

Shadow Banking & the Financial Crisis

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Origins

- Banks perform several vital roles in the economy:
 - ① Pool individual savings to “insure” against liquidity shocks.
 - ② Maturity Transformation.
 - ③ Liquidity Transformation.
 - ④ Credit Transformation.
- A consequence of these beneficial activities is that banks are subject to *runs*.
- Today:
 - Problems arising from incomplete pooling at individual banks are mitigated by the Federal Funds Market.
 - Federal deposit insurance and The Fed’s role of lender of last resort solve the bank runs problem.

US Banking Pre-1913

- Gorton (2010) reviews the banking panics during the “US National Banking Era, 1864-1913.”
 - ① They were common (7 during this 67 year period).
 - ② They occur at the peak of business cycles.
 - ③ The 2 most severe crises were in 1873 – 1879 and 1893 – 1894, when 56 and 74 national banks failed, respectively (being 2.8 and 1.9% of national banks).
 - ④ In these 2 cases the loss per \$ deposit were 2.1 and 1.7¢, respectively.
 - ⑤ The low losses are the result of the private deposit-insurance structures of that time.
- These panics share 4 characteristics:
 - ① The banking system is insolvent.
 - ② “Currency Famine.” (Shortage of transactions media.)
 - ③ Currency Premium.
 - ④ Gorton argues that the panics are not the result of bank-specific information.

Private Bank Clearinghouses

- In response to a panic, banks:
 - ① would jointly suspend cashing out of deposits.
 - ② join together to form a central bank.
 - ③ cease publishing individual bank accounting information.
 - ④ –instead publish aggregate information of the “central bank.”
 - ⑤ issued loan certificates, which were liabilities of the “central bank.”
- So why isn't this a viable solution?
 - ① Note that this system did not forestall bank runs.
 - ② The economy experiences a shortage of cash—disrupting economic activity during a run.

Regulation

- The fact that the FDIC provides a public back-up for depositors provides the backdrop for banking regulations: Clearly having access to deposit insurance is valuable, and it comes with costs.
- Traditionally these costs take the forms of:
 - ① A premium for the deposit insurance.
 - ② Minimum capital requirements (tied to activities).
 - ③ Reserve requirements.
 - ④ Supervisory oversight and restriction of activities.
- So, much of the history of financial innovation (whether promoted by technological advances or regulatory changes/loopholes) involves circumventing these costs.
- This is because incentives make this profitable for an individual institution, while the *runs problem* is borne by society as a whole.

Long Term Capital Management

- The experience of the hedge fund Long Term Capital Management provides a clean example of this problem:
 - ① LTCM explicitly sought to profit by maturity and liquidity transformation.
 - ② As such any one of their trades had very little risk.
 - ③ In order to translate these low-risk trades into reasonably-sized profits, the fund borrowed heavily.
 - ④ A small shock in the economy caused its convergence trades to temporarily diverge.
 - ⑤ Lenders to LTCM confronted the classical coordination problem inherent in many runs.—Each had an incentive to get his money out before the others.
 - ⑥ If this run were to start it could have disruptive effects on global financial markets.

Long Term Capital Management 2.

- In September 1998, the Federal Reserve responded to this threat to financial stability by organizing a reorganization of the hedge fund.
- Under this arrangement the partners' stake was wiped out.
- The most surprising aspect of this case is the apparent naïvety of the lenders. Although, after the fact, they actually made out ok.
- The Fed's role, therefore can be criticized as creating incentives for excessive risk taking.

Shadow Banking

- Traditional banking usually involves relationships and contracts (deposits and loans);
- whereas, by contrast, shadow banking entails transactions and securities.
- Luttrell, Rosenblum, and Thies (2012) argue that the distinguishing characteristic of shadow banking is the absence of explicit public sector backups, which makes it subject to runs.
- From LRT:

Traditional banks used the shadow banking system to move liquidity risk and credit risk off of their balance sheets, transferring these risks outside of the regulation and regulatory support (safety nets) of traditional banking. However, these risks were not eliminated from the financial system.

Scope of Shadow Banking

- Figure 3 (p. 7) of LRT summarizes the scope of shadow banking activities in the US financial system.
- **Deposits**
 - ① Money Market Funds (Rule 2a-7).
 - ② Securities lenders.
 - ③ Short-term bond funds.
 - ④ Cash funds.
 - ⑤ Overnight sweep agreements.
 - ⑥ Cash-plus funds.

Loans

- These deposits take the form of:
 - ① Commercial Paper.
 - ② Asset-Backed Commercial Paper.
 - ③ Medium Term Notes.
 - ④ Repo.

Rehypothecation

- According to Mitchell and Pulvino (2012), Prime Brokerage operations of large investment banks provide a menu of services to their hedge fund clients.
- Hedge funds grant their prime broker the right to rehypothecate the hedge fund's securities. (That is: The prime broker can use these securities –owned by the hedge fund– as collateral for a loan.)
- In practice, investment banks do not use their own balance sheets to fund prime brokerage operations. This is achieved using off-balance sheet financing by rehypothecating client securities.

Rehypothecation 2.

- US and UK regulations on rehypothecation are quite different. The US restricts rehypothecation to 140% of client's debit balance. (SEC 15c3-3)
- UK: No restrictions. This created some confusion in the Lehman Bankruptcy and later (October 2011) MF Global bankruptcy.

Repo

- Both Copeland, Martin and Walker (2012) and Krishnamurthy, Nagel, and Orlov (2012) use the tri-party repo market to identify the portion of repo activity that comes from outside the dealer community.
- The idea is that MMF and security lenders (SL) use tri-party repo, whereas dealers use bilateral repo with one-another.
- Tri-party repo involves either JP-Morgan Chase or Bank of New York-Mellon acting as intermediary between the two parties to the repo.

Repo 2.

- Krishnamurthy, Nagel and Orlov provide the following example of a repo chain and rehypothecation:
 - ① A hedge fund (H) with \$2 in equity buys \$102 in a US Treasury note.
 - ② It repos-in the note by using it as collateral to borrow \$100 from Dealer A.
 - ③ Dealer A uses the note as collateral in a repo with Dealer B.
 - ④ Dealer B uses the note as collateral in a repo with a Money Market Fund (M).
- Consequences of these transactions:
 - ① The Shadow Banking system is lending \$100 from M to H.
 - ② There are 3 repo loans of \$100 each – all using the same note as collateral.
 - ③ The Fed's Dealer repo statistics will show \$200 in repo.

Repo 3.

- Gorton and Metrick (2012) document that the bilateral repo market experienced a significant increase in haircuts in late September 2007.
- They show that prior to September 2007 the haircut in repo on structured debt averaged 0.
- By January 2008, this was 10%, and it reached 46% by December 2008.
- Gorton and Metrick describe this as a *run on repo*.
- By contrast, both Copeland, Martin and Walker (2012) and Krishnamurthy, Nagel, and Orlov (2012) document that the tri-party repo market did not experience any major changes or disruptions throughout the financial crisis.

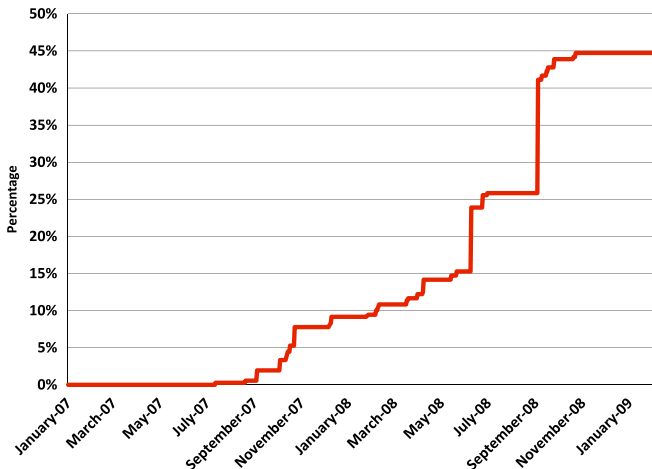
Repo 4.

- This is important, because if (as argued above), tri-party repo represents the flow of retail money into the shadow banking system, then the turmoil of the crisis did not adversely affect this part of the shadow banking system.
- Indeed Krishnamurthy, Nagel, and Orlov argue that there was not a run on repo during the crisis. They say that there was a credit crunch (which is not a coordination failure).

Repo in the Crisis

G. Gorton, A. Metrick / *Journal of Financial Economics* 104 (2012) 425–451

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4. The repo-haircut index. The repo-haircut index is the equally weighted average haircut for all nine asset classes included in Table 2, Panel D.

Repo in the Crisis 2.

- Gorton and Metrick (2012 *JFE*) examine the behavior of repo rates and haircuts in the *bilateral* repo market through the financial crisis on the preceding slide.
- Krishnamurthy, Nagel, and Orlov look at haircuts in the tri-party repo market on the next slide.

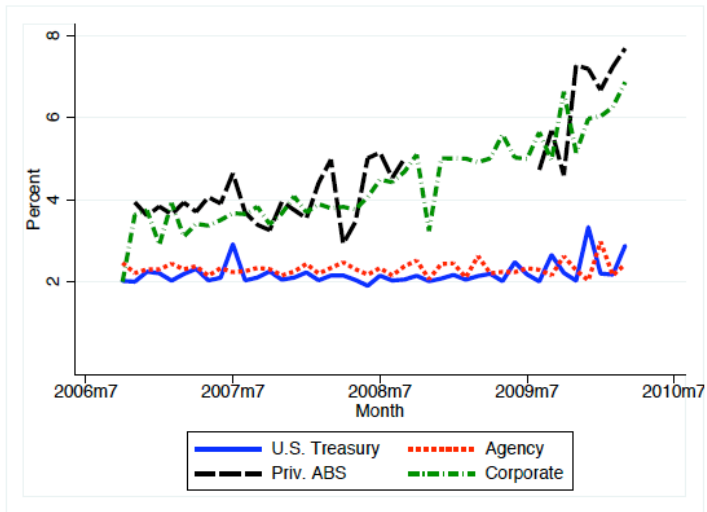


Figure 6: Haircuts by Collateral Type (weighted by notional value)

Commercial Paper

- Asset-backed commercial paper was first issued in the 1980s.
- In the 1980's and 90's, most *conduits* (or special purpose entities) were set up to finance an institution's clients' accounts receivable.
- By the early 2000's, most conduits invested in long-term assets.
- As the figure on the next slide shows, by 2006, there was \$1.1 trillion in ABCP outstanding.
- This is significantly more than the amount of industrial commercial paper (\$0.1 trillion) and financial commercial paper (\$0.7 trillion).
- Acharya, Schnabl and Suarez (*JFE* 2013) make the case that these conduits were set up so that the institutions could avoid capital requirements. (Regulatory Arbitrage)
- The key to this argument is that some 75% of ABCP was issued with full credit support.

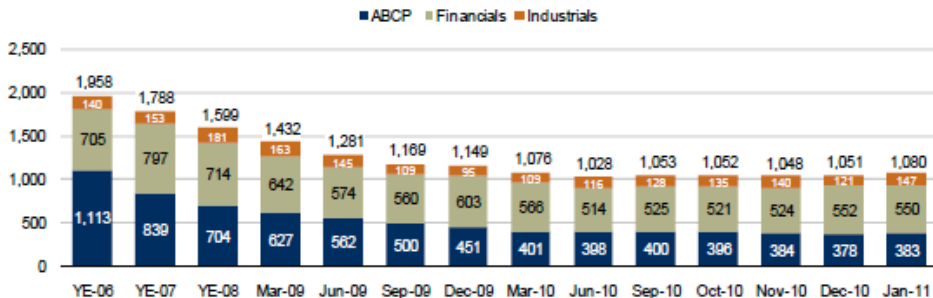
Commercial Paper 2.

- Evidence supporting the *regulatory arbitrage* hypothesis is that some 75% of ABCP was issued with full credit guarantees.
- The second figure is from Krishnamurthy, Nagel and Orlov. It highlights the fact that while ABCP was financed in part with repo, even at its peak, this amounted to less than 10% of the outstanding ABCP.
- Kacperczyk and Schnabl (2010 *JEP*) document that the ABCP market collapsed in August 2007:
 - ① On July 31, 2007, two Bear-Stearns hedge funds with exposure to subprime mortgages filed for bankruptcy.
 - ② On August 7, 2007, BNP Paribas closed 3 hedge funds.
 - ③ By August 9, 2007, ABCP spreads widened from 10 bps above FFR to 150 bps.
 - ④ Maturing ABCP could not be rolled over, so sponsors had to inject cash into their conduits.
 - ⑤ This, in turn, raised concerns about these institutions—heightening counterparty risk premia.

ABCP in the Crisis

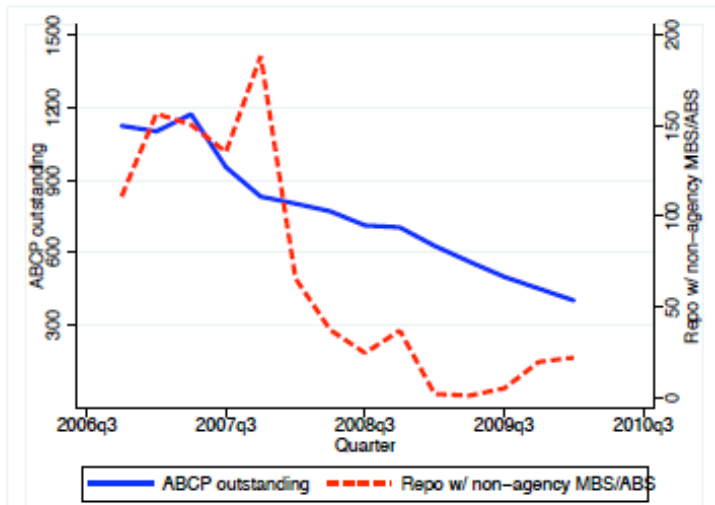
U.S. Commercial Paper Outstanding

All Issuers (\$Billions)



Source: Morgan Stanley, "Morgan Stanley Short-Term Credit Weekly Update," January 28, 2011

ABCP in the Crisis 2.



ABCP in the Crisis 3.

- Continuing with the sequence of events affecting ABCP as related by Kacpercyk and Schnabl:
 - 1 This infusion of scarce capital into their conduits raised concerns about these institutions—heightening counterparty risk premia.
 - 2 Interestingly, as the ABCP market was rapidly shrinking, both financial and industrial CP outstandings actually increased.
 - 3 When Lehman filed for bankruptcy, the MMF, Reserve Fund, which held \$785 in Lehman Brothers' CP experienced a run.
 - 4 Kacpercyk and Schnabl show that in the week following Lehman's bankruptcy MMF assets fell by more than \$172 billion.
 - 5 This prompted the US Treasury to provide insurance directly to participating MMFs (for one year).
 - 6 The Fed also implemented its ABCP facility specifically to help MMFs to sell their ABCP to banks—if they were experiencing significant withdrawals.

ABCP in the Crisis 4.

- Kacperczyk and Schnabl consider three possible reasons for the collapse of the ABCP market.
 - ① Substitution to other funding sources.
 - Throughout 2007 and 08, market participants learned that ABCP was much riskier –and required more research into the underlying conduit– than previously thought.
 - ② Adverse selection.
 - With borrowing costs for ABCP rising, those left willing to pay the higher rates reveal themselves to be desperate – and hence of higher risk than previously thought.
 - Covitz, Liang, and Suarez (2009) find that following the August 9, 2007, ABCP market collapse, all issuers were affected. But over time, the weaker conduits (with weaker sponsor guarantees) left the market.
 - By contrast, KS find that following Lehman's bankruptcy, financial firms with stable stock prices stopped issuing CP, whereas those with large stock price declines continued to issue CP.

ABCP in the Crisis 5

- (Possible reasons for the collapse of the ABCP market (continued)).
 - 3 Institutional constraints.
 - This explanation derives from Rule 2a-7 constraints on money market mutual fund holdings.