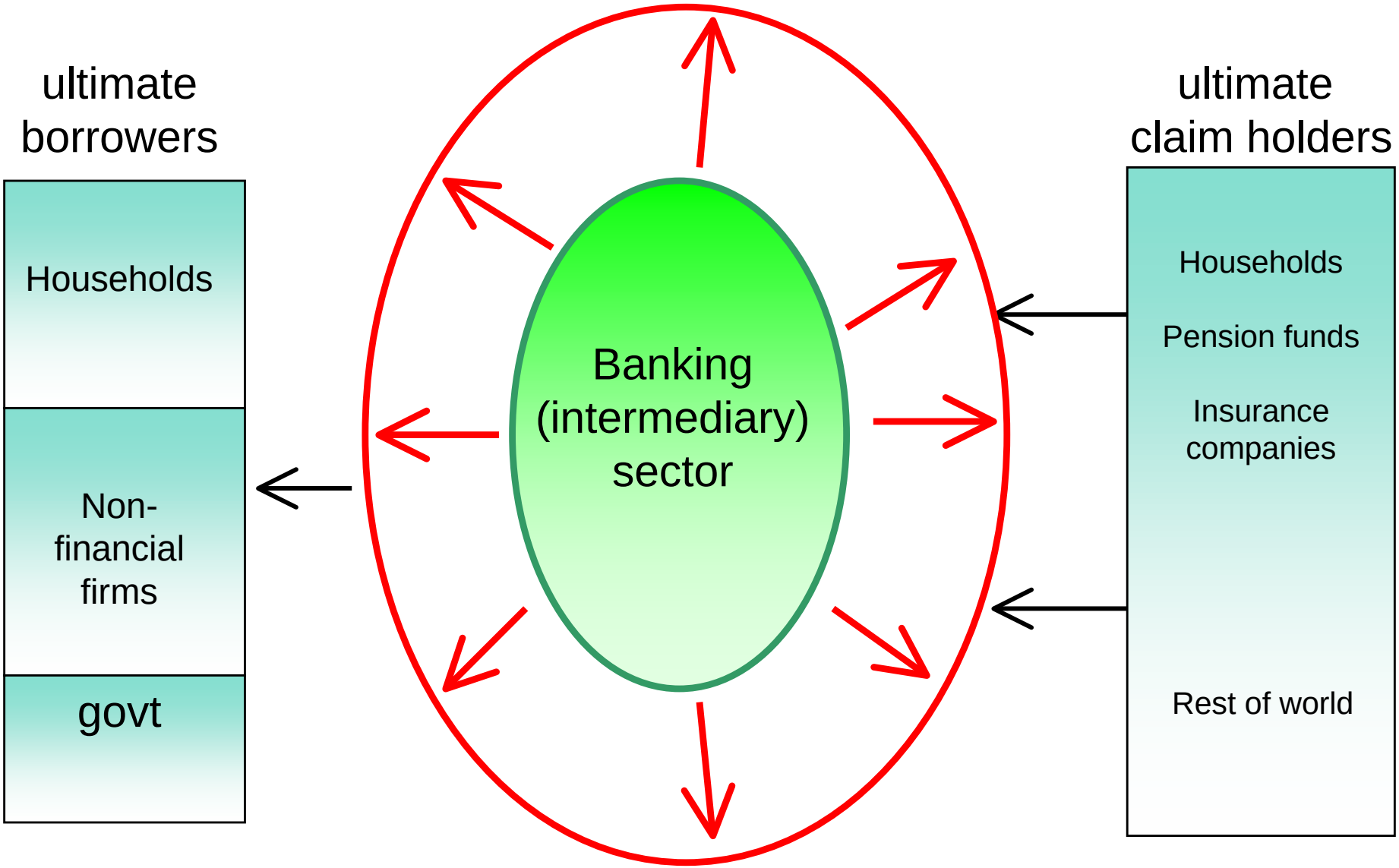


Source: JP Morgan

Biggest Damage is Done in Contractions



But Seeds of Crises Are Sown in Expansions



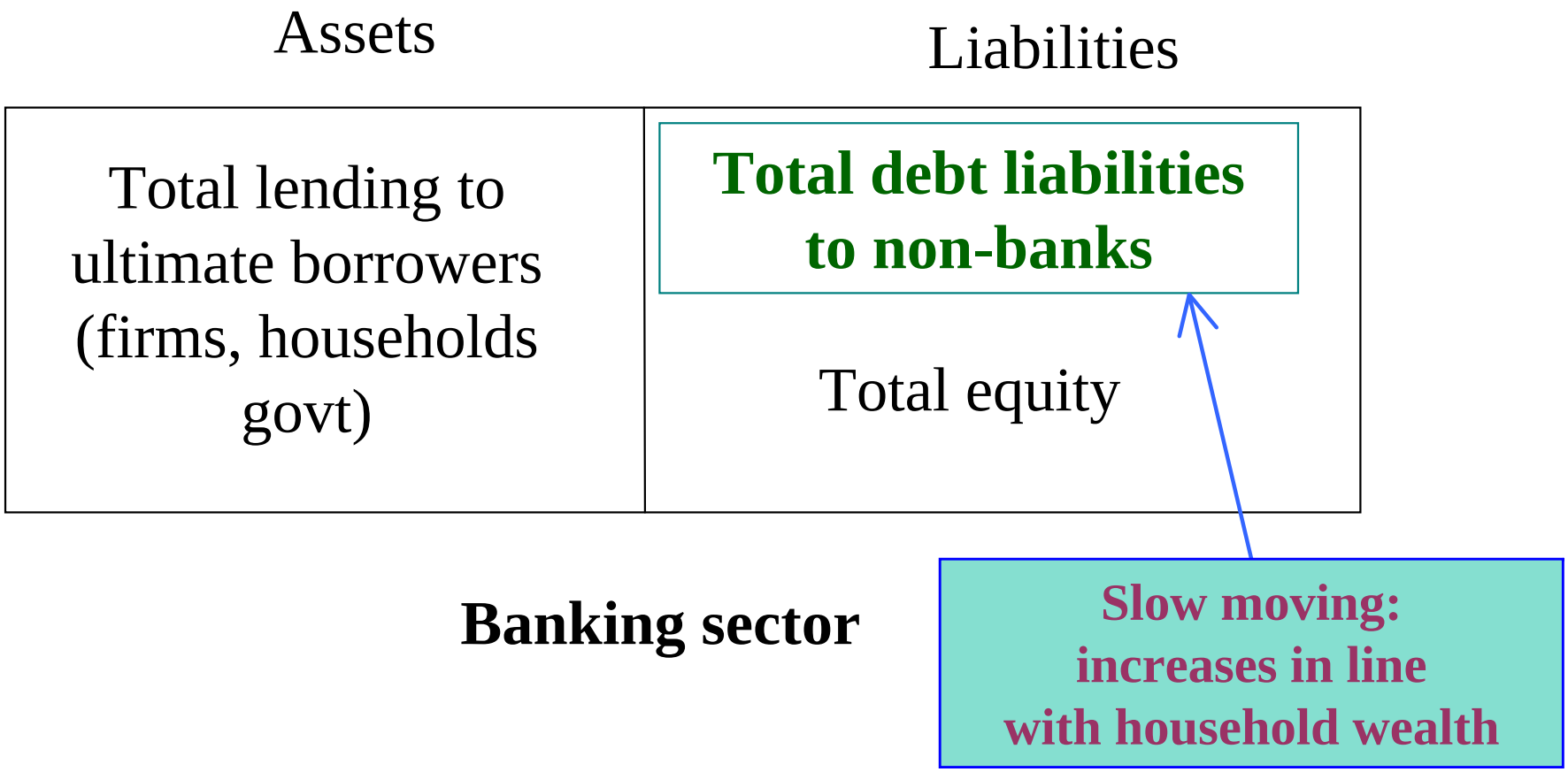
How To Moderate Balance Sheet Boom/Bust Cycles?

Individual Bank Balance Sheet

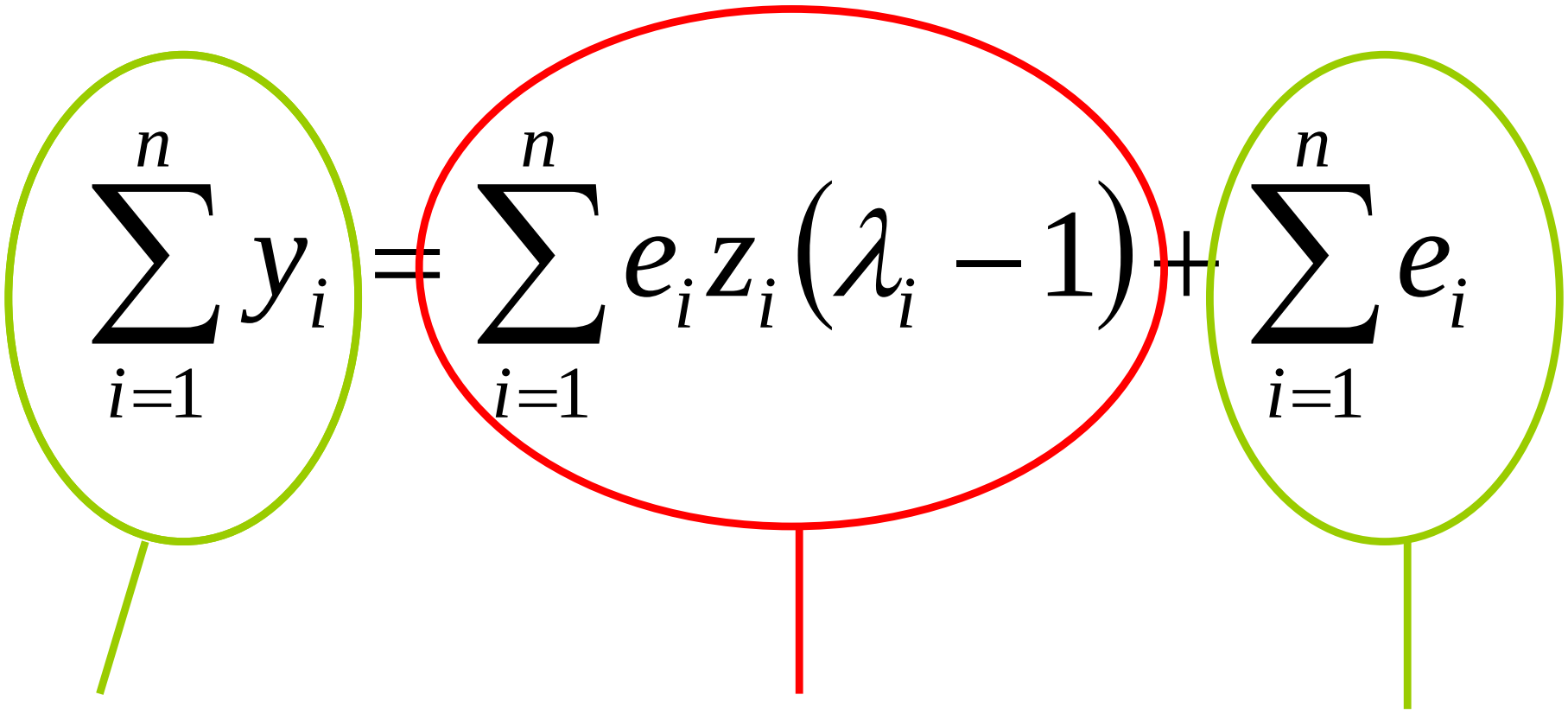
Assets	Liabilities
Loans to firms, households	Liabilities to non-banks (e.g. deposits)
Claims on other banks	Liabilities to other banks
	Equity

Individual bank

Balance Sheet for Banking Sector



Aggregate Balance Sheet Identity



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

Northern Rock

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)

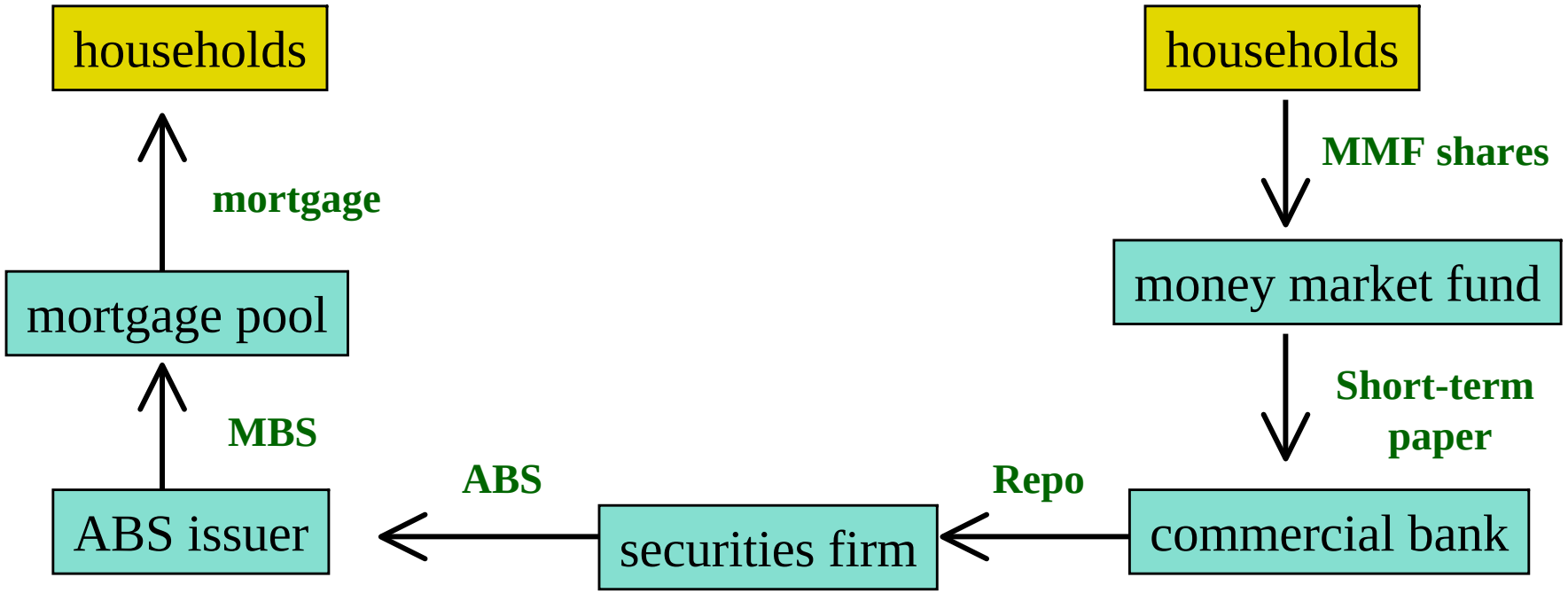
Approach 3: Shortening Intermediation Chains through Development of New Instruments

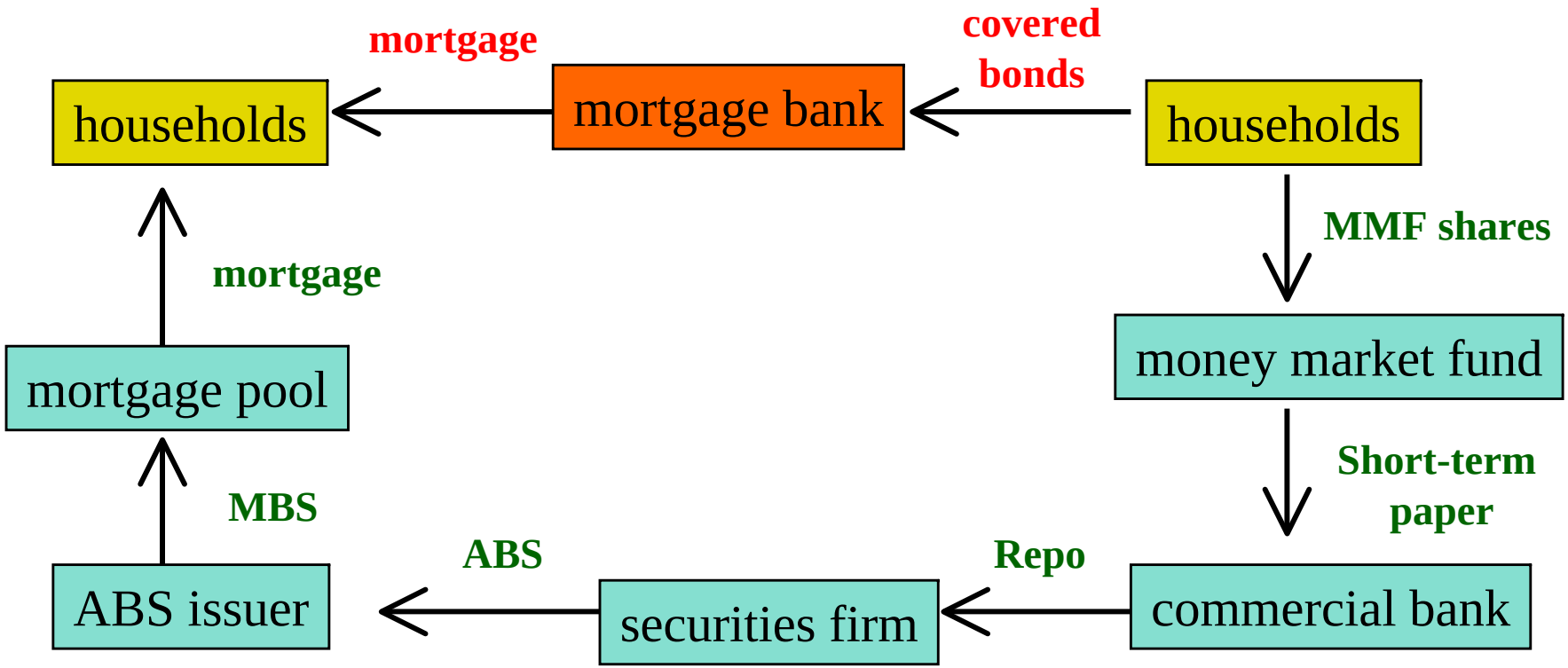
$$\sum_{i=1}^{n} y_i = \sum_{i=1}^{n} e_i z_i (\lambda_i - 1) + \sum_{i=1}^{n} e_i$$

Covered bonds

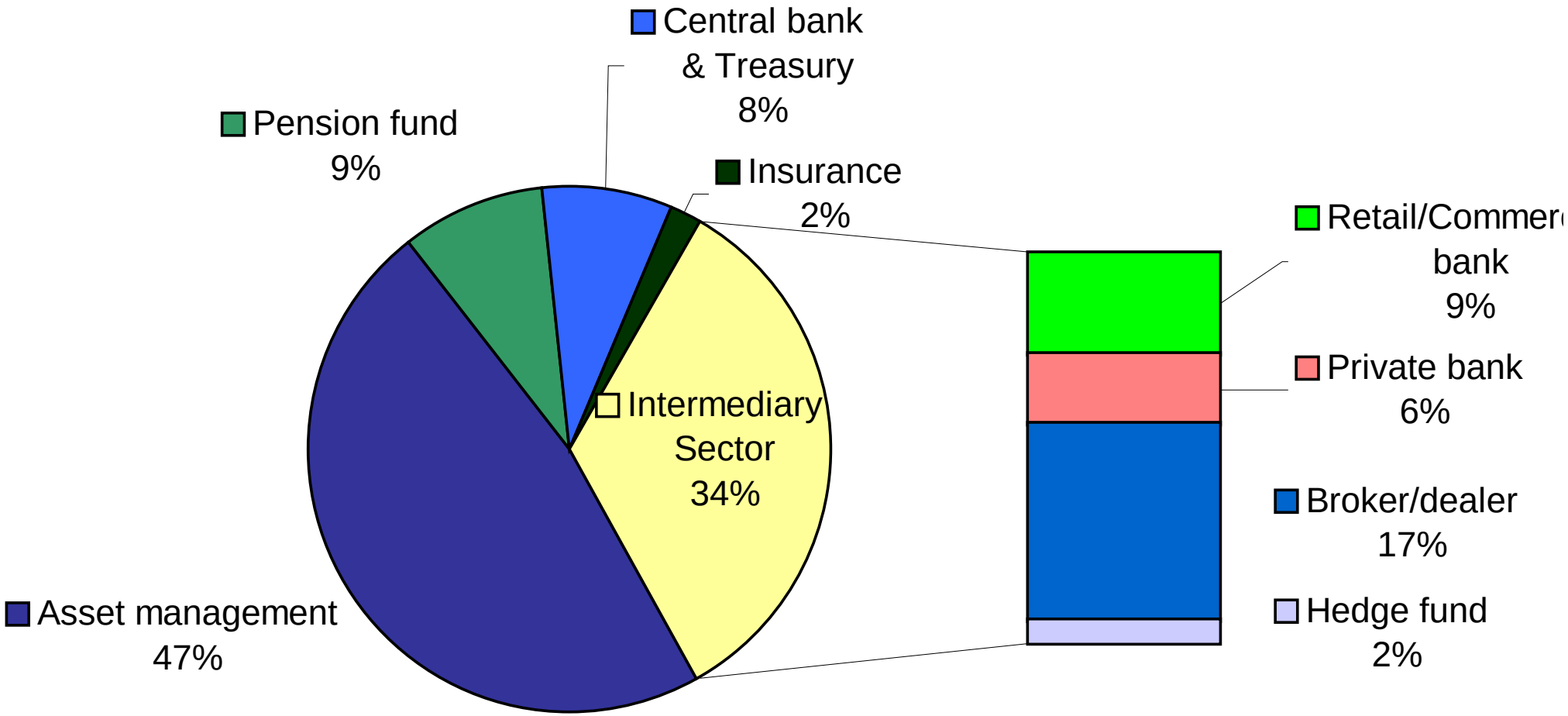
- Danish mortgage bonds
- German pfandbrief bonds

Long Intermediation Chain




households
mortgage
mortgage bank
covered
bonds
households
mortgage
MMF shares
mortgage pool
money market fund
MBS
Short-term
paper
ABS issuer
ABS
securities firm
Repo
commercial bank

Investors in Covered Bonds



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?