

# **Integrating Capital and Liquidity Requirements in Prudential Regulation**

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CEASA / CARE Conference

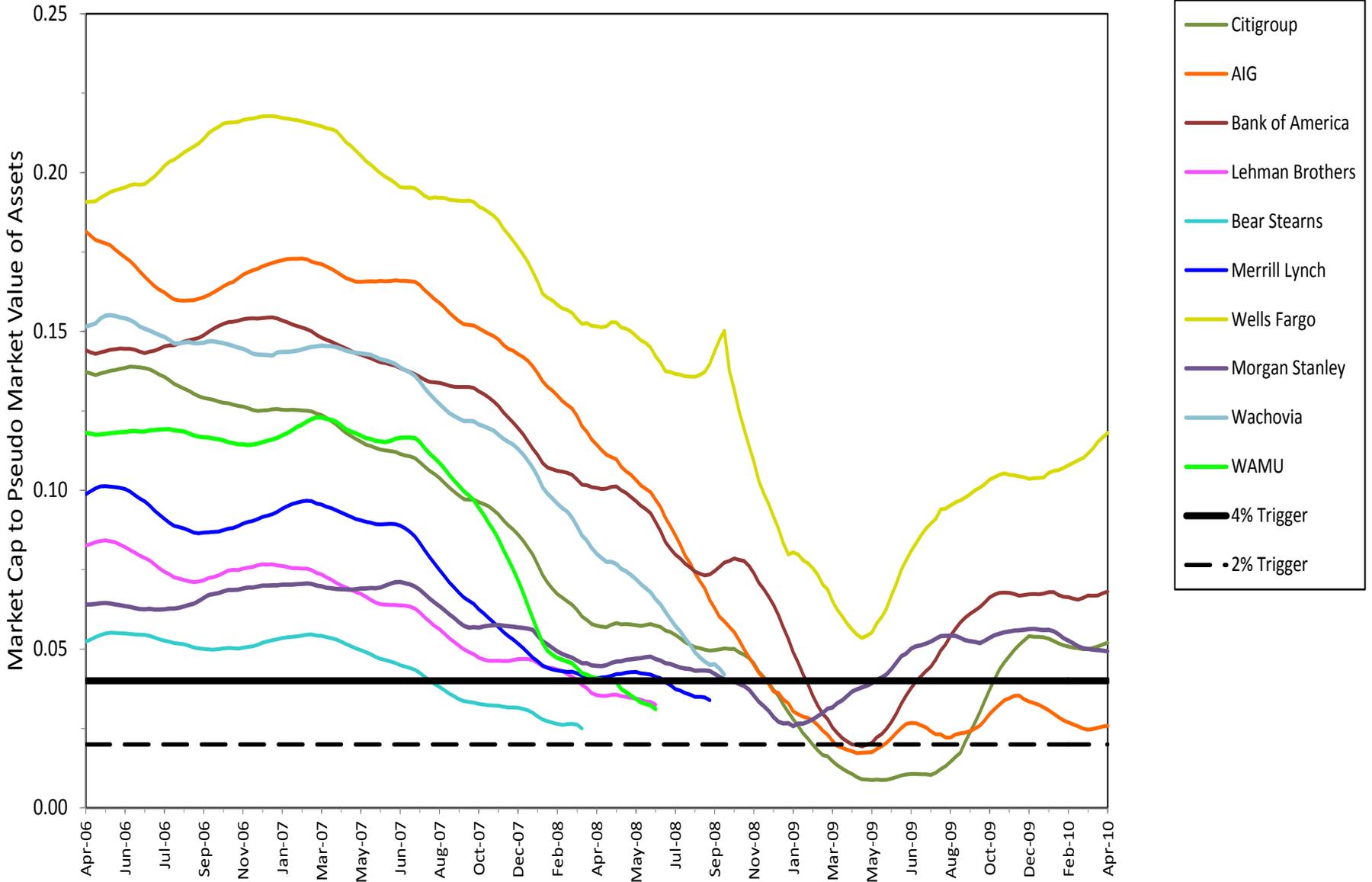
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# The Crisis in Cross Section

- Cross-sectional evidence shows that there was **not a common crisis experience**.
  - Ex post losses differed dramatically (UBS, Citi, Baer, Merrill, Lehman, AIG, Fannie, Freddie vs. Credit Suisse, DeutscheBank, JPMorgan, Goldman, and many others)
  - Ex ante risks relative to equity capital obviously were quite different (Citibank vs. Goldman)
  - Internal quality of risk management is at least part of this story (not all obviously intentional CEO risk taking)

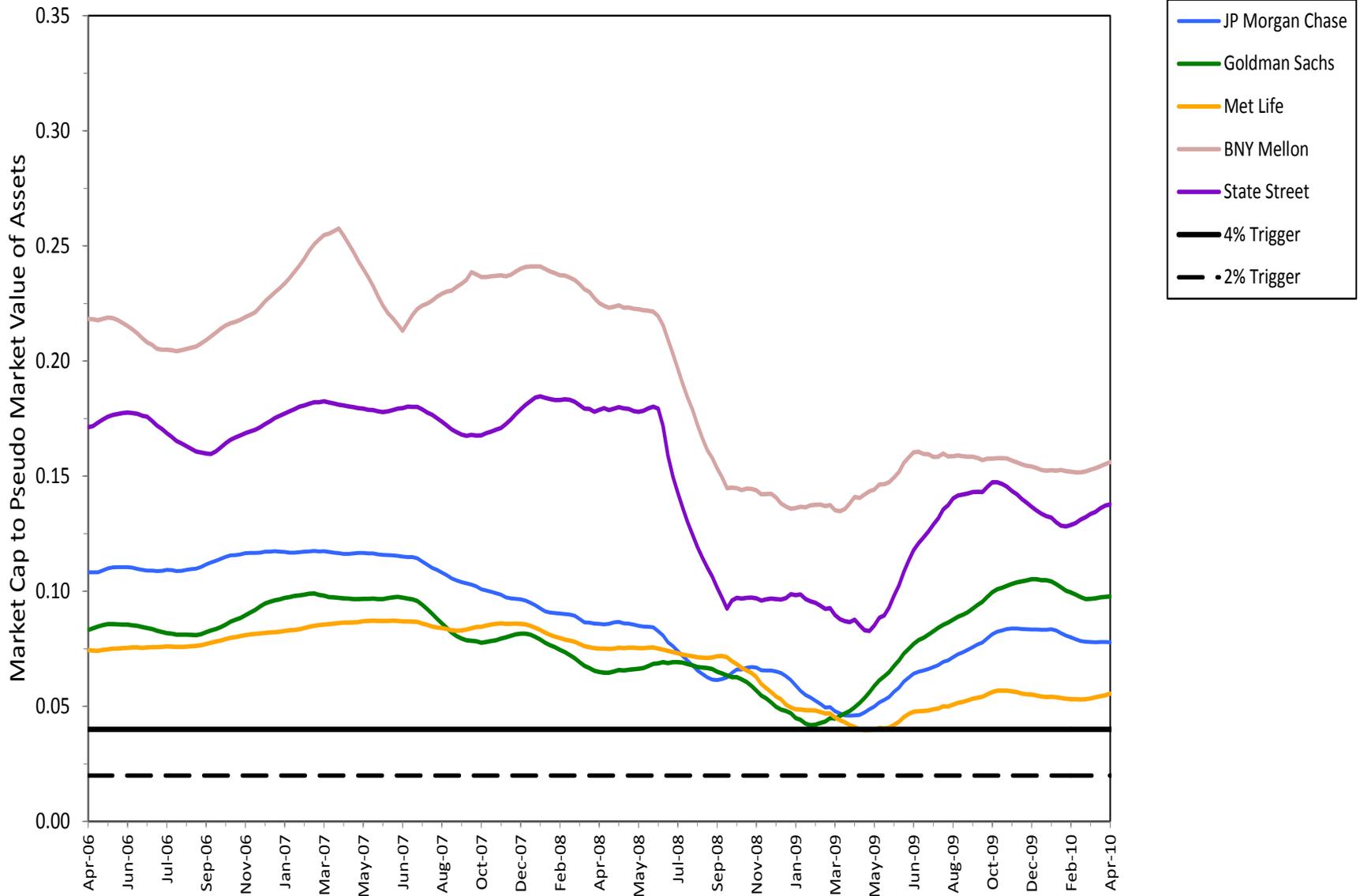
# 90 Day Rolling Market Cap to Pseudo Market Value of Assets

For large American financial institutions that received SCAP infusions

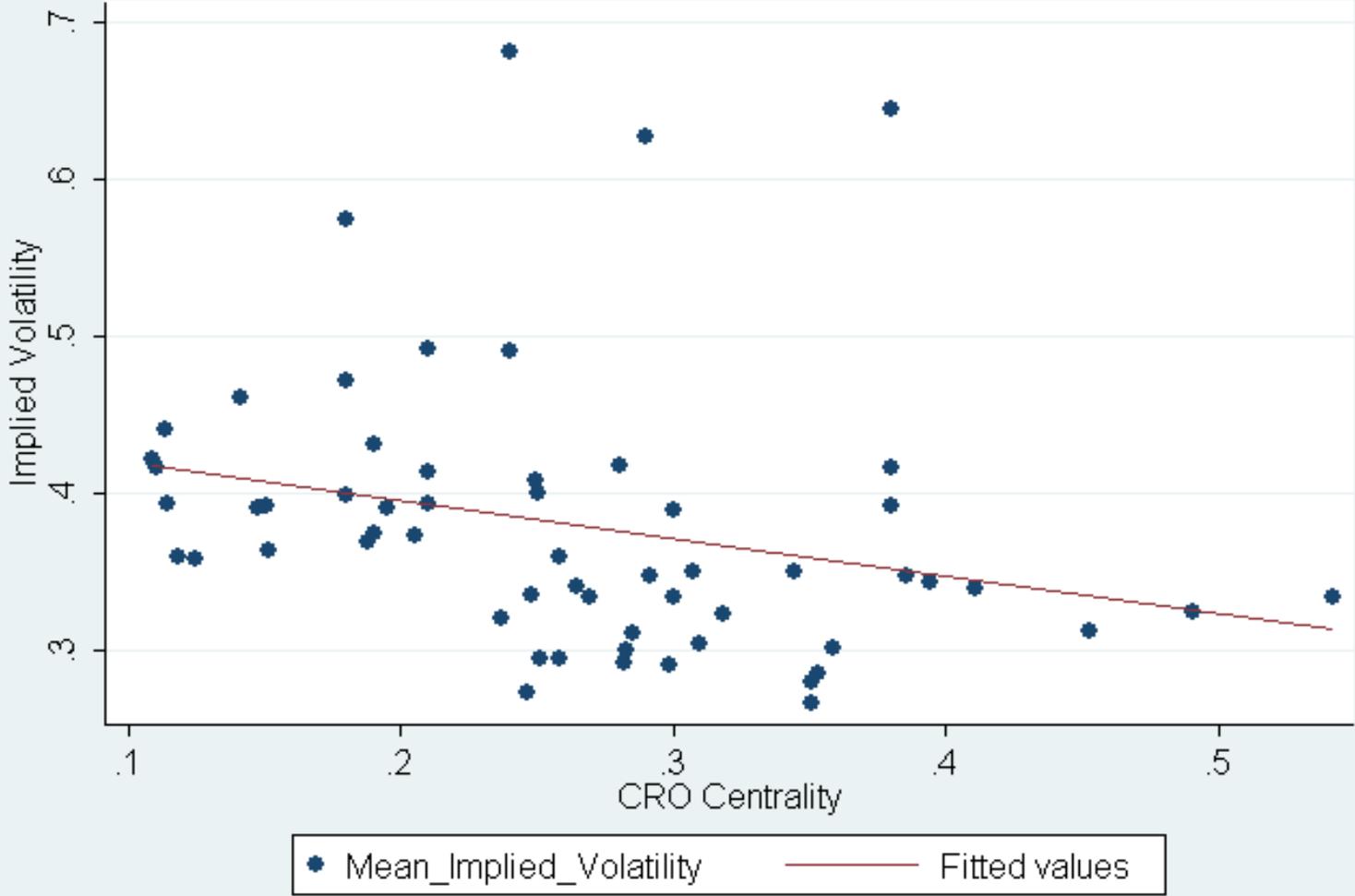


# 90 Day Rolling Market Cap to Pseudo Market Value of Assets

For large American financial institutions that did not receive SCAP infusions



# Risk Management: Ellul and Yerramilli (2010)



# Lessons for Reform?

- Clearly, there are serious ongoing problems not addressed by reform include:
  - Inaccurate measurement of risk ex ante
  - Timely ex post recognition of loss
  - The moral hazard effects of mismeasured ex ante risk and mismeasured ex post loss, particularly for too-big-to-fail institutions.
  - Potential incentive problems that promote poor internal risk management

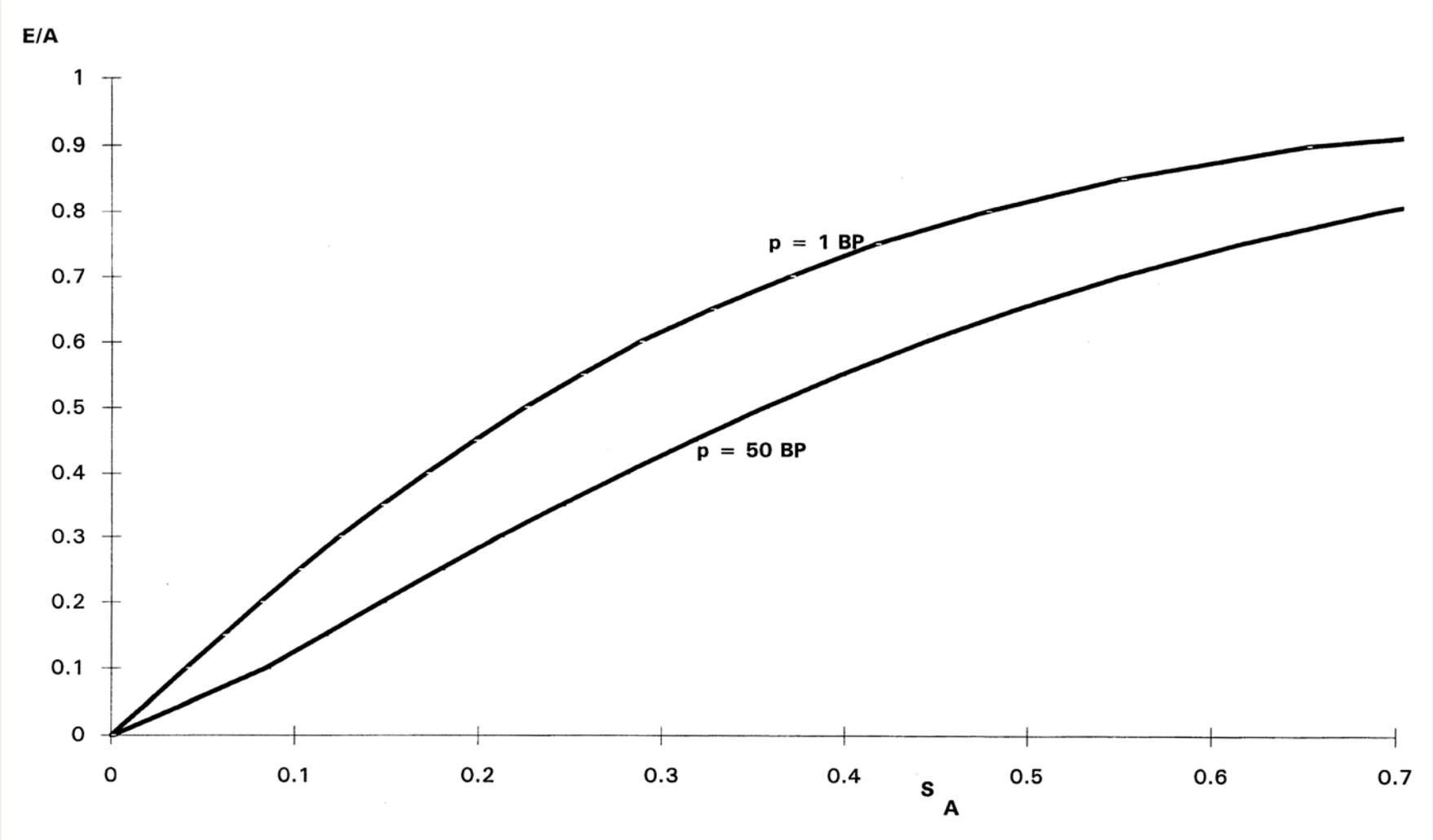
# My Focus Today

- A full response to regulatory challenges is beyond the scope of my remarks today (for that, see my paper, “An Incentive-Robust Program for Financial Reform”)
- I will focus on one piece of that reform program: Conceptually, how to integrate capital and liquidity requirements.
- Why do we need both?
- In what combination?

# Liquidity Requirement? Theory I

- In a frictionless world (with perfect information, no transaction costs) a liquidity standard would add nothing to a capital standard (two ways to skin the cat of target default risk on bank debt).
- Using Merton (1977), assuming a default risk target for risk-based capital, set the combination of sigma of assets (reduced by cash assets) and equity ratio to achieve targeted risk (p-value) of debt.

# Two Ways to Skin the Cat of Target Default Risk of Banks



# Theory II

- More realistic models, however, show that liquidity requirements could add a lot.
  - **Lack of substitutability of debt capacity for cash during times of need** due to financing frictions associated with asymmetric information means that cash has real option value for limiting costs of liquidating assets (Almeida, Campello and Weisbach 2004, Acharya, Almeida and Campello 2006, Denis and Sibilkov 2007, provide empirical evidence that cash is not a perfect substitute for debt capacity). **This is especially true of banks (ABCP, repos, Libor)!**

# Theory II (Cont'd)

- More realistic models....
  - **Observability of cash is better for moral hazard prevention after unrecognized losses** than for capital (important given regulatory incentives to hide losses, and asymmetric information problems about loans, modeled in Calomiris, Heider and Hoerova 2011).
  - **Buffer against noisy signals** (Calomiris and Kahn 1991).
  - **Reduce dependence on LOLR** (and accumulation of assets by central bank during crisis) by having banks self-insure against liquidity risk.

# Evidence that Merton Isn't Enough

- In the crisis funding risk => market risk.
- Funding risk shows in quantities as well as prices in money market instruments: repos, Libor, Euribor, ABCP.
- Long-term debt spreads widen dramatically in ways not captured by Merton 1977.
- This implies a role for (1) **crisis-induced liquidity problems in the pricing of debt**, after controlling for (2) **crisis-induced fundamental deterioration** in debtors' creditworthiness in **explaining debt returns**.
- **How to sort out the two?**

# Evidence

- Pricing of debt effects.
- Credit supply contraction, and liquidity hoarding, in response to crises.
- Historical focus on liquidity requirements more than capital requirements reflected an understanding of these costs.

# History

- The first prudential standards were **liquidity** standards (25% required reserve for NYC clearing house). The first exegesis of this policy was by George Coe in a famous 1873 Report, advocating the relaxation of reserve requirements to permit use of reserves and collective distribution by clearing house:

“An expedient was found by which the stronger banks placed themselves under the unequal burden and equalized the pressure of gathering in their resources and placing them at the disposal of the weaker, who were thus furnished with the means to meet the demands of their depositors and to save themselves from public exposure and their dealers in city and country from disaster and ruin.”

“The practical difficulty consists of attaching a rigid and inflexible [required reserve] rule of law to a mobile fund which is held for the purpose of meeting sudden emergencies, which is, therefore, in its very nature a variable quantity.”

# History (Cont'd)

The NYC CH implementation of this approach was criticized by J.P. Morgan, O.M.W. Sprague, Elmus Wicker, and many others, for not using preexisting reserves adequately during crises and for not issuing sufficient clearing house loan certificates to restore liquidity, and for resorting instead excessively to suspensions, due to incentive problems.

JP Morgan in 1907:

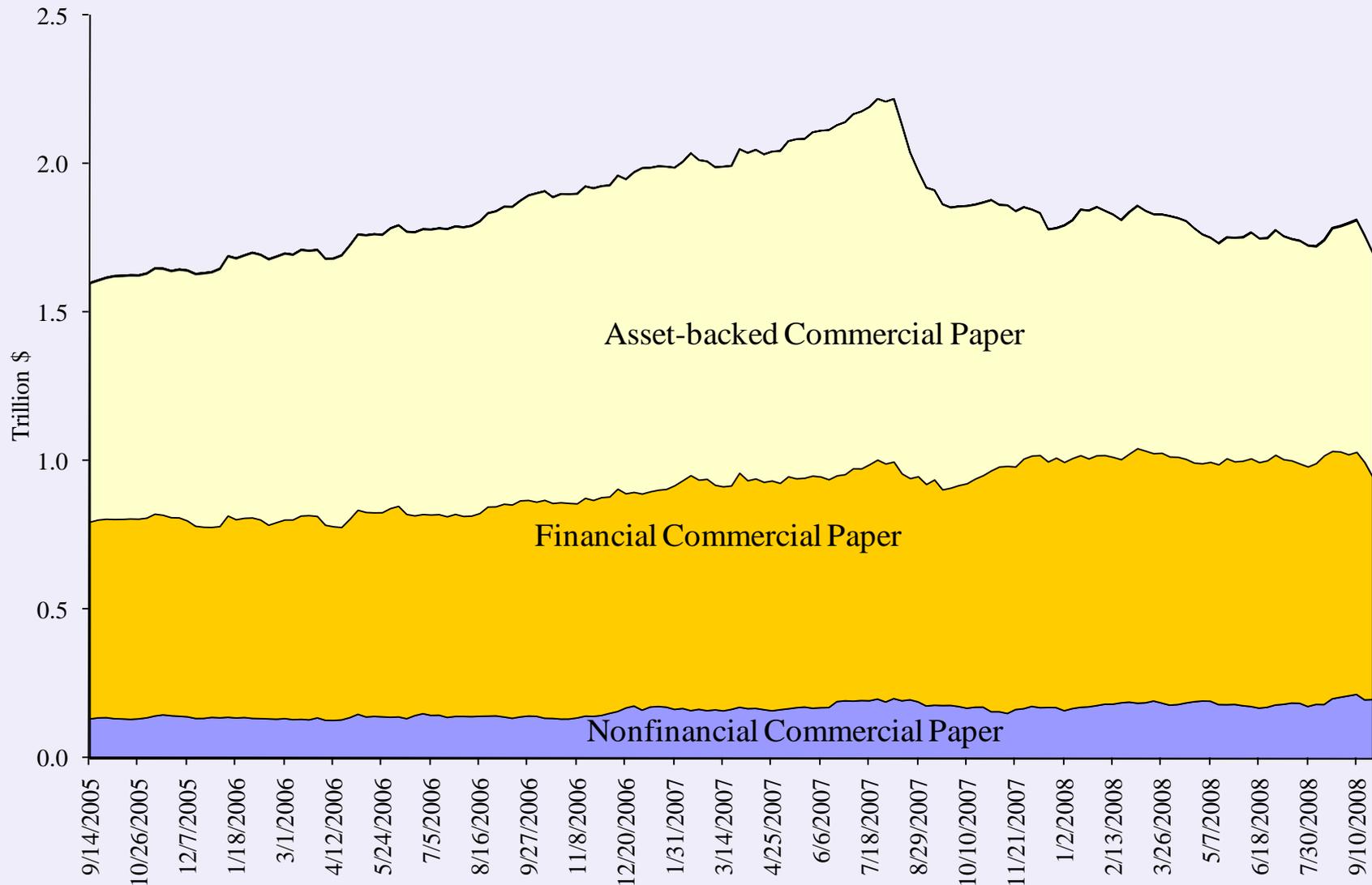
“You ought to be ashamed of yourself to be anywhere near your legal reserve. **What is your reserve for a time like this except to use.**”

**=> You still need a lender of last resort.**

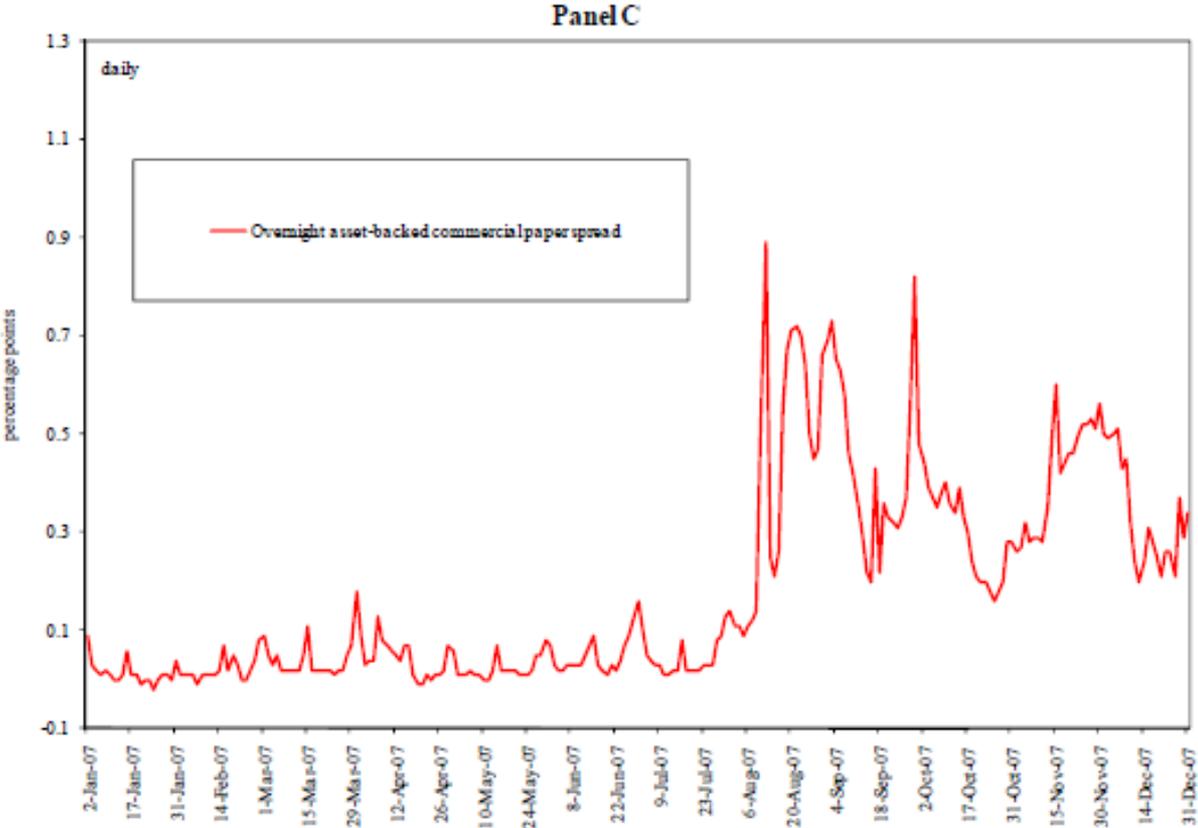
# The 2007-2009 Crisis

- ABCP
- Bond spreads
- Libor-OIS spread
- Bank credit contraction

# Commercial Paper Outstanding (Weekly, Seasonally Adjusted)

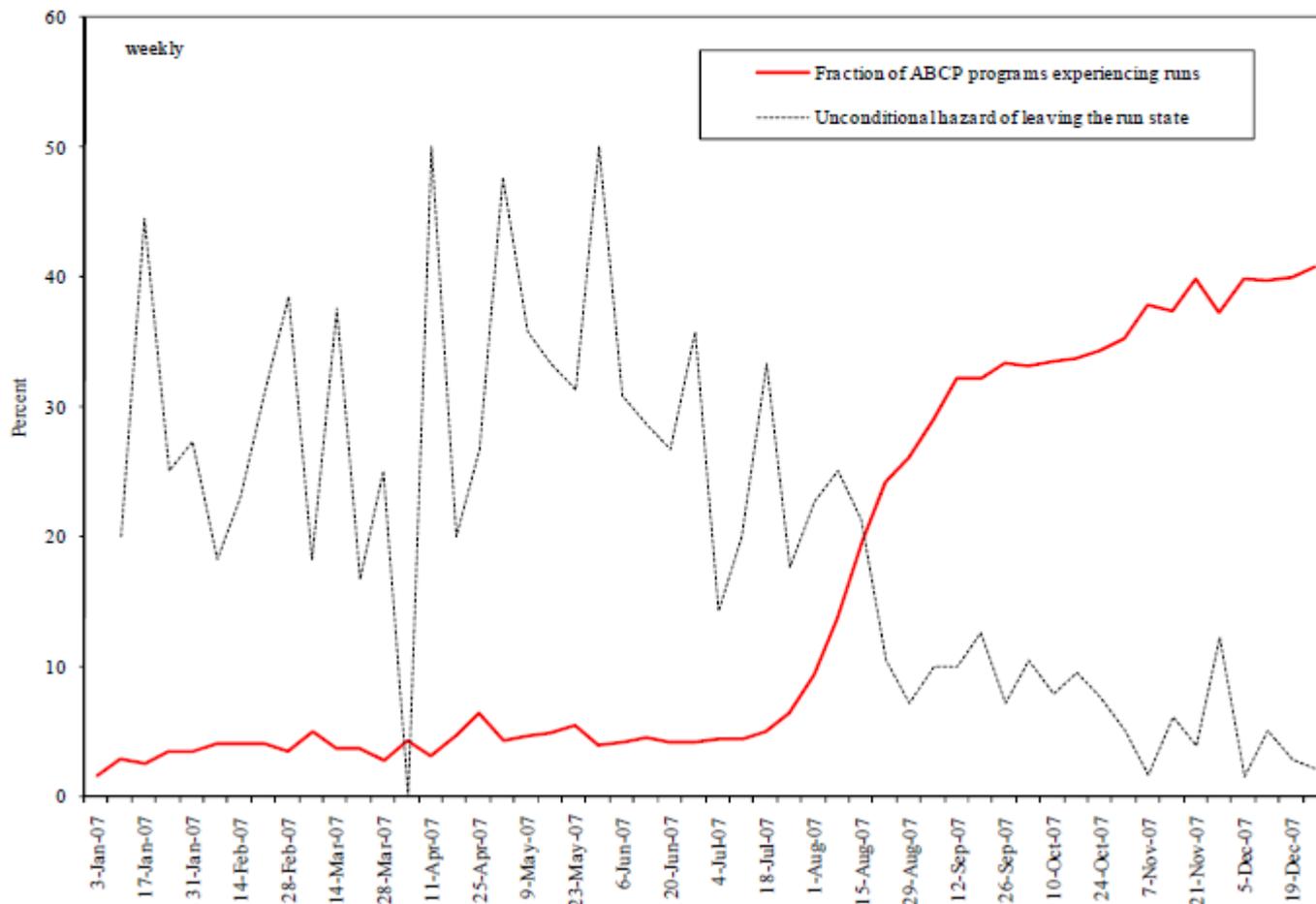


**Figure 1: The market for asset-backed commercial paper (ABCP): aggregate amount of paper outstanding, average maturity of new issues, and overnight spreads (continued)**

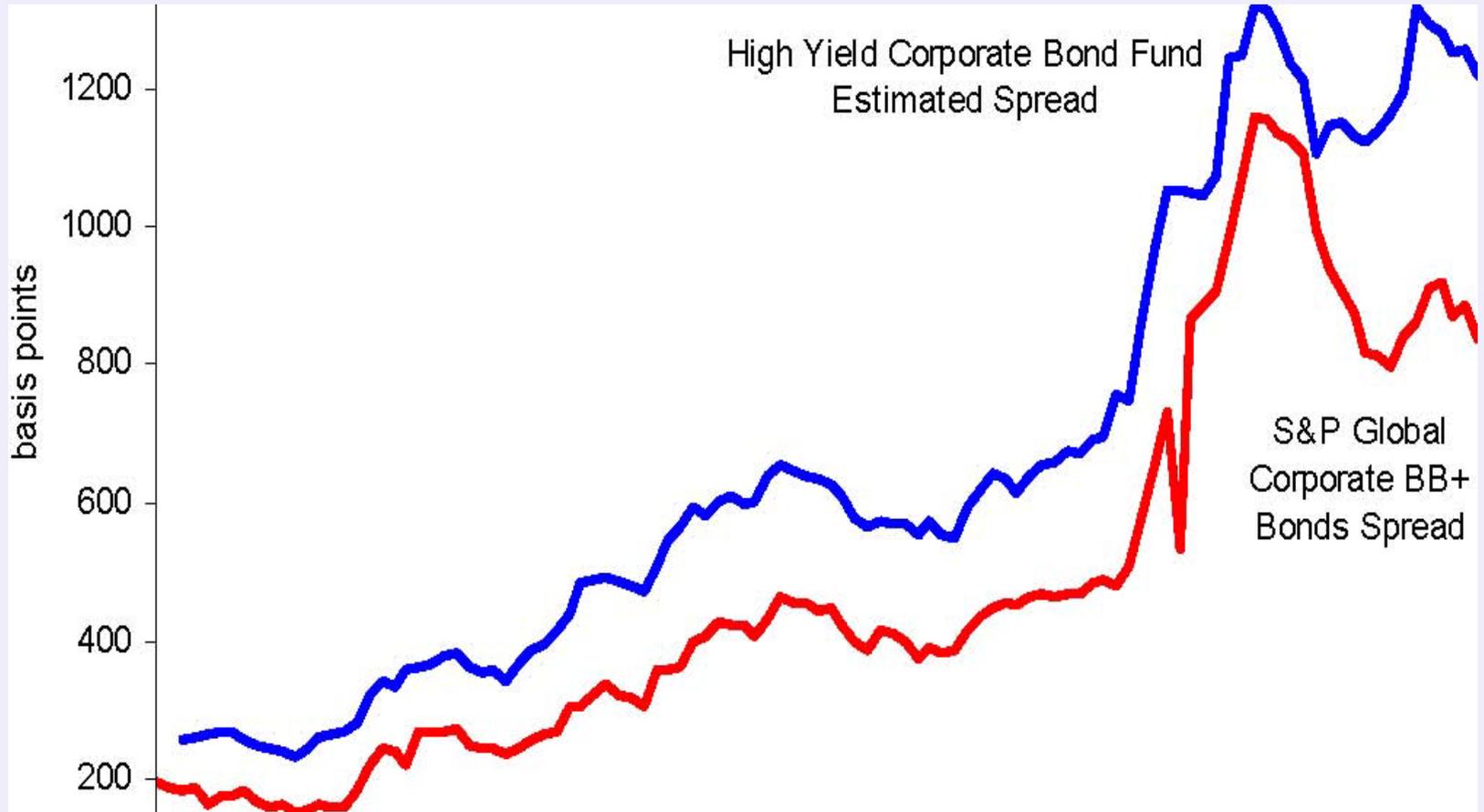


**Figure 3: Runs on asset-backed commercial paper (ABCP) programs in 2007**

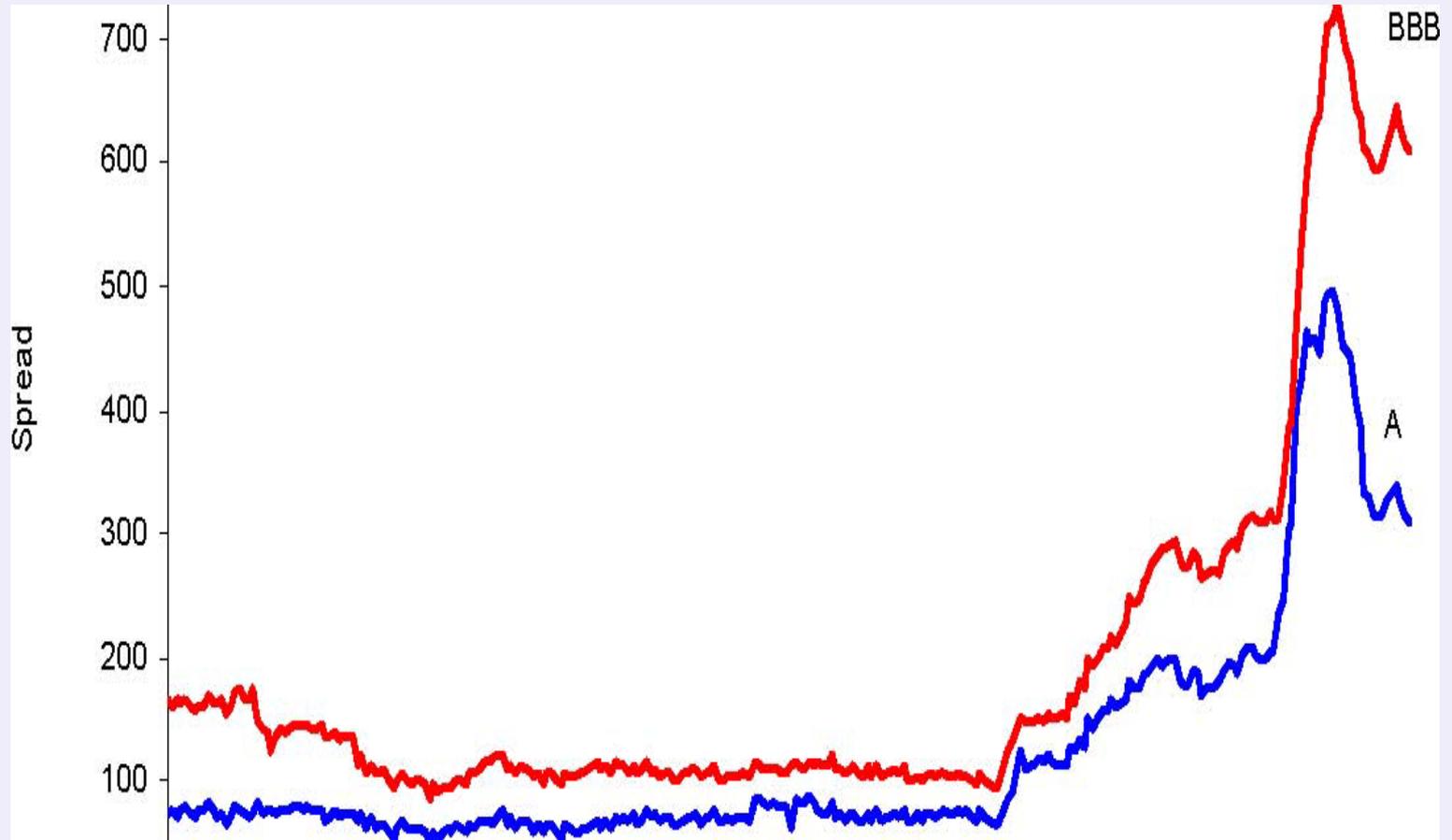
The solid line plots the percent of programs experiencing a run. We define that a program experiences a run in weeks when it does not issue paper but has at least 10 percent of paper maturing or when the program continues not issuing paper after experiencing a run in the previous week (see equation (1) in the text). The dotted line plots the unconditional probability of not experiencing a run in a given week after having experienced a run in the previous week (i.e., the hazard rate of leaving the run state). The figure is based on weekly data from DTCC on paper outstanding, maturities, and issuance for 349 ABCP programs in 2007.



# High-Risk Spreads, 2003- April 8, 2009

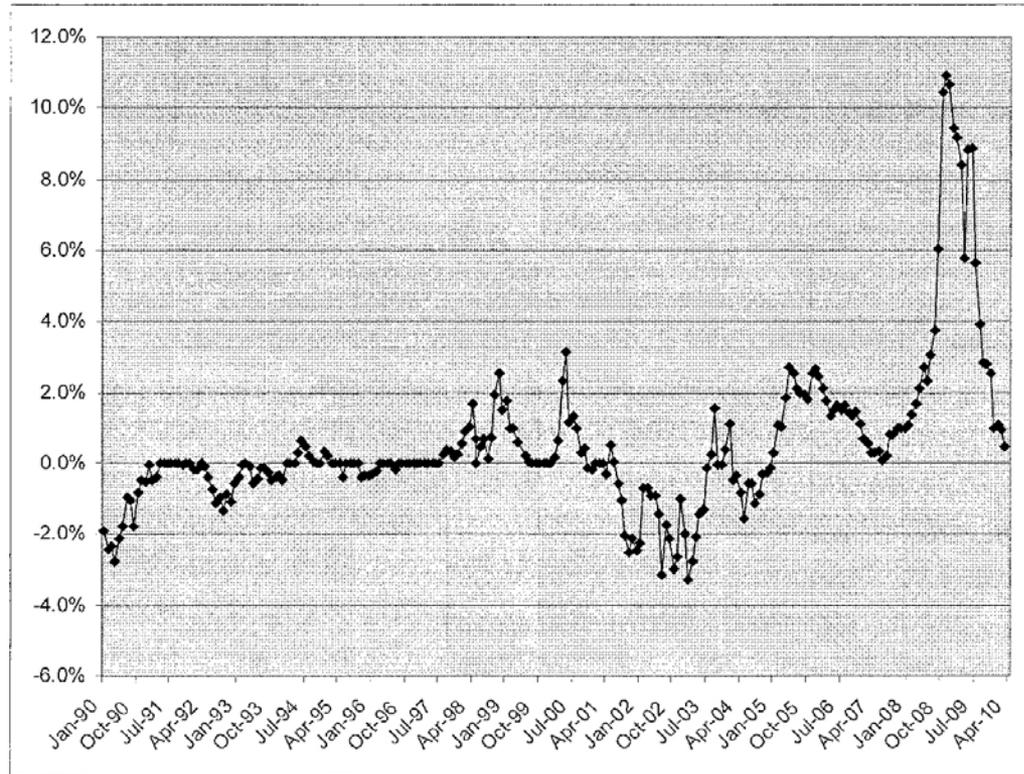


# Low-Risk Spreads, 2003- April 8, 2009



# Mitchell and Pulvino (2010)

Figure 4: Convertible Debenture Cheapness/Richness (January 1990 - March 2010)



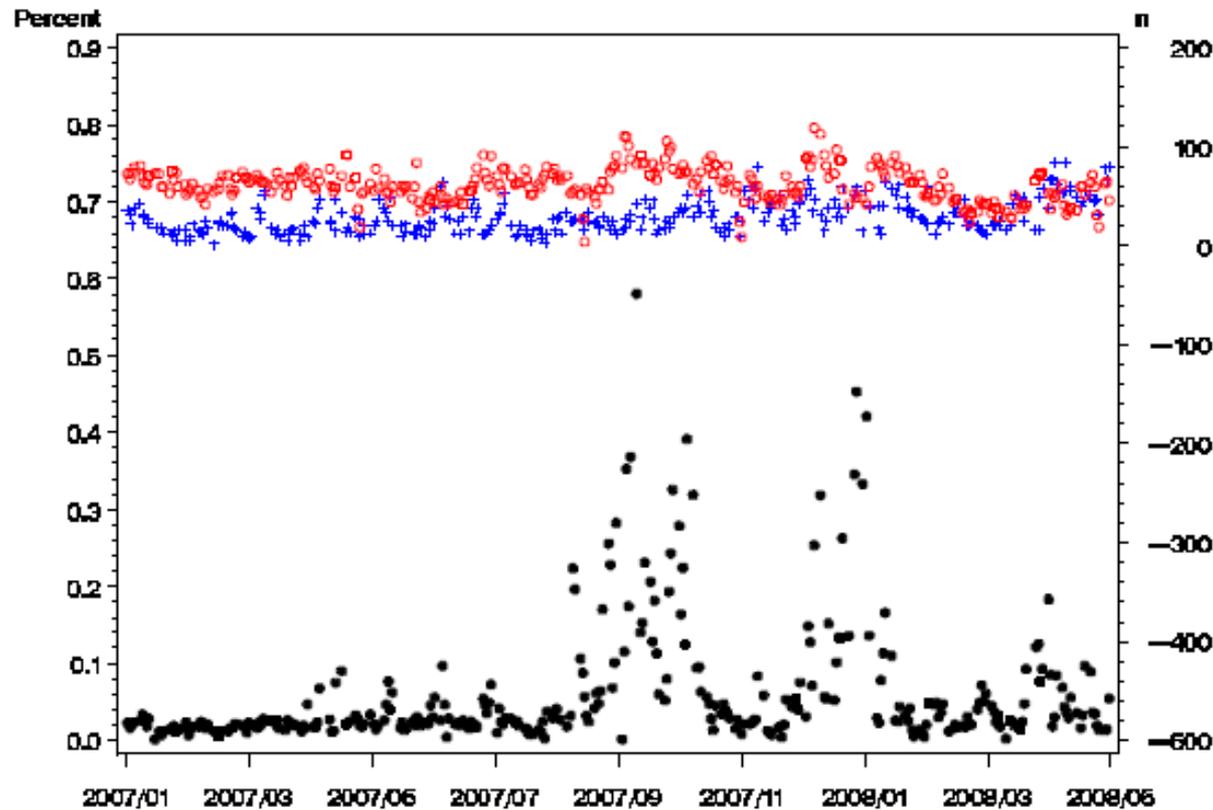
This figure displays the monthly median difference between the fundamental value of equity-sensitive convertible debentures and their traded prices during January 1990 through March 2010. We define equity-sensitive convertible debentures as convertibles with moneyness (ratio of issuer stock price to conversion price) > 0.64. Data on traded prices provided by *Value Line Investment Surveys* and various Wall Street investment banks. The fundamental or theoretical value of the convertible debentures is calculated using a finite difference model and input estimates (stock price, equity volatility, credit spread, and term structure of interest rates) corresponding to each convertible debenture at every point in time.

# Isolating the Role of Liquidity Risk

- Fundamentals were important, but **crisis pricing of debt mainly reflected panic selling of risky assets and scramble for liquidity** (huge spreads for long-term assets and in quantity declines in money market instruments, ABCP, CP, repos, Libor).
- Schwarz (2009) identifies liquidity risk factor from German government bond spread, and separates it from credit risk “tiering” in Libor spreads, and shows about 2/3 of spread widening is related to this factor.

Figure 4

## Credit Tiering of Overnight Interbank Borrowing Rates

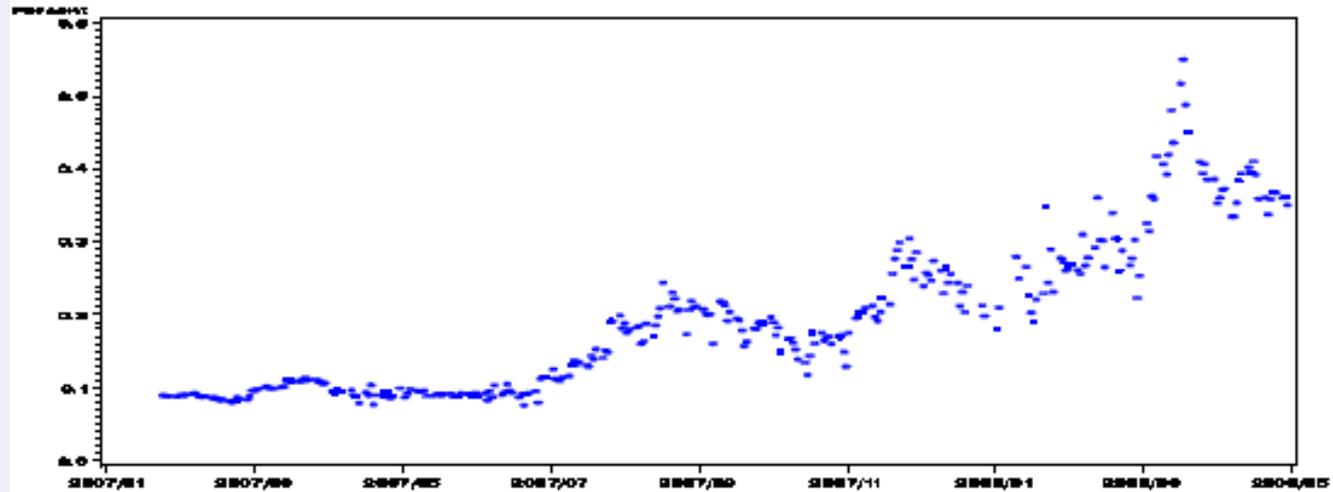


Credit Tiering (LHS) ● Best Credit Transactions (RHS) + Worst Credit Transactions (RHS) ●

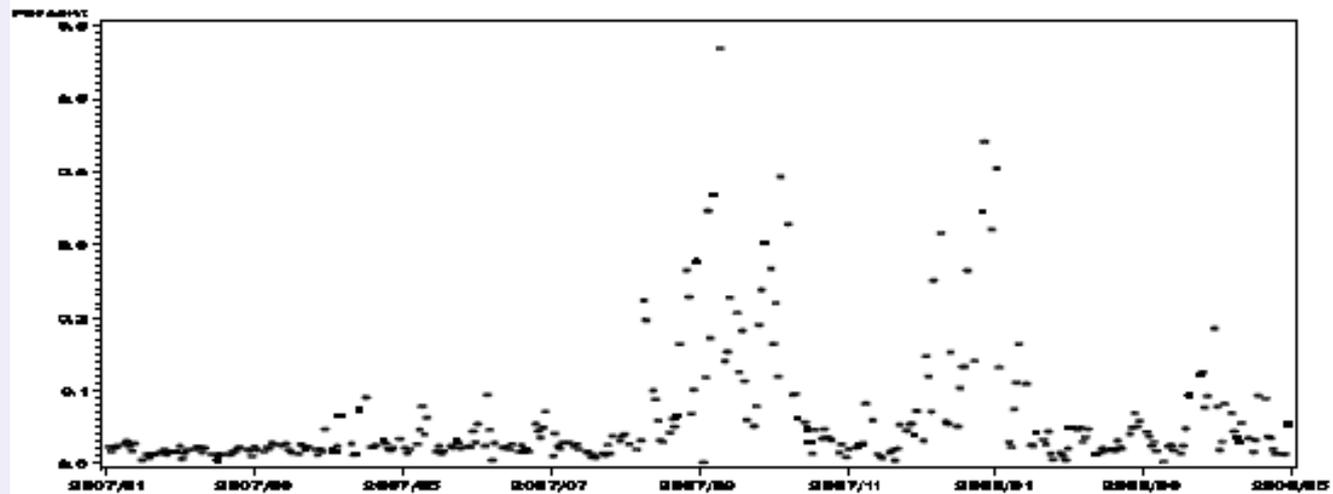
Notes: This figure shows the daily private credit tiering measure computed from overnight euro deposit transactions on the e-MID platform (left axis). This figure also shows the daily number of euro interbank deposit transactions on the e-MID platform for the decile of banks with the lowest credit premium estimates and the decile of banks with the highest credit premium estimates (right axis).

Figure 6

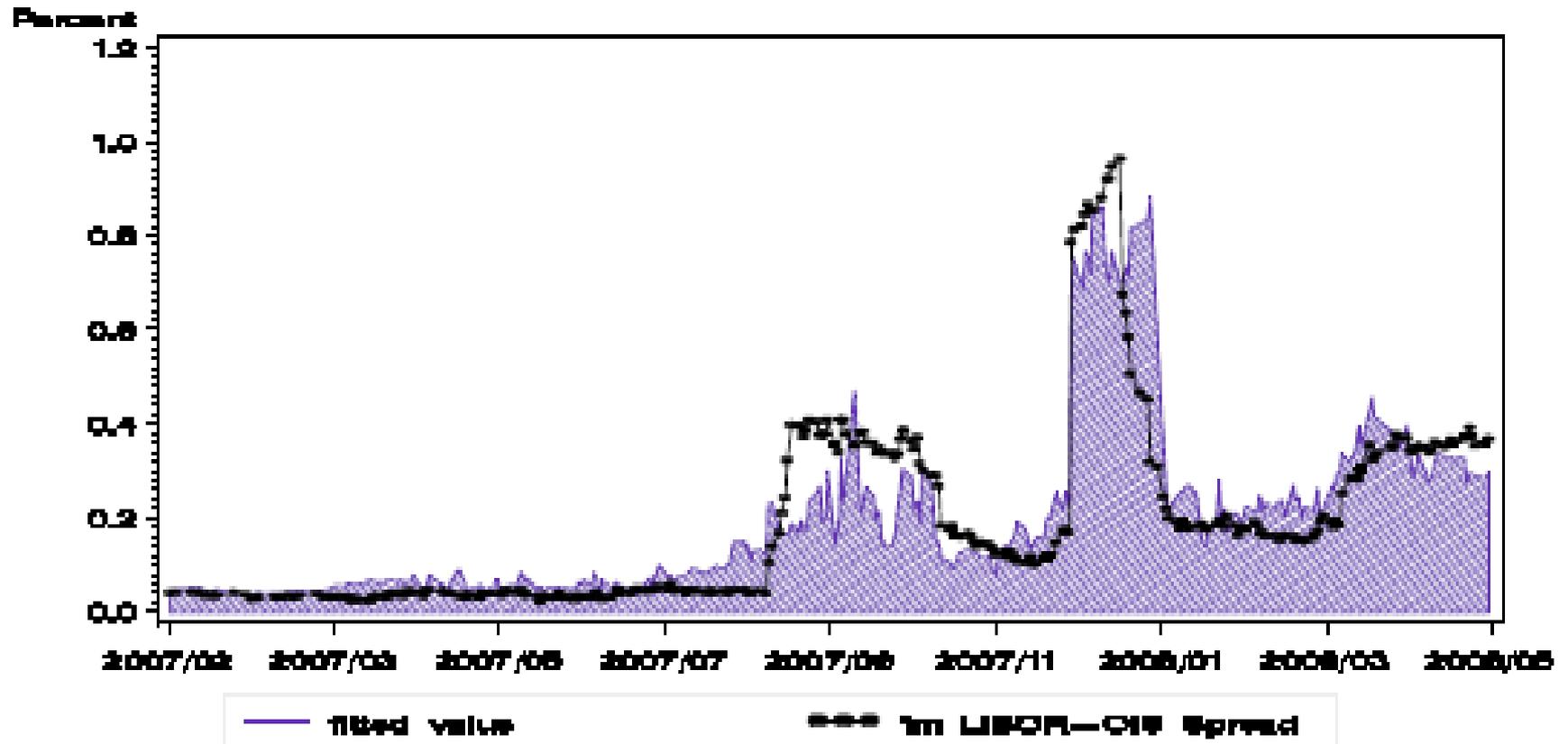
**Market Liquidity**



**Private Credit**



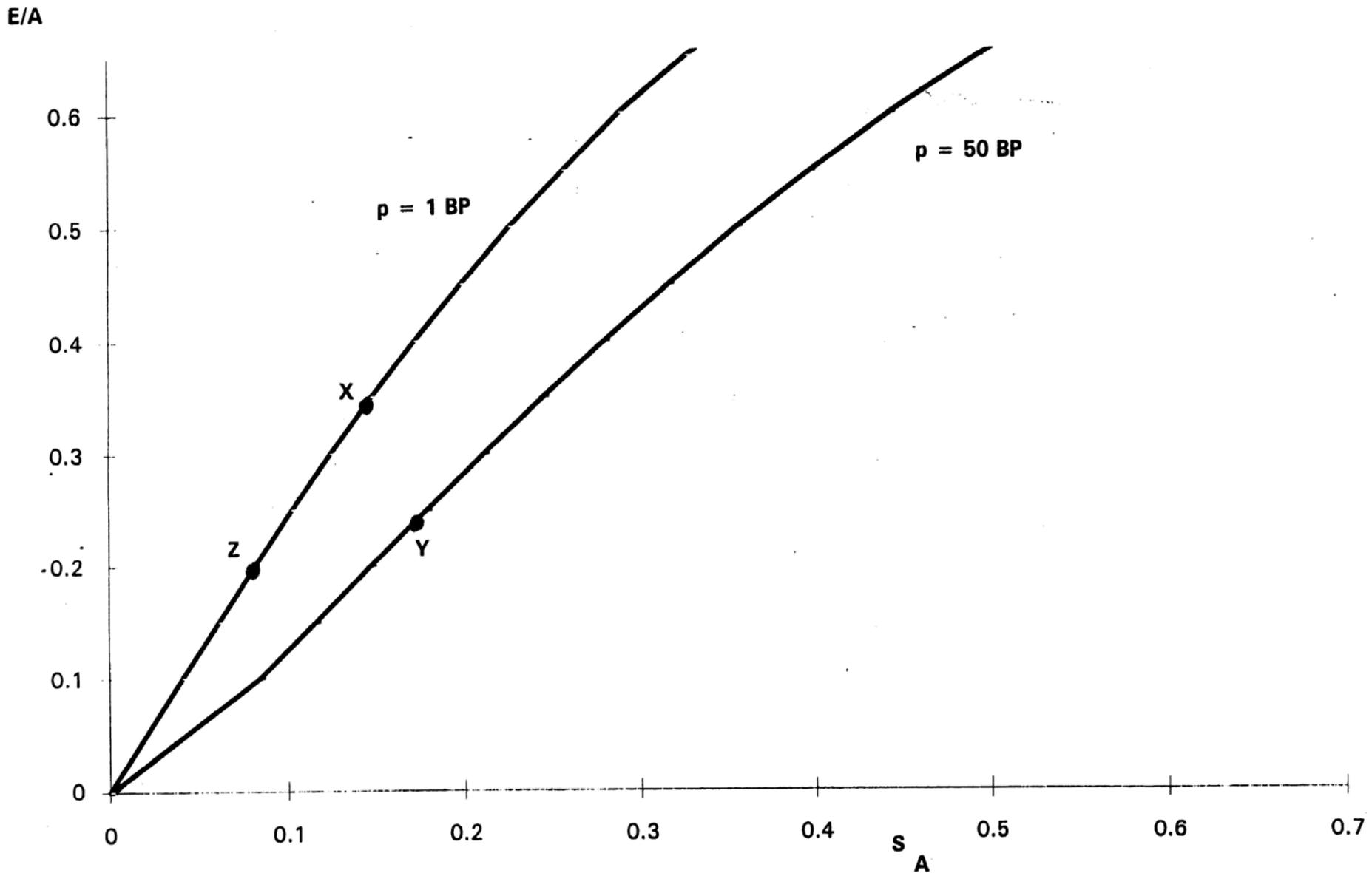
## LIBOR-OIS Spread Explained by Liquidity, Credit, and Year-End



# Is It Worth It? Social Costs of Crises?

- Disposal of risky assets can create not only collapses of prices of risky assets, but also collapses of credit supply.
- This is an old story, and the recent crisis was another in a long series of examples.
- Financial crises, worldwide, according to the World Bank's studies of the past thirty years' experience, tend to result, on average in negative net worth of failed banks of about 16%, and lost GDP of about 20%.

# NYC Bank Capital and Risk 1920-1936



# NYC Banks' Loans/Cash, Risk, Equity, Dividends

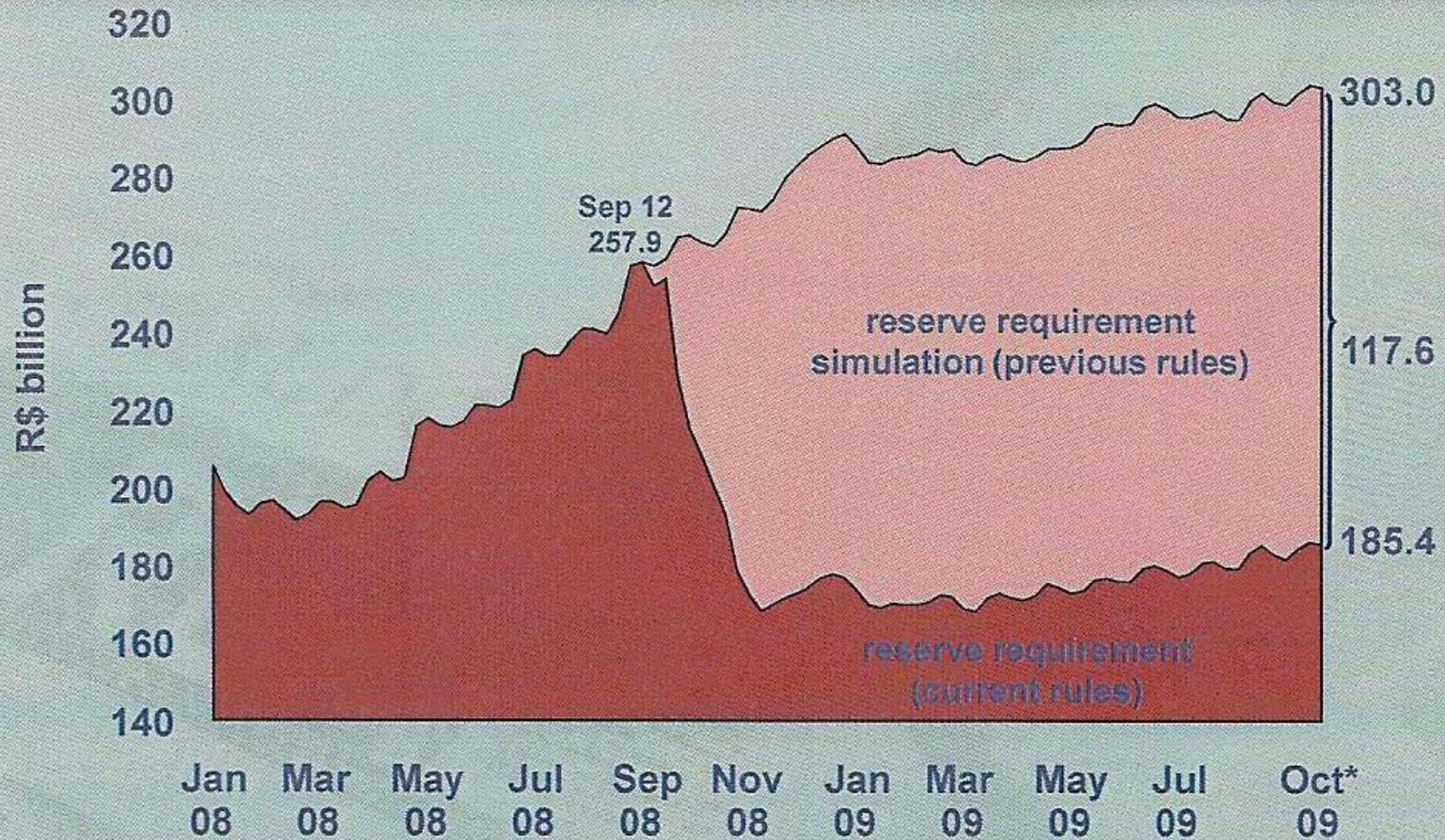
	Loans/(R+T)	Ass.Risk	Equity/Ass.	p	Dividends
1923	2.2	1.9	0.20	0.0	
1929	3.3	17.5	0.33	33.5	\$392m
1933	1.0	6.1	0.15	41.7	
1936	0.6	4.3	0.17	1.3	
1940	0.3	2.0	0.10	2.1	\$162m

Source: Calomiris and Wilson, *Journal of Business*, 2004.

# Brazil's Crisis Response in 2008-2009

- Compulsory reserves were reduced by R\$100 b
- Private deposit insurance was “encouraged” to extend its coverage for a special assessment
- The private deposit insurance fund was “encouraged” to purchase some loans from banks
- Liquid (large) banks were “encouraged” to lend to illiquid (smaller) banks
- Currency swaps from Federal Reserve were passed through to banks
- Tier one capital requirements were relaxed by allowing excess provisioning to count as tier one capital
- Emergency measures were reversed in 2009 and 2010
- No LOLR lending was employed, as bank reserves took pressure off of the LOLR, but without arm-twisting, would have been.

# Crisis Management (BRL)



Source: BCB

\*up to 10/16

# Proper Design of Requirements

- Remunerative (no reason for a new tax).
- Note partial offset via risk-based capital.
- Would be relaxed by regulator during crisis.
- Imposed on banks, and perhaps on non-bank intermediaries for whom liquidity risk is high (safe harbor for non-banks that don't rely on repos or CP to finance more than x% of assets).
- No arm twisting on interbank lending by government. Liquidity requirements do not prevent breakdown of interbank market, and so **LOLR is still needed**.
- Allow it to be met in part (say, up to 25%, similar to successful system in Argentina in the 1990s) through standby letters of credit by qualified institutional investors (which promotes transparency and market discipline).

# Paradox of Realism

- Models in Theory II category are all “toy” models.
- You can only confidently quantify how much liquidity you need in a model where liquidity plays no essential role (like Merton 1977).
- So what to do?
- Rely on history of crises to guide you, and cross-country comparisons.
- 20% of assets is a reasonable number, so is 15%, and maybe even as low as 10% (if other things changed too).

# Basel III on Liquidity Risk (2012 or 2014)

- Liquidity coverage ratio – measures the ability of a bank to meet all its required cash outflows during an acute funding stress lasting a month. Liquid assets = cash and unencumbered government securities.
- Net stable funding ratio – measures the “stickiness” of funding sources; funding that isn’t prone to flight in a crisis. Fed funds, commercial paper, and repo are not considered stable funding sources.
- Stable funding = retail deposits, long-term debt, and equity capital.
- US banks are not compliant with either the liquidity coverage or net stable funding ratios. Estimates of either gap depend on a number of key assumptions regarding the timing of any adjustment, as well as future bank asset (and liability) composition and growth.

# Barclay's Estimates of Impact on US Banks

- To meet their liquidity coverage ratio, US banks would need increase their liquid holdings by about \$900bn
  - Purchase US Treasuries
  - Hold cash at the Federal Reserve
  - Reduce the amount of debt/obligations that mature within 1m – repo, commercial paper, and fed funds
- To meet stable funding ratio requirement, US banks would need to alter the composition of their liabilities and liabilities to close current gap in stable funding of \$1.7trn
  - Raise retail deposits
  - Reduce reliance on repo, commercial paper, and fed funds (wholesale funding still accounts for more than 20% of large bank liabilities)
  - Alter the composition of their assets
    - Securities holdings require lower net stable funding than loans
    - Required funding for Treasuries, agencies, and MBS = 5-20%
    - Long-term loans = 100%
    - Unused commitments = 10%

# Conclusion

- Prudential regulatory system is deeply broken.
- Not every financial institution and every country is equally broken.
- Lots of changes are potentially desirable, with a need to focus on incentives.
- When conceptualizing the right combination of liquidity and capital requirements, one needs to look beyond frictionless finance.
- One also needs to be properly humble about calibration, and **rely on simple and rough rules of thumb, historical experience, and learning**, not pretentious, complicated and cumbersome (Basel) formulas based on false precision.