Financial Crises 30 years after Diamond-Dybvig

Poitiers France

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and NBER

Diamond-Dybvig (*JPE*, 1983), the paper

- Motivated by Friedman-Schwartz Monetary History of the United States.
- Real runs, not bad monetary policy
- Shadow banks

Three parts of the model

1. Demand for liquidity, uncertain horizon, private information about the horizon and risk aversion.
   - (not means of payment, more of a precautionary demand)
   - Short-term debt as liquid
2. Runs caused by potential rather than actual insolvency due to (exogenously) illiquid assets.
   - Maturity mismatch.
   - Liquidity mismatch.
   - First-come-first-served.
   - Coordination failure.

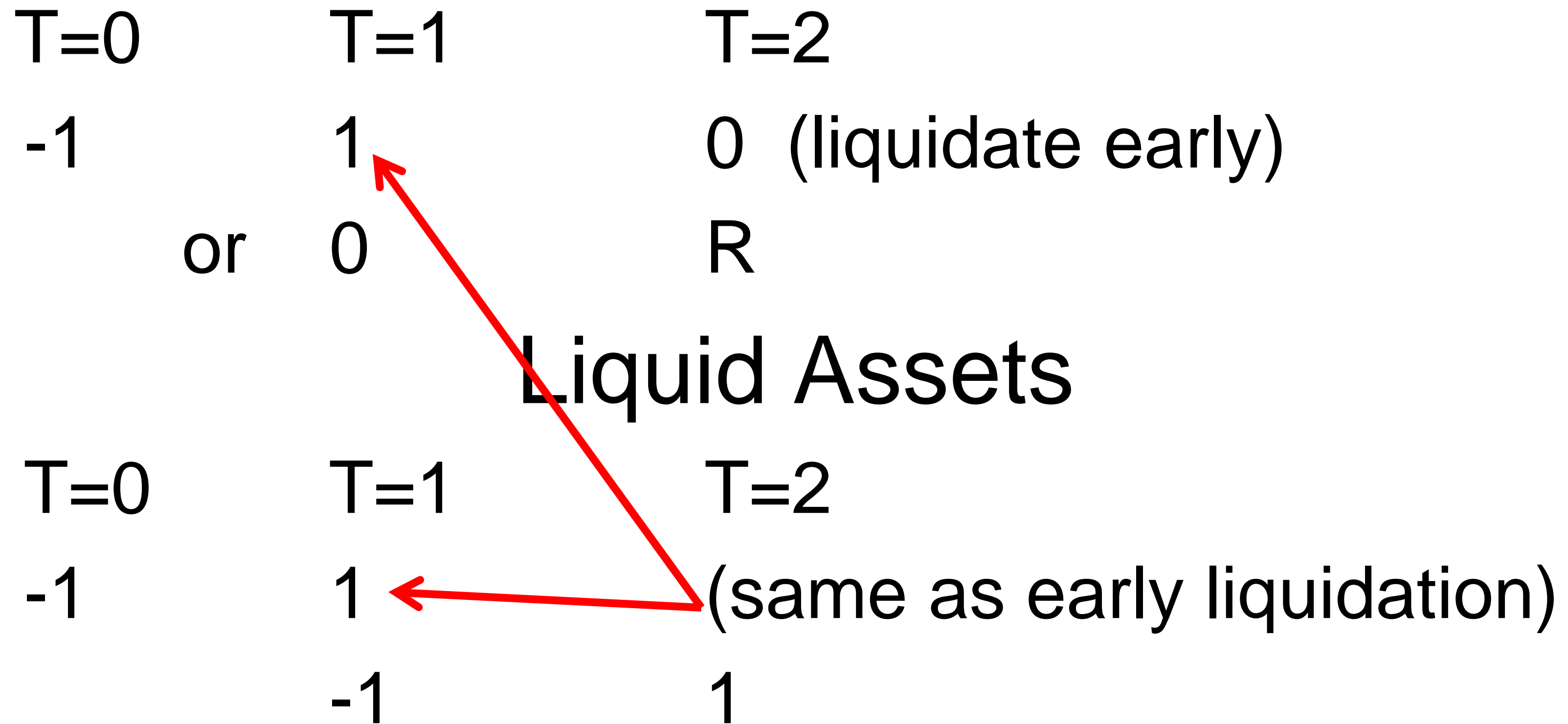
Three parts of the model

- 3. Interventions
  - Deposit insurance (or lender of last resort which always lends with no “stigma”).
  - Suspension of convertibility.

Important Extensions on intervention: Link Capital and Liquidity Regulation

- Free riding on costly liquidity (in markets).
  - Jacklin, C. (1987). “Demand Deposits, Trading Restrictions, and Risk Sharing.”
  - Bhattacharya-Gale (1987) “Preference Shock, Liquidity and Central Bank Policy.”
  - Farhi-Golosov-Tsyvinski (2009), “A Theory of Liquidity and Regulation of Financial Intermediation,” *Review of Economic Studies.*
  - Link to bank capital, interbank markets and bank liquidity regulation

Diamond- Dybvig's Illiquid Asset



Jacklin’s Aggregate Liquidity Illiquid Asset

T=0		T=1	T=2
-1		L<1	0 (liquidate early)
	or	0	2

Liquid Assets

T=0	T=1	T=2
-1	1	(Dominates early liquidation)
	-1	1

What was still needed to make it about multi-bank crises?

- General Equilibrium pricing of illiquid assets with multiple banks (aggregate liquidity)
  - Diamond (1997), "Banks, Markets and Liquidity," *JPE.*
  - Holmström-Tirole (1998), Public and Private Liquidity, *JPE.*
  - Allen-Gale (2004) "Financial Intermediaries and Markets," *Econometrica.*
  - Diamond-Rajan (2005). "Liquidity Shortages and Banking Crises," *JPE.*

What was still needed to make it about multi-bank crises?

- Specificity of intermediary lending (what makes assets illiquid and how is this related to financing with short-term debt.
  - Need for short-term funding with the threat of runs as a commitment device
  - Diamond-Rajan (JPE, 2001)
  - Related to: Calomiris-Kahn (*AER,* 1991)

The recent crisis is like all others

- *Private* financial crises are everywhere and always due to problems of short-term debt (and to the reasons why short-term debt is needed).

An Overview of Theory, Evidence and Policy Recommendations

- Beneficial roles of Short-term debt of financial sector.
- Need for its regulation (Not too much, not too little).
- Evidence on runs and liquidity shortages in recent crisis.
- A lens for a framework for financial regulation and my policy recommendations on contingent capital and capital requirements (some with Squam Lake Group).

Banking Regulation and Capital

- Contingent Capital (CoCo bonds which convert to equity) is a good form of capital.
- Bail in (issuing bonds which convert just before insolvency) is needed when banks are too big to save.
- More than just this bail-in is needed.
  - High Trigger Conversion above insolvency is needed for incentives.
  - Bonuses need to be regulated as well.

Why so much short-term debt?

- Demand for liquid, safe claim when most assets are illiquid (or “moneyness”).
- Demand for a claim which is not sensitive to the information or payoffs of intermediary insiders.
- Short-term debt provides discipline due to threat of runs.   Allows maximum borrowing capacity.

Features of short-term debt that matter

- No anticipated future losses can be imposed on short-term debt– it will run!
- Immediate run and failure once the prospect of losses become apparent or feared.
- Because any future losses on it leads to runs, it will never participate in workouts.
- As a result, it allows a borrower to raise more against illiquid assets when run risk is low.

There too much short-term debt in total

- When several institutions are in trouble, the discipline of short-term debt *punishes all short-term debt financed institutions*, causing contagious losses, fire sales. (Diamond-Rajan (2005, 2010)).
- When this occurs, bailouts, liquidity injections, or central bank interest rate reductions follow, imposing the risks on other claim holders in the institution, on the state, or distorting monetary policy.

Lessons from the credit crisis

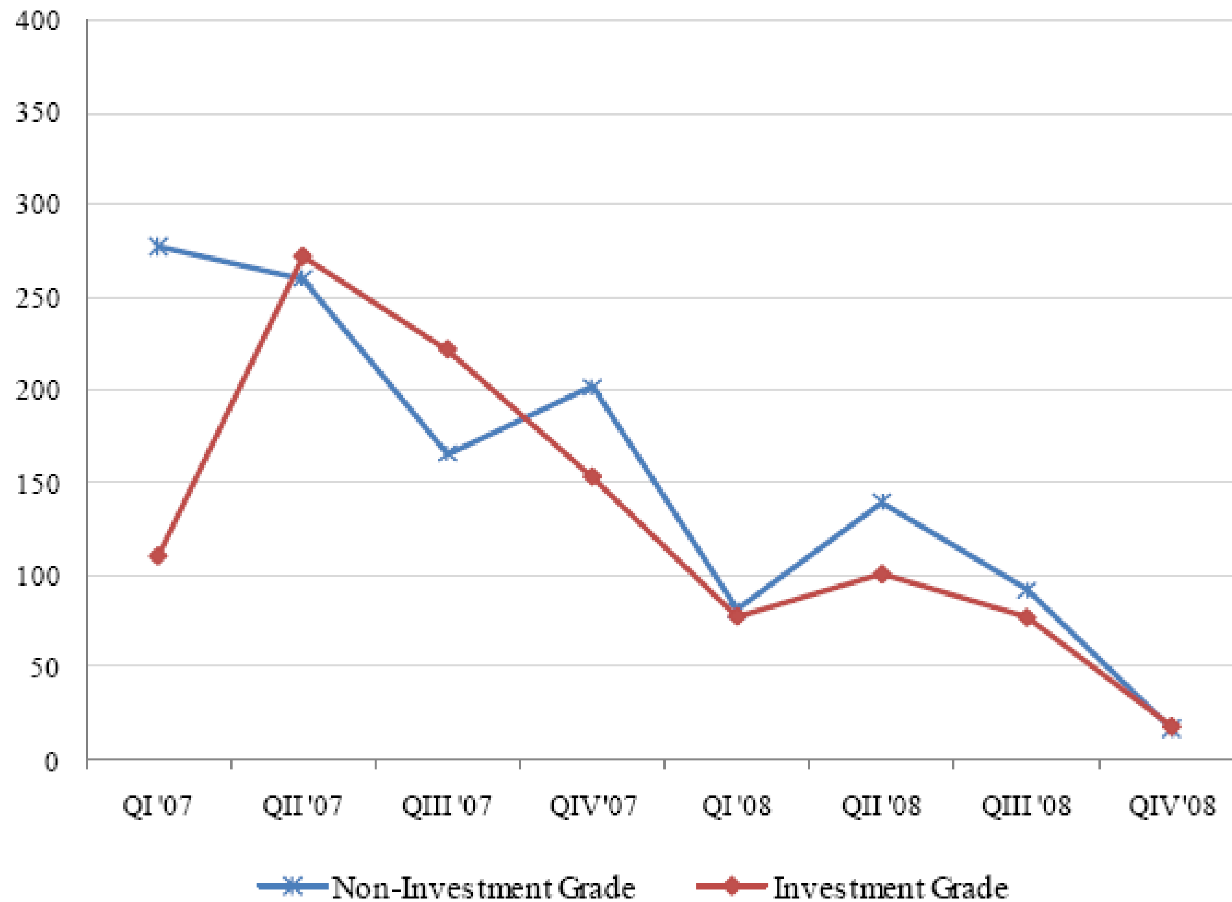
- Discipline from short-term debt did not work to prevent build up of risks: the liquidity crisis became likely in late 2007 to late 2008, the discipline from debt broke down for large banks (SIFIs).
- When liquidity problems became likely, large banks in US and Europe did not seek to shed illiquid assets; they bought more in 2007-8 according to He, Khang and Krishnamurthy (2011).

In the 2008-10 credit crisis

- Liquidity dried up for certain categories of assets such as sub-prime mortgage backed securities.
- Term borrowing also dried up, even loans from well capitalized liquid entities were scarce.

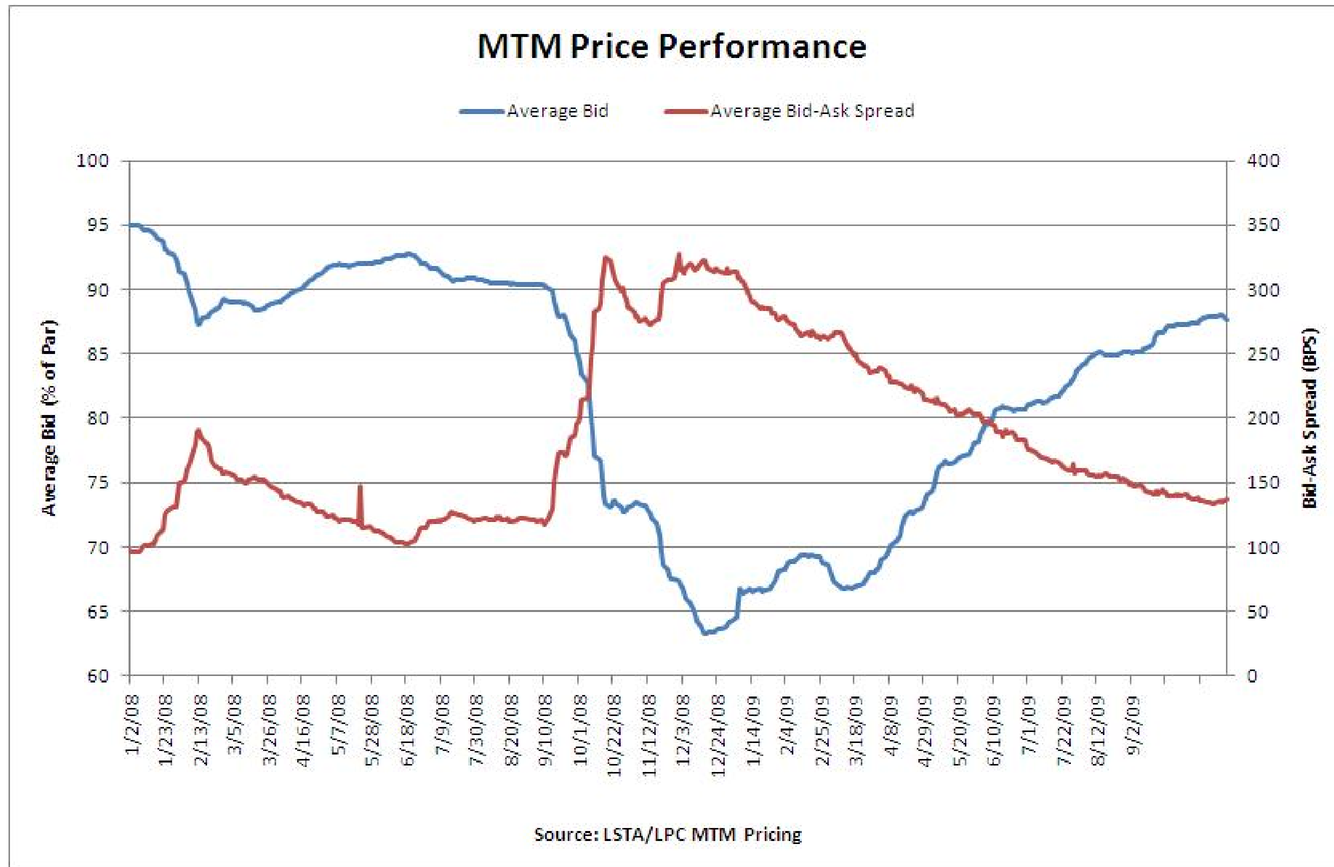
Figure 3: Total Loan Issuance, by Corporate Rating (Billion USD)

Compiled from DealScan database of loan originations. This figure is based on a sub-sample of loans for which credit ratings are available.

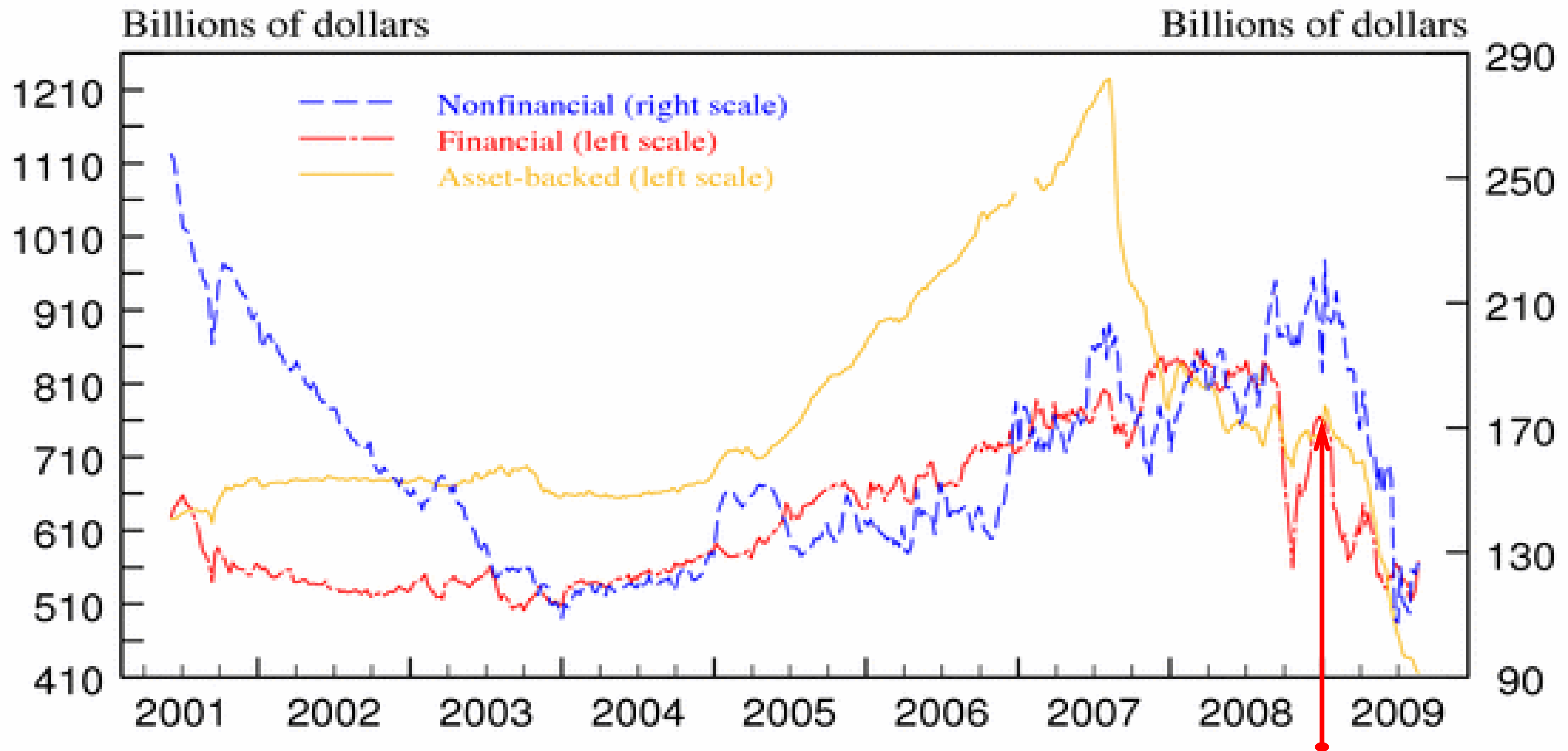


Source: Ivashina and Scharfstein (2009)

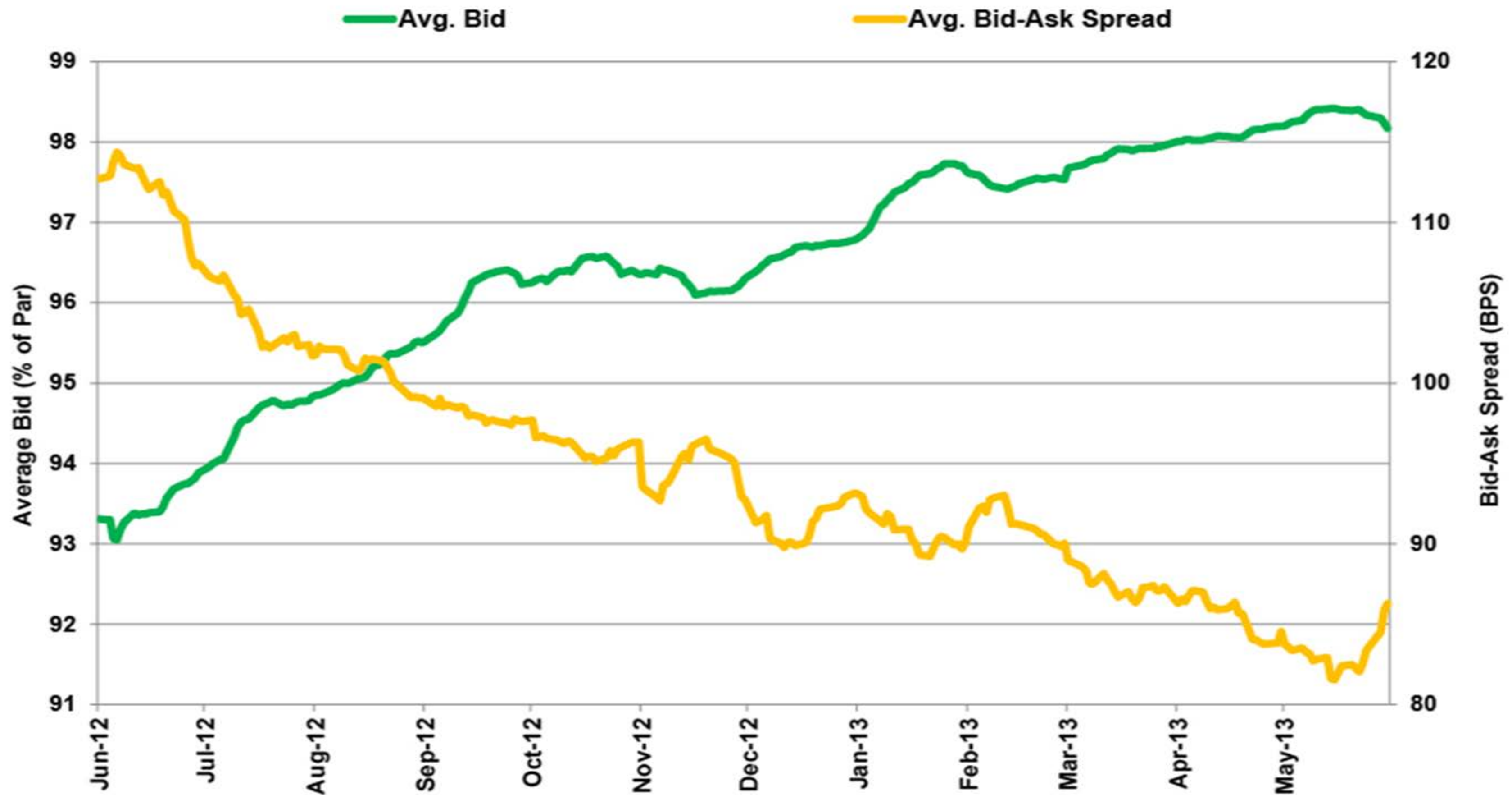
S&P/LSTA U.S. Leveraged Loan 100 Index 2008-2010



US Commercial Paper Outstanding: A Funding Crisis



S&P/LSTA U.S. Leveraged Loan 100 Index 6/2012-Current



Short-term debt is useful, but there can be bad general equilibrium effects (fire sale/ contagion).

- We need to integrate incentives/ debt overhang / risk shifting incentives of short-term debt to understand intermediary incentives, for excessive systemic risk and to understand what financial regulation is desirable.
- Diamond-Rajan (*QJE* 2010, *JPE* 2012)
- Diamond-He (Journal of Finance, forthcoming)

Odd incentives for a Financial Institution that fears a Run or a Fire Sale

- It will not sell in advance to avoid insolvency.
- Trading will freeze in illiquid assets held by banks which might be run.
- By selling today, bank raises cash, which bolsters value of long-term debt or reduces losses given failure, at the expense of equity.
- Bank incentives will become perverse and their actions will lead to a more severe systemic collapse than is necessary.

Periods of “fear of fire sales” cause the financial market to dysfunction

- Allowing undercapitalized banks to operate freely is bad for the financial system.

Implications for Regulatory Policy

- Low aggregate bank capital leads to contagious and perverse incentives for short-term debt financed banks to make a crisis worse.
- The shadow financial sector sheds assets and the traditional sector (with government backing anticipated) acquires them.
- Capital regulation (by the market or by regulators) needs to be improved!

Goals for financial regulation

- Avoid runs and unneeded bailouts.
- Control the supply of short-term debt.
- Avoid perverse incentive systemic risk effects of debt overhang.
  - Consider the incentives of equity holders and of management.

Goals for financial regulation

- Don't allow slightly undercapitalized banks to defer recapitalization.
  - Contingent Capital (debt converts well before insolvency)
  - Bail In (debt converts to equity just before insolvency) deals with different issues.
  - Also, make sure management payoffs also reflect the incentive effects of forced recapitalization.

We need to keep banks well-capitalized, not just allow their failure to be cheaply resolved.

- We need to be able to impose losses on long-term creditors (and on managers) near insolvency without causing systemic problems (European bail-in or US resolution authority: **Cheap Resolution**).
  - But Also:
- We need to force runable institutions to recapitalize when capital is too low, but not near failure. (Contingent capital/ CoCos).

Two levels of Contingent Capital: Isolate private from gov't solvency

- Bail in / Resolution Authority allows orderly resolution when governments are in trouble, helping separate banking crises from sovereign debt crises as well as limiting Too Big to Fail Incentives. This is due to prefunding of loss bearing.
- Contingent Capital conversions at higher levels of capital might jointly commit banks and regulators to staying out of the undercapitalized "perverse incentives" region.
- Not just level of capital rules, but recapitalization.

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THE SQUAM LAKE REPORT

FIXING THE FINANCIAL SYSTEM

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Squam Lake (2010 book) on Bank Capital Levels: Higher capital required for:

- Larger banks (despite being more diversified).
  - SIFIs
- Banks with more Illiquid Assets
  - Run and Fire Sale Risk
- Banks with a higher fraction of short-term debt
  - Run risk
- Activities with Hard to Measure risks
  - Proprietary trading?
- Provide bonuses in Junior Debt.

Squam Lake Recommendation: Compensation/ Bonus Bonds (similar to UBS)

- SIFIs must hold back-- perhaps 20% – of the compensation of the relevant employees in an implicit junior bond.
- The holdback is forfeited if the firm's capital ratio falls below a specified threshold (say, over 5 years).
- The threshold for forfeiture should be crossed well before a firm violates its regulatory capital requirements and even before its high level contingent CoCos convert to equity.
- Managers are not permitted to hedge the risk of forfeiture

What debt to bail-in/ convert?

- Ideally, never runnable short-term debt!
- If short-term debt needs to be bailed in, the conversion of long-term debt and other claims was too late (absent a catastrophic drop in bank asset values).
- Better to exempt short-term from bail-in.

Open issues

- Not just “higher capital required!!”
- What is “capital” in these triggers?
- Book Capital is noisy and discretionary, but this is less of a problem for high level conversions.
- Market values for capital may commit regulators not to allow book to be overstated but has problems of its own.
- Can’t rely only on market price based discipline and still avoid all runs.   Regulators need their own information and incentives.

The recent world crisis is like all others

- *Private* financial crises are everywhere and always due to problems of short-term debt (and to the reasons why short-term debt is needed).
- This is the basis for research-based innovations to financial regulation.