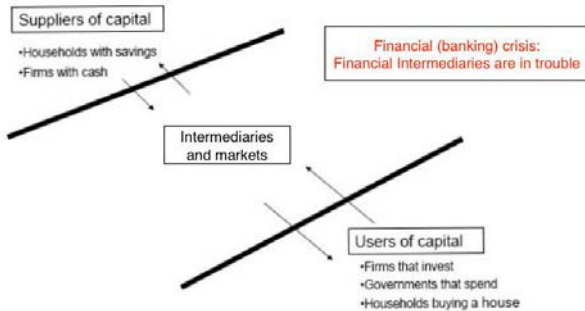


14.09: Financial Crises

Lecture 8: Lessons and Policy Responses

Alp Simsek

We have covered quite a bit of material on financial/banking crises.
Let's do a recap and think about the ideal policy response.



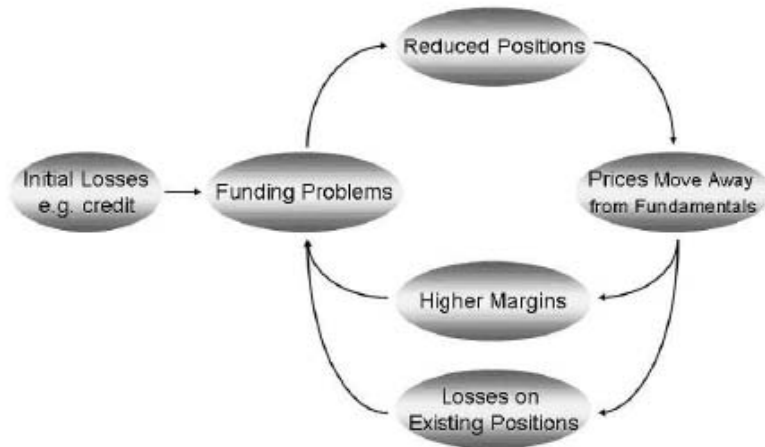
First set of issues: Solvency, capital, leverage

Little net worth/capital and high leverage
Relatively risky assets and relatively safe liabilities (risk mismatch)
Associated with the banks' role as investment specialists

Balance Sheet of All Commercial Banks in the U.S. in August 2007
(entries are percentage of total assets)

Assets		Liabilities	
Reserves and cash substitutes	8%	Transaction (checkable) deposits	6%
Securities		Nontransaction deposits (e.g., time deposits, savings deposits)	56%
U.S. government and agency	11%	Borrowings	21%
Other securities	11%	Other liabilities	6%
Loans			
Commercial and industrial	13%		
Real estate	34%		
Consumer	7%		
Other loans	7%		
Other assets (e.g., physical capital)	9%	Bank capital	11%
Total	100%	Total	100%

Net worth channel, credit crunch, fire sales



Courtesy of Markus K. Brunnermeier. Used with permission.

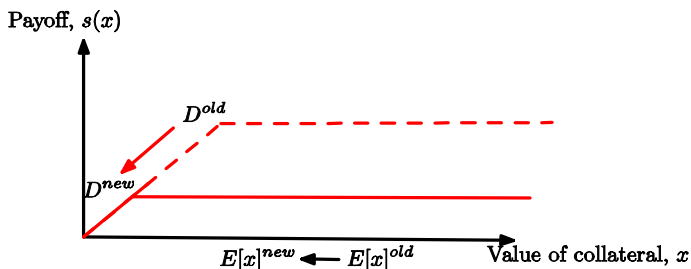
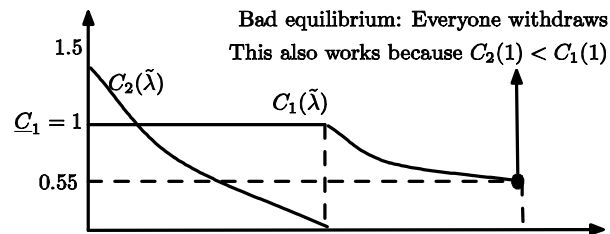
Second set of issues: Liquidity, runs, panics

Little liquidity buffer and potential for runs
Long term/illiquid assets and short term/liquid liabilities (maturity mismatch)
Associated with the banks' role as liquidity pools/creators

Balance Sheet of All Commercial Banks in the U.S. in August 2007
(entries are percentage of total assets)

Assets		Liabilities	
Reserves and cash substitutes	8%	Transaction (checkable) deposits	6%
Securities		Nontransaction deposits (e.g., time deposits, savings deposits)	56%
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Other assets (e.g., physical capital)	9%	Bank capital	11%
Total	100%	Total	100%

DD-type and HGG-type runs



And std (risk) increases

Panics driven by interconnections

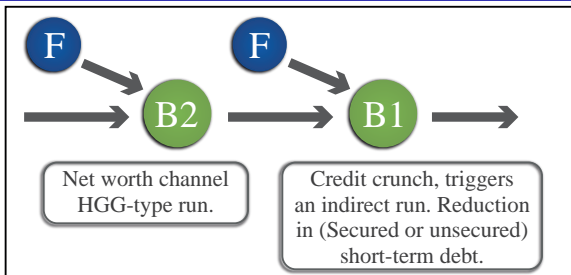
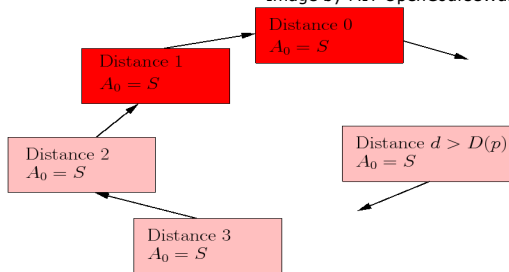


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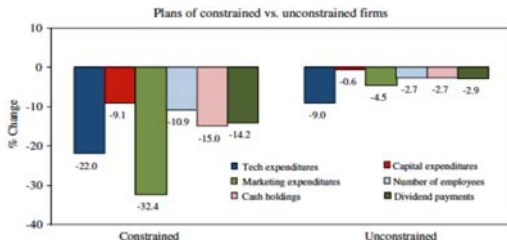
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We care because....

TABLE IX
THE EFFECT OF LENDER CREDIT SUPPLY ON EMPLOYMENT

	(1)	(2)	(3)	(4)	(5)	(6)
	Employment growth rate 2008:3-2009:3					
	OLS		$\Delta \tilde{L}_{i,t}$ instrumented using			
			Lehman exposure	ABX exposure	Bank statement items	All
Explanatory variables						
% Δ loans to other firms ($\Delta \tilde{L}_{i,t}$)	1.17*	1.67**	2.49*	3.17*	2.13*	2.38**
	(0.58)	(0.61)	(1.00)	(1.35)	(0.88)	(0.77)

Courtesy of Gabriel Chodorow-Reich. Used with permission.



Courtesy of Murillo Campello, John Graham, and Campbell R. Harvey. Used with permission.

Evidence/theory: Government support mitigates panics



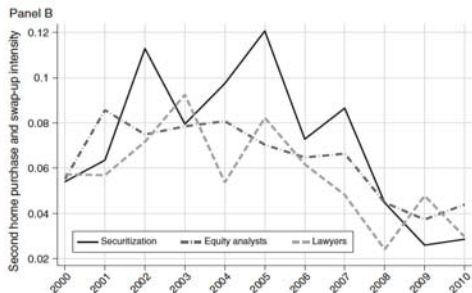
Source: [Banking and Monetary Statistics](#) and FDIC.

Courtesy of Gary Gorton. Used with permission.



Courtesy of Gabriel Chodorow-Reich. Used with permission.

Evidence: Ultimate cause can be mistakes



Courtesy of American Economic Association. Used with permission.

	Log Change Loans Backed by Real Estate (02-05)				
	(1)	(2)	(3)	(4)	(5)
Log Holding Change (02-05)	0.305*** (0.0781)	0.267*** (0.0748)	0.340*** (0.121)	0.300*** (0.111)	0.275** (0.105)
	Holding Period Return (2007-2009)				
	(1)	(2)	(3)	(4)	(5)
Log Holding Change (02-05)	-0.213** (0.0838)	-0.200** (0.0871)	-0.217** (0.105)	-0.300** (0.133)	-0.333** (0.165)

Courtesy of Yueran Ma. Used with permission.

Theory: Some discipline against moral hazard

Exhibit 4 Bear Stearns & Co., Income Sheet Data, as amended, 2004-2007, and unaudited Q1 2008
(in \$ million, except EPS and ratios)

(FY ending November 30)	Q1 2008 (unaudited)	2007	2006	2005	2004
Revenues	3,427	16,151	16,551	11,552	8,422
Capital Markets	1,036	3,919	7,322	5,722	5,305
Institutional equities	811	2,158	1,962	1,446	1,088
Fixed income	66	685	4,190	3,293	3,147
Investment Banking	159	1,076	1,170	983	1,070
Global Clearing Services	253	1,200	1,077	1,029	894
Wealth Management	200	830	858	681	628
Private client services	161	602	522	453	442
Asset management	39	228	335	228	187
Other	-10	-4	-29	-21	-15
Interest Expense	1,948	10,206	7,324	4,141	1,609
Net Revenues	1,479	5,945	9,227	7,411	6,813

Potential
Franchise Value
at Risk
(absent mistakes)

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So what is the optimal crisis policy?

Based on our analysis, how should we think about crisis policy?

The question has two dimensions that might also interact:

What is the optimal **ex-post** policy to fight/mitigate crises?

What is the optimal **ex-ante** policy to prevent/rarefy crises?

- 1 Optimal policy during crises
- 2 Optimal policy to “prevent” crises

How to react to a developing crisis?

- Caballero (2010) draws an analogy between a heart failure ("sudden cardiac arrest") and a financial crisis ("sudden financial arrest").
- The main treatment for a sudden cardiac arrest requires a defibrillator. Moreover, time is of the essence: the defibrillator must be applied within minutes of the arrest. Thus, it is important to have numerous and easily accessible defibrillators.
- Likewise, the main solution to a financial crisis is rapid and massive government support to the financial system, either in the form of bailouts (to mitigate the solvency problems) or guarantees (to mitigate the liquidity problems). These are the financial defibrillators.

Moral hazard concerns are secondary during a crisis

- However, many people resist the use of financial defibrillators, as they seem to think this will generate moral hazard and exacerbate future crises.
- As Caballero notes, this is similar to objecting the use of defibrillators out of concern that, once people realize they are more likely to survive a heart attack, they will eat more cheeseburgers and will become more likely to have heart attacks.
- The point is that the moral hazard concerns are secondary during a crisis. Even if moral hazard is a major cause of the crisis (which itself is debatable--see Lecture 4), it is best dealt with once the crisis is over and by applying other policies. To continue the analogy, one could imagine taxing cheeseburgers in normal times, as opposed to banning defibrillators during crises.
- Once the crisis hits, the pragmatic policymakers often realize that they must apply the financial defibrillators. How did the policymakers in the US react to the crisis?

Bernanke (January, 2009), "The Crisis and the Policy Response"

- "Other than policies tied to current and expected future values of the overnight interest rate, the Federal Reserve has-and indeed, has been actively using-a range of policy tools to provide direct support to credit markets and thus to the broader economy. As I will elaborate, I find it useful to divide these tools into three groups. Although these sets of tools differ in important respects,they have one aspect in common: They all make use of the asset side of the Federal Reserve's balance sheet. That is, each involves the Fed's authorities to extend credit or purchase securities."

Courtesy of the Federal Reserve Board. This content is in the public domain.

Traditional LLR to mitigate DD runs

“The first set of tools, which are closely tied to the central bank’s traditional role as the lender of last resort, involve the provision of short-term liquidity to sound financial institutions. Over the course of the crisis, the Fed has taken a number of extraordinary actions to ensure that financial institutions have adequate access to short-term credit. These actions include creating new facilities for auctioning credit and making primary securities dealers, as well as banks, eligible to borrow at the Fed’s discount window... ”

“Liquidity provision by the central bank reduces systemic risk by assuring market participants that, should short-term investors begin to lose confidence, financial institutions will be able to meet the resulting demands for cash without resorting to potentially destabilizing fire sales of assets....”

Courtesy of the Federal Reserve Board. This content is in the public domain.

Collateralized LLR to mitigate HGG runs

“On the other hand,....providing liquidity to financial institutions does not address directly instability or declining credit availability in critical nonbank markets, such as the commercial paper market or the market for asset-backed securities, both of which normally play major roles in the extension of credit in the United States.”

“To address these issues, the Federal Reserve has developed a second set of policy tools, which involve the provision of liquidity directly to borrowers and investors in key credit markets....In addition, the Federal Reserve and the Treasury have jointly announced a facility that will lend against AAA-rated asset-backed securities collateralized by student loans, auto loans, credit card loans, and loans guaranteed by the Small Business Administration. The Federal Reserve’s credit risk exposure in the latter facility will be minimal, because the collateral will be subject to a "haircut" and the Treasury is providing \$20 billion of capital as supplementary loss protection.”

Courtesy of the Federal Reserve Board. This content is in the public domain.

QE1 to mitigate asset fire sales

“The Federal Reserve’s third set of policy tools for supporting the functioning of credit markets involves the purchase of longer-term securities for the Fed’s portfolio. For example, we recently announced plans to purchase up to \$100 billion in government-sponsored enterprise (GSE) debt and up to \$500 billion in GSE mortgage-backed securities over the next few quarters. Notably, mortgage rates dropped significantly on the announcement of this program and have fallen further since it went into operation. Lower mortgage rates should support the housing sector. The Committee is also evaluating the possibility of purchasing longer-term Treasury securities.”

Courtesy of the Federal Reserve Board. This content is in the public domain.

How about the treasury and the FDIC?

The Fed could mitigate liquidity issues, but it could not (by itself) deal with all of the net worth/capital/solvency issues.

Treasury and the FDIC needed to step in.

Treasury needed authorization by the Congress.

FDIC had own resources and emergency authority to tap more funds.

Swagel (2015): “Constraints on the Crisis Policy Response”:

“The Troubled Asset Relief Program (TARP) was proposed on September 18, 2008—the same week as the Lehman collapse and the AIG bailout—and passed into law as part of the Emergency Economic Stabilization Act on October 3, 2008. The TARP provided authority for the Treasury to purchase or guarantee up to \$700 billion of troubled assets...”

Courtesy of the American Economic Association. Used with permission.

TARP: From asset purchases to recapitalization

“While the intent of the TARP when it was proposed was to purchase illiquid assets...It became clear to policymakers that a more rapid approach was needed...The switch from asset purchases to capital injections fit within the TARP’s legislative language, because shares of banks that originated loans represented troubled assets related to mortgages.”

Asset purchases is at best an indirect fix to net worth issues:

“Asset purchases would help cleanse bank balance sheets of illiquid mortgages and contribute to price discovery but would raise firms’ net worth only if Treasury intentionally overpaid for assets (which was not the plan) or if asset prices rose following the TARP purchases (a possibility if the implementation of the reverse auctions lifted confidence and thereby improved asset prices).”

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TARP: Recapitalization to mitigate net worth channel

“The eight institutions ultimately receiving capital injections (after Bank of America’s acquisition of Merrill Lynch) together accounted for more than half of both the assets and deposits of the US banking system. The existence of these mega-firms, while giving rise to concerns over institutions that were too big to fail, also made it possible to strengthen a broad swathe of the banking system rapidly. Each firm received public capital equal to 3 percent of its risk-weighted assets, for a total of about \$125 billion. The remaining thousands of US banks together would be eligible for another \$125 billion in capital.”

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TARP: Additional capital to particularly weak banks

“...Treasury decisions to provide additional assistance to Citigroup and Bank of America in 2008 and 2009 beyond the initial capital investment of \$25 billion for each institution. These two banks (and perhaps others) appeared to be insolvent at points during the crisis, and were to require extraordinary assistance from the TARP, and yet the government propped them up rather than invoking the usual bank resolution authority of the FDIC. These decisions reflected several factors. First, there was the concern that a government takeover of Citigroup would lead to a renewed flight from other still-fragile banks. Second,...there was little confidence across the government in the agency’s ability to run a mega-bank.”

“At the end...the firm did not fail. Meanwhile, bondholders and other counterparties avoided losses entirely, which was in some ways less than fully desirable, but did have the positive effect of limiting further financial contagion.”

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FDIC: Public guarantees to facilitate private borrowing

Swagel (2015): "...the Federal Deposit Insurance Commission introduced the Temporary Liquidity Guarantee Program (TLGP), under which it would insure senior debt issued by banks. The FDIC further extended its deposit insurance to provide an unlimited backstop on business transactional checking accounts that were previously uninsured. The TLGP program was undertaken using the FDIC's emergency authority, which allowed the FDIC to put taxpayer money...without the usual requirement to act in a manner that ensured the least cost for taxpayers...."

"Veronesi and Zingales (2010) calculate that the guarantees from the FDIC account for most of the benefits in terms of stabilization of the financial system.

"...The Dodd–Frank legislation was later to prohibit a repeat of the TLGP without explicit Congressional approval."

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(Can you see a problem/tension in the last two bullet points?)

Veronesi and Zingales (2010), “Paulson’s Gift”

“We calculate the costs and benefits of the largest ever U.S. Government intervention in the financial sector announced the 2008 Columbus-day weekend. We estimate that this intervention increased the value of banks’ financial claims by \$130 billion at a taxpayers’ cost of \$21 - \$44 billions with a net benefit between \$86bn and \$109bn. By looking at the limited cross section we infer that this net benefit arises from a reduction in the probability of bankruptcy, which we estimate would destroy 22% of the enterprise value. The big winners of the plan were the bondholders of the three former investment banks and Citigroup, while the losers were JP Morgan shareholders and the U.S. taxpayers.”

(The would-be destruction of the enterprise value is consistent with DD type runs/inefficient liquidations on less liquid assets.)

Courtesy of Pietro Veronesi and Luigi Zingales. Used with permission.

Stress tests: Incentivize and back up private capital

Swagel (2015): “In 2009, TARP funds were again set to be used to shore up the financial system, serving as the source of public capital backstopping the so-called “stress tests,” in which bank balance sheets were evaluated to see whether they could withstand an additional period of financial stress. Banks that lacked the appropriate capital as determined by the stress test would be given a chance to raise additional capital from the private sector after which they would be required by their regulator to accept it from the TARP (on onerous terms meant to induce private capital-raising)....The availability of TARP capital was essential to making the stress tests credible in that public capital was available to be forced on firms that could not (or would not) raise their own in response to the results of the stress test.”

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Stress tests: Incentivize and back up private capital

Hanson, Kashyap, and Stein (2011): “The penalty box in this case was that any bank failing to raise the capital from the private markets would be required to accept an equity injection from the Treasury, which would have involved strict limits on executive compensation. Remarkably, in the few weeks following the release of the SCAP (stress test) results, the banks involved were able to raise nearly \$60 billion in new common equity; by the end of 2009 this figure had risen to over \$125 billion.”

“Here is a case where a strong regulatory hand appears to have had highly beneficial effects. Indeed, by being tough and giving banks no choice, regulators probably made it easier for banks to do the capital raising.”

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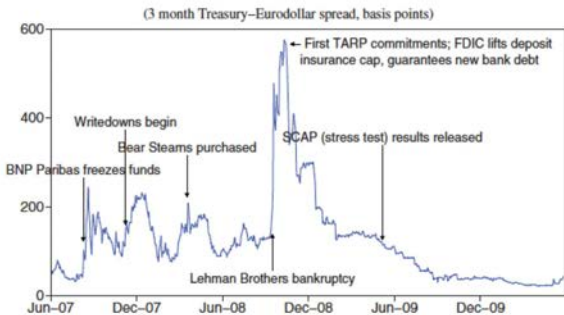


FIGURE I

Stress in the Interbank Lending Market

Courtesy of Gabriel Chodorow-Reich. Used with permission.

How did the crisis end?

Stress tests are considered to be the turning point in the US crisis. Europe also did stress tests in 2009 but much less successful. Didn't have credible public capital as backstop (political frictions). Consistent with important role of government support during crises. Caballero (2010): Make the government support more systematic....

Did the US follow Caballero's advice to prepare for the next crisis?

Quote from page 9 from Caballero, Ricardo J. "[Sudden financial arrest.](#)" (PDF) *IMF Economic Review* 58, no. 1 (2010): 6-36.

Dodd-Frank Act: Glass is half empty

Swagel (2015): “What constraints will policymakers and regulators face when the next financial crisis arrives? It seems safe to conclude, based on political considerations, that there will not soon be another TARP...Attacks on the bank bailouts in particular have become a staple of political campaigns. Moreover, some emergency actions taken during the crisis are no longer available to policymakers as a result of provisions in the 2010 Dodd–Frank financial reform bill. The Treasury is no longer permitted to use the Exchange Stabilization Fund to guarantee money markets. The Federal Deposit Insurance Corporation must now obtain Congressional approval to provide broad debt guarantees. The Federal Reserve can no longer make emergency loans to individual nonbank institutions but must instead devise broad-based programs.”

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Dodd-Frank Act: But it is also half full

“At the same time, the Dodd–Frank law provided important new powers for government regulators to respond to a future financial crisis. Title II of the Dodd–Frank law creates a nonbank resolution authority under which the government can put taxpayer funds into a failing institution to prevent a collapse. Government officials are required to recoup taxpayer funds by imposing losses on shareholders, bondholders, or other counterparties of the failing firm, and ultimately through assessments on other financial sector participants if needed. The FDIC is still developing the tools for such an intervention.”

Courtesy of the American Economic Association. Used with permission.

- 1 Optimal policy during crises
- 2 Optimal policy to “prevent” crises

How about ex-ante policies to prevent crises?

The ideal ex-ante policies are much less well understood.

Moral hazard suggests that bank risk-taking should be restricted.

But mistakes also suggest the same thing in view of **externalities**.

Banks (managers) will tend to take excessive risks because they do not internalize the effect that their failures would have on the rest of the economy.

They will not think hard about actions and make excessive mistakes.

This is not moral hazard per se—it is simply maximizing own utility.

Regardless of MH or mistakes, it makes sense to regulate banks so as to make them safer than they would be on their own...

Need: More capital and more liquidity

Balance Sheet of All Commercial Banks in the U.S. in August 2007
(entries are percentage of total assets)

Assets		Liabilities	
Reserves and cash substitutes	8%	Transaction (checkable) deposits	6%
Securities		Nontransaction deposits (e.g., time deposits, savings deposits)	56%
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Commercial and industrial	13%		
Real estate	34%		
Consumer	7%		
Other loans	7%		
Other assets (e.g., physical capital)	9%	Bank capital	11%
Total	100%	Total	100%

How much is a difficult question

There are two dimensions to bank safety: capital and liquidity.

Economic logic suggests increasing buffers on both margins.

There are also some costs to these policies since they might restrict bank lending/investment in normal times.

The trade-off is difficult, especially if you take the mistakes view.

But it seems reasonable to increase capital requirements somewhat...

Does more capital restrict lending in normal times?

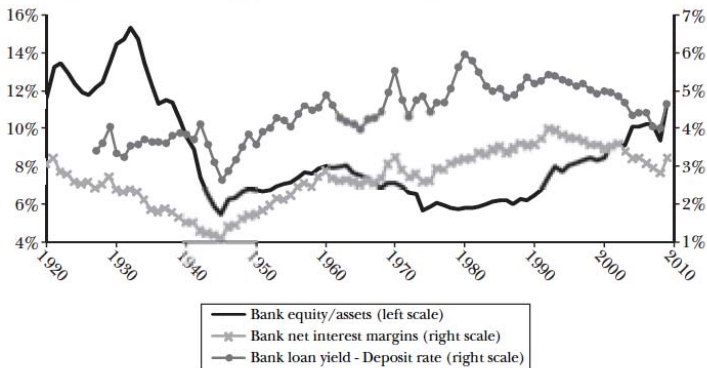
Hanson, Kashyap, Stein (2011): “But will these higher capital requirements lead to increased costs for borrowers? In what follows, we focus on the long-run steady-state consequences of higher capital requirements, setting aside the transitional issues associated with phase-in of a new regime. To preview, our reading of the theory and relevant empirical evidence suggests that while increased capital requirements might be expected to have some long-run impact on the cost of loans, this effect is likely to be quite small.”

They do some back of the envelope calculations to assess costs.

They also look at the historical record to see trace of costs...

Courtesy of the American Economic Association. Used with permission.

B: Relationship between Loan Spreads and Bank Equity/Assets, 1920–2009



Sources: Data from 1840 to 1896 is based on Berger, Herring, and Szego (1995) who use data from the

Courtesy of the American Economic Association. Used with permission.

“...we have examined the behavior of various proxies for the markup that banks charge on loans. In a variety of regression specifications (not shown here), we found no reliable time-series correlation between these markup variables and bank capital ratios.”

“To illustrate the loose ties between loan costs and capital ratios, Figure 2B plots capital ratios for the period 1920–2009 against two markup proxies: 1) the net interest margin (net interest income over earning assets); and 2) the yield on loans (interest income on loans over gross loans) minus the rate paid on deposits (interest expense on deposits over deposits). As can be seen, there is no apparent correlation between capital ratios and either measure of markups.”

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So how much more capital?

So evidence is limited but suggests reasonable increases in capital requirements will not create havoc on the financial system.

HKS also do back-of-the envelope calculation to argue for capital requirements (in good times) in the order of 15%.

“We have stressed the importance of requiring that financial firms have both more capital, and, crucially, higher-quality capital. On this score, the Basel III recommendations look quite good. They would raise the minimum common equity requirement from 2 percent of risk-weighted assets to 7 percent (this is inclusive of a “capital conservation buffer”). While we have argued for a higher number, this is a significant step in the right direction.”

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How about liquidity?

For liquidity, the issues are even more complicated, because what matters the most is liquidity in crisis/distress times.

Liquidity measures in good times can be misleading (fire sales...).

There are also various complications (off-balance sheet positions...).

“Liquidity Mismatch Measurement” by Brunnermeier, Krishnamurthy, Gorton (2013) discuss issues and propose an index.

Bai, Krishnamurthy, Weymuller (2015), “Measuring Liquidity Mismatch in the Banking Sector” implement for the US banks...

“This paper implements a liquidity measure, “Liquidity Mismatch Index (LMI),” to gauge the mismatch between the market liquidity of assets and the funding liquidity of liabilities. We construct the LMIs for 2882 bank holding companies during 2002 - 2014 and investigate the time-series and cross-sectional patterns of banks’ liquidity and liquidity risk. The aggregate banking sector liquidity worsens from +\$5 trillion before the crisis to -\$3 trillion in 2008, and reverses back to the pre-crisis level in 2009. We also show how a liquidity stress test can be conducted with the LMI metric, and that such a stress test as an effective macroprudential tool could have revealed the liquidity need of the banking system in the late 2007. In the cross section, we find that banks with more ex-ante liquidity mismatch have a higher crash probability and have a higher chance of borrowing from the government during the financial crisis. Thus the LMI measure is informative regarding both individual bank liquidity risk as well as the liquidity risk of the entire banking system...”

Courtesy of Jennie Bai, Arvind Krishnamurthy, and Charles-Henri Weymuller. Used with permission.

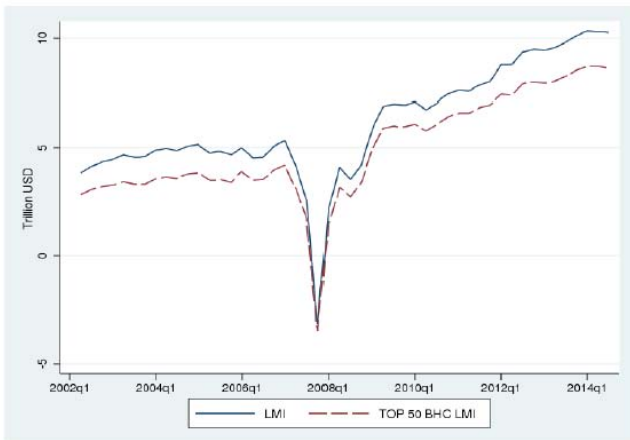


Figure 4: **Aggregate Liquidity Mismatch (\$Trillion) for Top 50 and All BHCs**

Courtesy of Jennie Bai, Arvind Krishnamurthy, and Charles-Henri Weymuller. Used with permission.

The drop is consistent with the DD/HGG run theories we have seen.

So what causes crises and what to do about them?

Anonymous quote: “We have not succeeded in answering all our problems. The answers we have found only serve to raise a whole set of new questions. In some ways we feel we are as confused as ever, but we believe we are confused on a higher level and about more important things.”

Thank you for your attention and interest!

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14.09 Financial Crises

January IAP 2016

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