

Topic 2:

“US Financial Markets and Approaches to Regulation of Shadow Banking”

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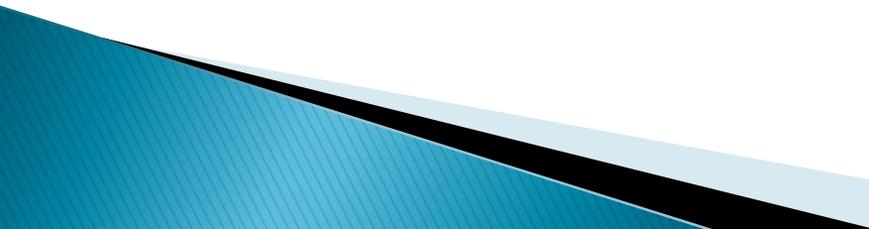
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Banking Supervision

- It has been argued that there were two interrelated sources of financial instability at heart of the 2007-08 financial crisis:
- Rapid deterioration or outright failure of several large, highly-leveraged institutions that resulted in widespread spillover effects to rest of financial sector
- Important market in asset-backed securities, containing many leveraged actors who were all dependent on a similar source of liquidity – the *repurchase market*
- Many commentators have called for complementary policy responses, especially if constraints applied to large regulated institutions in commercial banking sector push more activity into unregulated sector, i.e., *shadow banking*
- Debate revolves around switching to macro-prudential regulation

Micro-Prudential Financial Regulation

- **Micro-Prudential Regulation:** while deposit insurance has effect of preventing runs, creates incentive for bank managers to take excessive risks, knowing losses will be covered by taxpayer
 - **Goal of capital regulation** is to force banks to internalize losses, protecting deposit insurance fund, and mitigating moral hazard – as a result deposit insurer losses are reduced to a low level
 - **Critique of micro-prudential regulation** is that by pushing a bank to restore its capital ratio, regulator does not care if this is done by raising new capital or shrinking assets
 - **Makes sense** if considering only one bank, but if large fraction of financial system is in difficulty, simultaneous reduction in assets is damaging to economy
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Macro-Prudential Financial Regulation

- **Macro-Prudential Regulation: an effort to control social costs of excessive reduction in balance sheets on part of financial system hit by common shock**
- **Generalized asset shrinkage has both credit crunch and asset *fire-sale* effects, which are reinforcing as real cost of fire-sale helps deepen credit crunch through pushing up yields and hence interest rates – so why does this not draw in private capital?**
- **Capital is immobile due to “debt overhang”, when bank is in trouble, banks do not raise new equity as value gets siphoned off by more senior creditors, instead they shrink assets**
- **Also, if short-term debt is cheaper form of finance than equity in good times, banks take on too much debt**

Macro-Prudential Financial Regulation

- In such a world, financial institutions have strong incentive to: shrink assets rather than recapitalize once a crisis is underway, and operate with too thin capital buffers before crisis occurs
 - Macro-prudential approach is aimed at counter-balancing these two tendencies, and should be applied to all financial institutions, and not just insured deposit-takers
 - Many observers have argued regulatory framework in place before financial crisis was deficient because it was micro-prudential, i.e., partial equilibrium in nature, and aimed at preventing failure of an individual institution
 - By contrast, macro-prudential approach recognizes general equilibrium effects, and seeks to safeguard system at large
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Macro-Prudential Financial Regulation

- Hanson et al. (2011) argue that there are six instruments that may be helpful in implementing macro-prudential approach to financial regulation:

- **Time-Varying Capital Instruments**

Here banks would be asked to maintain higher capital ratios in good as opposed to bad times – allows them to draw on buffers when adverse shock hits, with less pressure to shrink assets

- **Higher-Quality Capital**

Regulators should require most of bank capital requirement be common equity – it is more friendly to recapitalization process than preferred stock due to debt overhang problem

Macro-Prudential Financial Regulation

- **Target Dollars of Capital, Not Capital Ratios**

Rather than banks being given choice of raising capital or selling assets, focus should be on creating incentives to raise incremental dollars of new capital, e.g. base capital ratio on higher value of assets in t or $t+1$

If banks starts with \$100 of assets and capital of \$8 in t , but then loses \$4 over $t+1$, and suppose required capital ratio is 6% - with this rule, it cannot reduce assets below \$100, and will have to raise \$2 of new capital

- **Contingent Capital**

Possible to pre-wire recapitalization with a contingent instrument such as “contingent convertibles”, i.e., banks issue debt security that converts into cash if capital ratio falls below certain level

Macro-Prudential Financial Regulation

■ Regulation of Debt Maturity

Insufficient attention was given by regulators to distinction between short-term and long-term debt – case for regulating former over and above regulating total leverage is based on two observations:

- ability of short-term lenders to run leads to more fragility than with equivalent amount of long-term debt
- if bank finances opts to finance largely with short-term debt, it fails to internalize that in a crisis, inability to roll over short-term debt will force it to liquidate assets, imposing fire-sale cost on others who hold same assets and see value of collateral diminished

Macro-Prudential Financial Regulation

■ Regulation of Shadow Banking

Fire-sale risk due to excessive short-term funding comes from both insured depositories and other financial intermediaries in shadow banking sector

Efforts should be made to impose similar capital standards on a given type of credit exposure irrespective of who ultimately holds that exposure, be it a bank, broker-dealer, hedge fund or special purpose vehicle (SPV)

This may require broad-based regulation of *haircuts* on asset-backed securities with two potential benefits:

- Help harmonize regulation across organizational forms, reducing incentives to migrate into shadow banking
- Haircut regulation will dampen problems of run on shadow banking

Banking Supervision

- While the US Dodd-Frank Act addresses a variety of commercial and shadow banking issues, it does not mandate specific levels for banks' capital requirements
 - This was left to the Basel Committee on Banking Supervision, a group of supervisors and bank regulators who formulate supervisory standards and guidelines for commercial banking system
 - Its most recent recommendations in were made in 2010-11, known as Basel III, the rules being scheduled for introduction from 2013-15, but now delayed until 2019
 - US Federal reserve announced in 2011 that it would implement all of Basel III rules, and that they would not only apply to banks, but all financial institutions with more than \$50 billion in assets
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Banking Supervision

- **Basel III was developed in response to deficiencies in financial regulation revealed by the financial crisis, and it was supposed to strengthen bank capital requirements by increasing bank liquidity and leverage**
- **Basel III made following changes to bank capital requirements:**
 - **Minimum equity capital banks must hold as proportion of their assets set at 7%, consisting of:**
 - **4.5% common equity capital (up from 4% in Basel II)**
 - **additional cushion of 2.5% equity capital which can be used up in emergency, as long as dividend payments are halted**
 - **During periods of rising asset prices, regulators can impose requirement that banks hold additional counter-cyclical buffer of 2.5% of risk-weighted assets**

Banking Supervision

- Latter requirement designed as a macro-prudential measure allowing banking supervisors to “...take away the punch bowl while the party is still in full swing...top it up when the economy is slowing” (*The Economist*, September, 2010)
- While many commentators agree that Basel III is tougher than its predecessors Basel I and II, common refrain that it creates strong potential for unintended consequences
- May result in incentives for what has been termed *regulatory arbitrage*, which is “...purposeful attempt by banks to avoid the rules which dictate how much capital they are required to hold...” (Stein, 2010)
- Basel III raises capital costs of banks, reducing profits, giving them incentive to move activities of balance sheets into less-regulated shadow banking system

US Banking Supervision

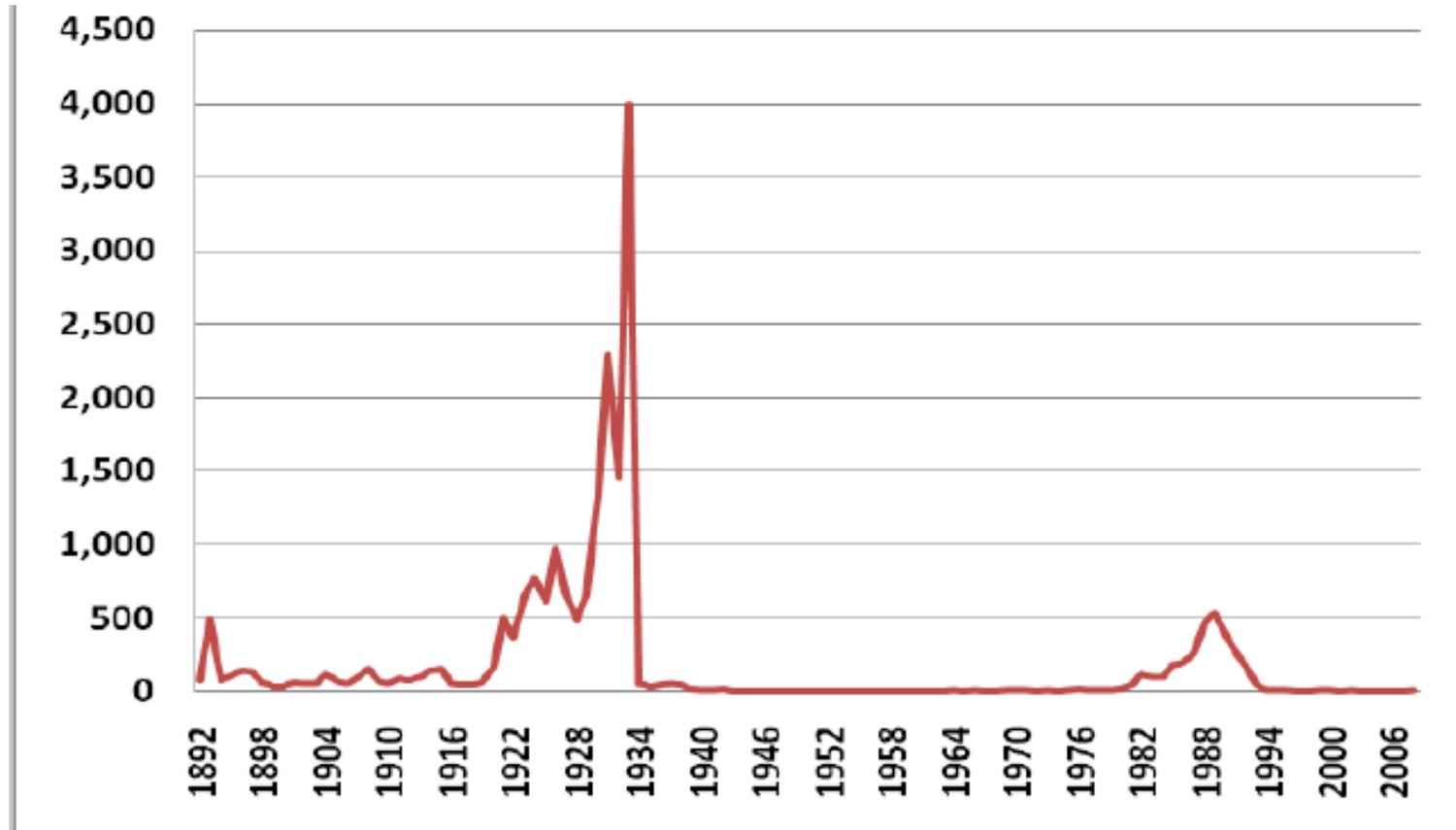
- **Following financial crisis of 2007-09, US Congress passed major regulatory reform of financial sector in the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010**
- **Dodd-Frank includes many provisions relevant to shadow banking:**
 - **Hedge funds must now register with Securities and Exchange Commission (SEC)**
 - **Much over-the-counter derivatives trading will be moved to exchanges and clearing-houses**
 - **All systematically important financial institutions will be regulated by the Federal Reserve**
- **Important gaps involve money market mutual funds (MMMFs) securitization and the repurchase market – all played central role in crisis and are in need of regulation (Gorton and Metrick, 2010)**

The Banking Panic of 2007

- As is now well-understood, the financial crisis which began in the summer of 2007 was essentially triggered by a systemic event – the bursting of the house-price bubble, combined with an increase in subprime mortgage defaults
- This resulted in the US banking sector becoming insolvent and the credit market ceasing to function (Gorton, 2008; Gorton and Metrick, 2009), i.e., there was a banking panic
- Historically, a bank-run is a where majority of depositors attempt to liquidate their demand and savings deposits at same time, but banking sector is unable to honor such demands for cash, the latter having been converted into illiquid loans
- Since 1934, when deposit insurance was introduced, along with discount-lending by the Federal Reserve there have been no banking panics for a span of almost 75 years (Figure 1)

The Banking Panic of 2007

Figure 1: Number of US Bank Failures, 1892-2008



Source: Banking and Monetary Statistics

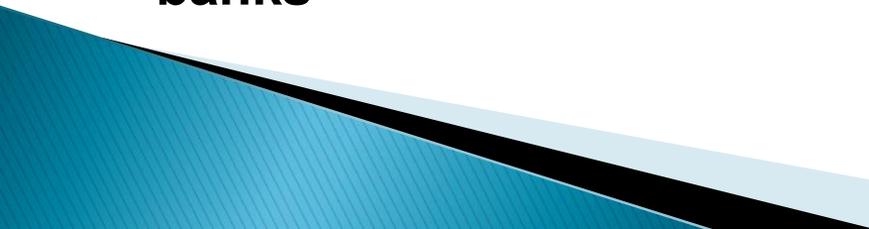
The Banking Panic of?



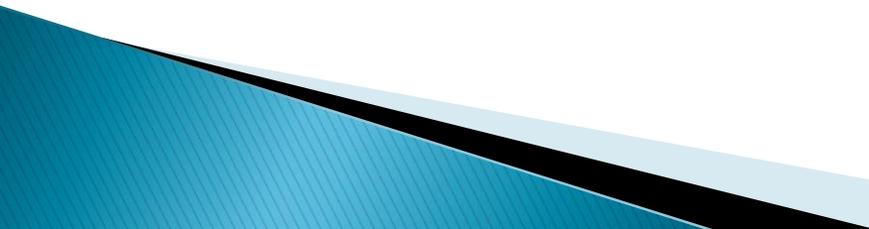
The Banking Panic of 2007

- Several interesting questions arise: what gave US almost 75 years of relative quiet in banking, and what has changed? How could problems in one part of housing sector cause banking crisis in 21st Century?
- Even though panic of 2007 did not emanate from commercial banking system, many have argued it was a run on shadow banking sector, with both forced rescues (Bear Sterns) and bankruptcies (Lehman Brothers)
- Essentially there was a run on repurchase or “repo” market, characterized by steep rise in price of haircuts and termination of repo market lending on collateral in form of asset-backed securities (ABSs)
- Net result was shortage of funding liquidity causing significant stress to financial system, including banking insolvency, i.e., a panic

What is Banking?

- In order to understand a panic, it is necessary to understand what banks actually do, and in particular whether their functioning makes banking system vulnerable to panic
 - There is a large academic literature on functions of banking, mostly focusing on asset side of balance sheet, i.e., loans
 - Loans require monitoring of borrower by bank, and production of private information about borrower when loan is initially made
 - Implies loans cannot be sold by banks, because then bank would have no incentive to produce information in first place when it made loan or to monitor borrower throughout lifetime of loan
 - Loans are in fact sold in significant quantities by banking system, and has been an important part of growth in shadow banking – so this academic argument cannot be key reason for existence of banks
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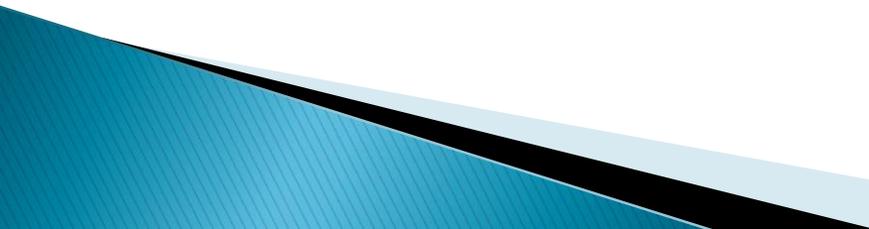
What is Banking?

- **Gorton and Pennacchi (1990) and others have argued that essential function of banking is to create a special kind of debt that is immune to adverse selection by privately informed traders**
 - **If speculators can learn information that is private (only they know it), they can take advantage of less-informed in trade – which is not a problem if value of security is not sensitive to such information, i.e., “informationally-insensitive” debt**
 - **Leading example is demand deposits - type of debt that is very liquid because value rarely changes and so it can be traded without fear some agents have secret information about value of debt**
 - **Key point about demand deposits is that counterparties accepting checks written to them, need not worry about value of check. Many features of checks contribute to this**
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What is Banking?

- Demand deposits are short-term – essentially have no maturity, and depositors can withdraw at any time – follows from deposit insurance, which means no party to a transaction need be concerned about value of check
 - Demand deposits, however, are of no use to large firms, banks, hedge funds and corporate treasuries, which may need to deposit large amounts of money for short period of time – not willing to deposit \$500 million in a bank as it cannot be insured
 - In repo market, cash can be deposited and collateralized with bonds, which the depositor receives, i.e., banks back deposits with bonds as collateral, and often collateral is *securitized* products
 - Consequently, demand for informationally-insensitive debt has grown, and now there is a range of securities with different information sensitivities
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What is Banking?

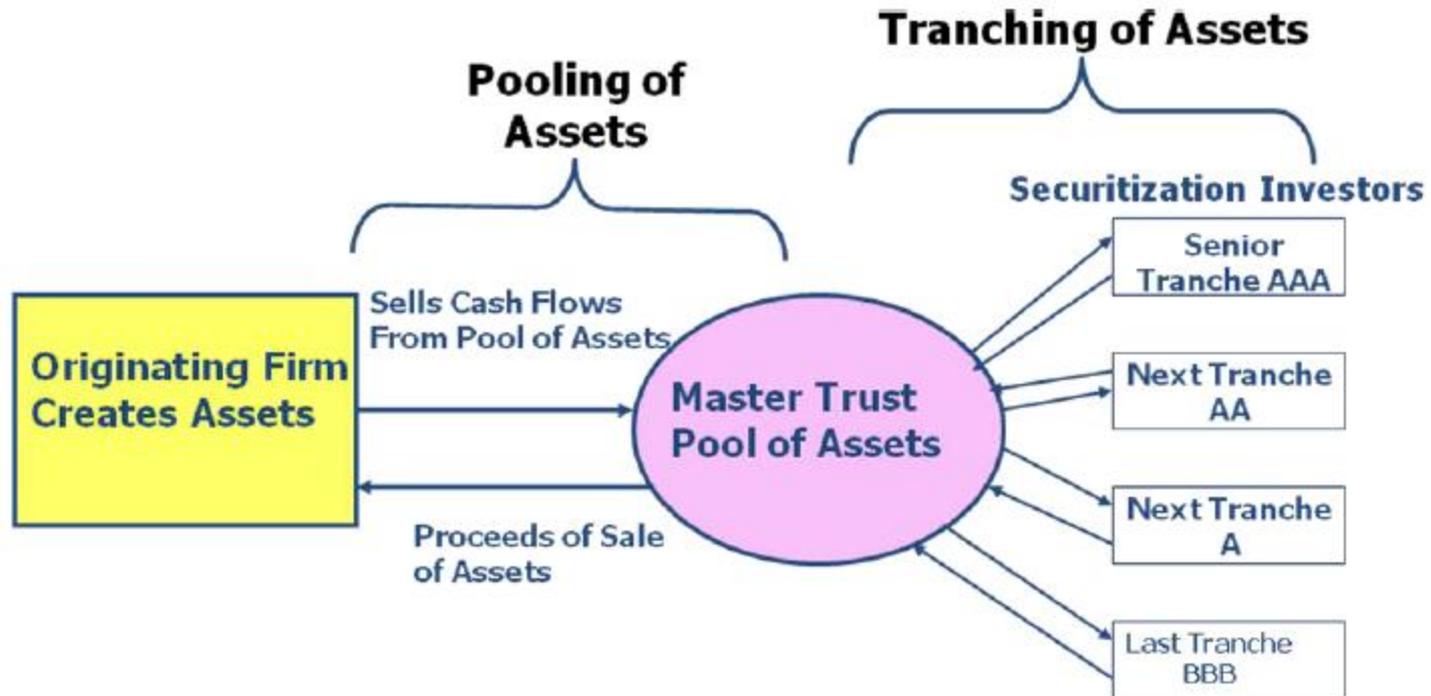
- Notion of informationally-insensitive debt corresponds to institutions that surround debt, as opposed to equity, which is informationally-sensitive, and traded on exchanges
 - Can other kinds of debt be treated in same way as demand deposits? Studies of corporate bond returns and bond yields conclude that investment-grade bonds behave like Treasury bonds, reacting to interest-rate movements
 - In comparison, below investment-grade bonds (junk bonds) are more sensitive to stock information, reacting to information about the firm; but even corporate debt, while being senior, can suffer losses if issuer defaults
 - A firm may also finance itself by segregating specified cash flows and selling claims linked to such cash flows
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Securitization

- This is accomplished by setting up a separate company, i.e., Special Purpose Vehicle (SPV), and selling cash flows to that company
- In turn SPV issues securities into the capital market to finance purchase of cash flow from company (the sponsor), and sponsor services those cash flows
- Key function of SPV is *securitization*, illustrated in Figure 2, which involves two key steps:
 - Underlying cash flows from assets (loans) are put in a pool and sold to SPV
 - Pool of cash flows are then *tranching*, i.e., securities with different seniorities designed and issued against pool

Securitization

Figure 2: Process of Securitization



Source: Gorton, 2009

Securitization

- In addition to home mortgages, several other asset classes have been securitized (Table 1)
- Securitized assets may be examples of relatively informationally-insensitive debt, created by private sector without government insurance
- Several features of this type of debt make it potentially immune from adverse selection:
 - Most of the debt is senior and investment-grade
 - Debt is backed by portfolios
 - Does not involve traded equity
- While not riskless, most senior tranches of securitized transactions have never experienced defaults

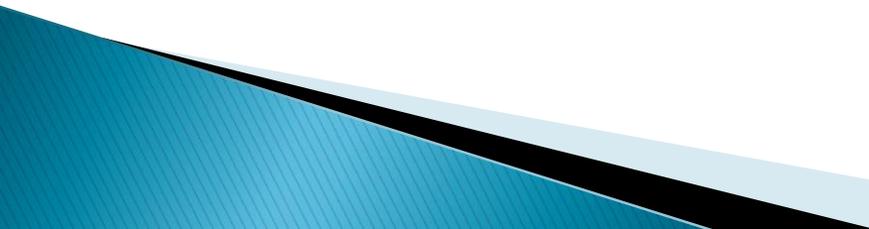
Securitization

Table 1: Examples of Securitized Assets

Aircraft leases	Health club receivables
Auto loans (prime)	Home equity loans
Auto loans (subprime)	Intellectual Property cash flows
Auto leases	Insurance receivables
B & C MBS	Motorcycle loans
Commercial real estate	Music royalties
Computer leases	Mutual Fund receivables
Conforming first-lien mortgages	Manufactured housing loans
Non-conforming mortgages	Small Business Loans
Consumer loans	Stranded utility costs
Credit card receivables	Student loans
Equipment leases	Trade receivables
Equipment loans	Time share loans
Franchise loans	Tax liens
“Future” receivables	Taxi medallion loans
Healthcare receivables	Viatical Settlements

Source: Gorton, 2009

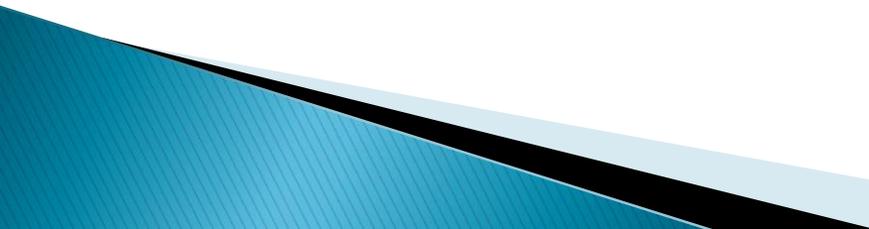
Securitization

- Due to security design, informationally-insensitive debt surrounded by different set of trading and related infrastructure and institutions compared to informationally-sensitive asset classes such as equity
 - This type of debt does not correspond to notion of “efficient markets”, which is essentially about the stock market
 - Primary market is over-the-counter, where debt is sold based on its rating; no organized secondary market, instead it is organized around dealer banks and depends on intermediation via the repo market
 - Informationally-insensitive debt requires few resources to conduct due diligence, but if there is a systemic shock to financial system, such debt may become informationally-sensitive
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Securitization

- As a result of shock, adverse selection creates sufficient uncertainty so as to make speculation profitable
- Fear of “lemons” market can cause collapse of trading in debt and stoppage of new credit being issued – this is precisely what happened in 2007
- Crisis had its roots in the transformation of the banking system:
 - Derivative securities have grown exponentially in past 30 years, creating demand for collateral
 - Very large movement of loans originated by banks into capital markets in form of securitization and loan sales, used extensively in repo market
 - Latter assets have freed up other assets such as Treasuries for use as collateral in derivatives transactions

Securitization

- **Current panic focused on repo market in 2007, which suffered run when “depositors” required increasing haircuts due to concerns about value and liquidity of collateral should the counterparty “bank” fail**
 - **Hence a banking panic began because informationally-insensitive debt became informationally-sensitive due to an economic shock, i.e., problems in subprime mortgages due to falling house prices**
 - **As Gorton has argued in several papers, shadow banking is in fact banking**
 - **Consequently, understanding that the financial crisis was essentially a banking panic is important for thinking about how to regulate the financial system, and in particular how to regulate shadow or securitized banking**
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Securitized Banking

- How then does securitized banking work? A starting point is commercial banking (see Figure 3)
- In this system, depositors transfer cash to a bank in exchange for credit in either a checking or savings account (step A); deposits then lent by bank in form of mortgages and other types of loan which remains on bank's balance sheet (step B)
- Key characteristic of this form of financial intermediation is *maturity mismatch*, whereby terms of bank's assets and liabilities do not match up, i.e., loans have long-term maturities, while depositors can withdraw at short notice
- Point of deposit insurance is to reduce incentive for mass withdrawal of cash by depositors when there is a shock to financial system

Securitized Banking

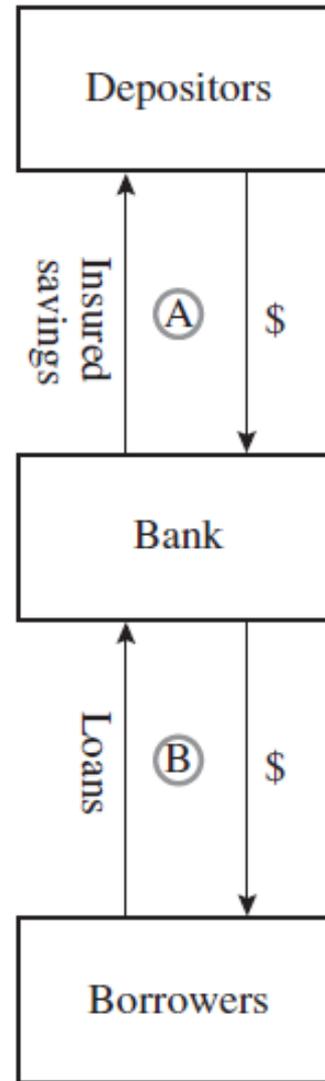
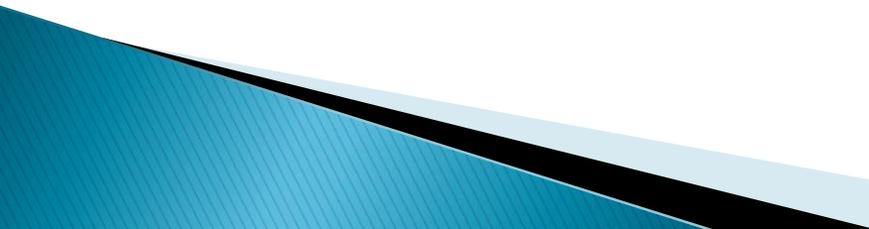


Figure 3: Traditional Banking

Securitized Banking

- While deposit insurance works well for retail investors, cap on amount of insurance means that large financial institutions seek access to safe short-term investments (cap currently stands at \$250,000 in US)
 - Securitized system of shadow banking, operating through repo market offers this form of financial intermediation (see Figure 4), where provision of insurance is now given in step 2
 - An MMMF or another institutional investor receives collateral from bank, transaction taking form of a repo agreement
 - Due to fact that repo agreements are typically short-term in nature, they are key source of maturity mismatch on balance sheets of shadow banks
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Securitized Banking

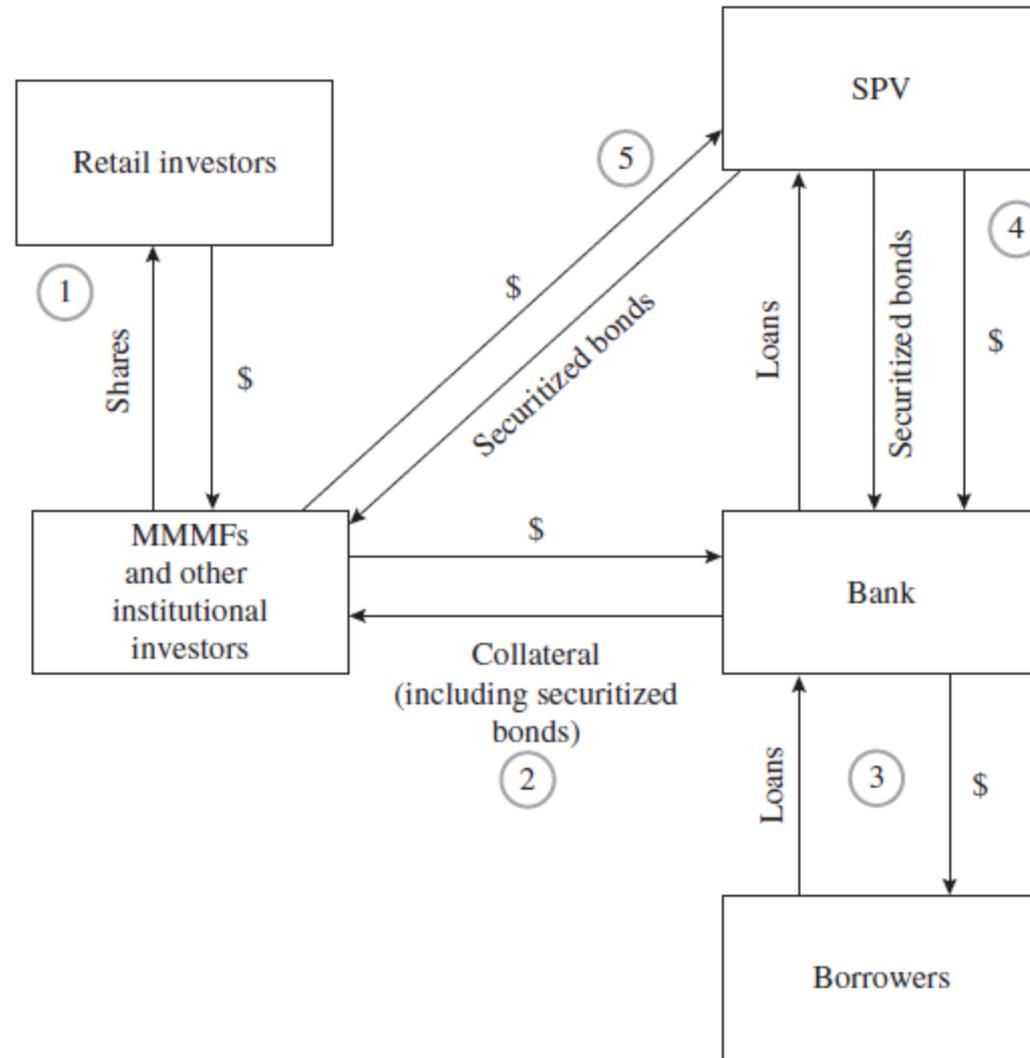
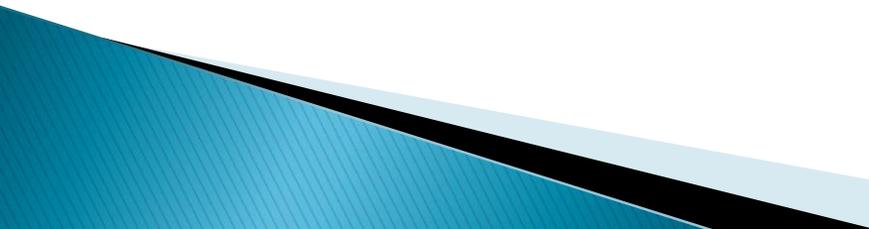


Figure 4: Shadow Banking

Securitized Banking

- A repo agreement works as follows: suppose investor purchases assets (collateral) worth \$5 million from bank, while bank agrees to repurchase assets after short time period for \$5.1 million, i.e., *repo rate* is $(5.1-5.0)/5.0 = 10\%$ - equivalent to return on savings deposit
- If bank defaults on promise to repurchase, investor gets to keep collateral
- An additional feature of repo agreements is implementation of a *haircut* – actual amount deposited by investor will be less than market value of asset used as collateral, e.g., if assets sold for \$5 million are actually worth \$6 million, haircut is $(6.0-5.0/6.0)=16.7\%$
- In other words, bank borrowing cash in repo agreement receives less than value of collateral they are putting up, i.e., bank has to hold some fraction of their assets in reserve when they borrow – analogous to *reserve requirements*

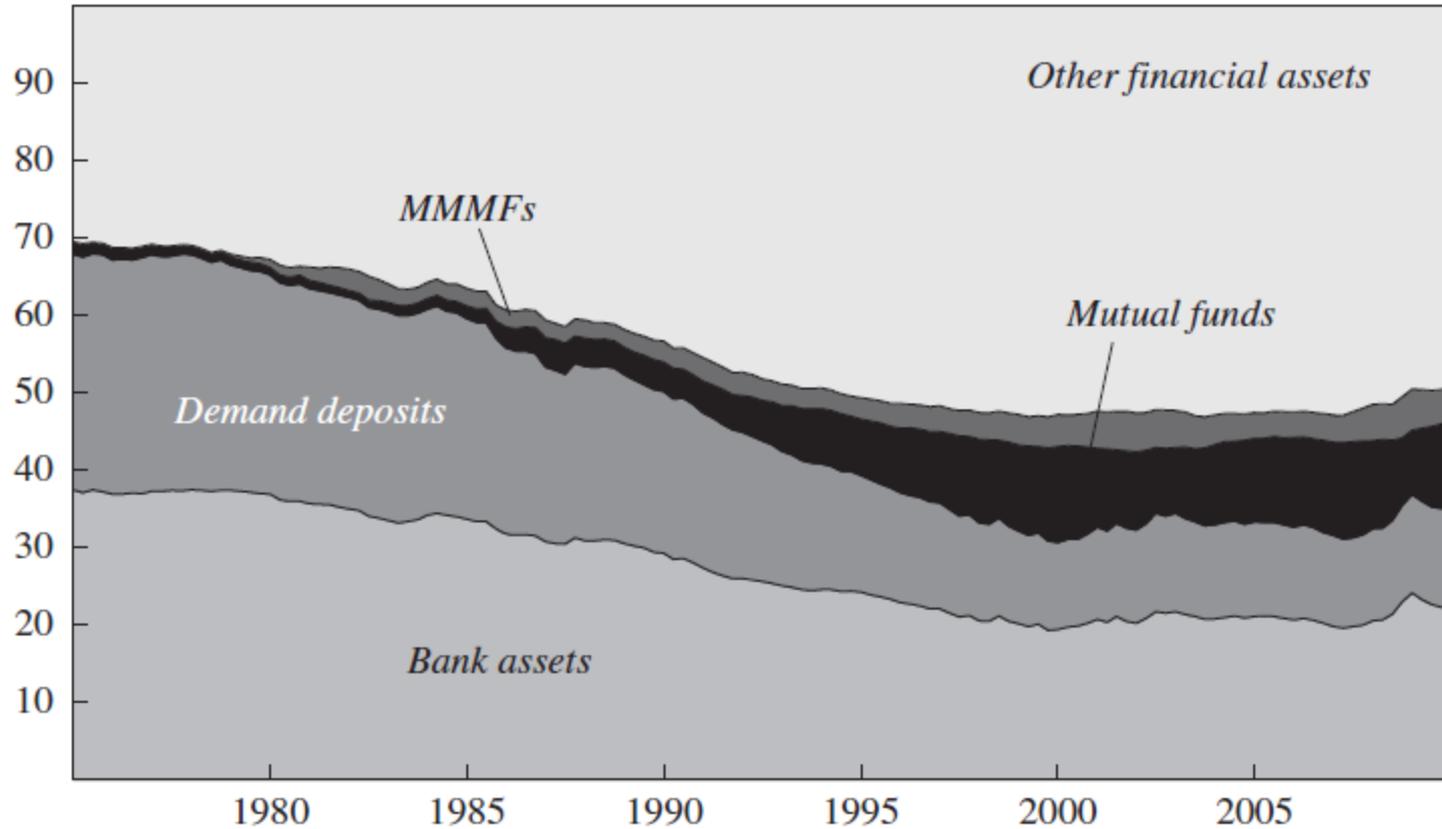
Securitized Banking

- **Step 4 is what moves financing off the balance sheet, where loans are pooled and securitized, where outputs of this process are either purchased directly by institutional investors in step 5, or used as collateral in step 2**
 - **Each component in off-balance-sheet financing cycle has grown rapidly since 1980 – bank share of assets declined by 20% between 1980 and 2008 (Figure 5)**
 - **Also significant growth in balance sheets of institutions playing role of banks in shadow banking sector, i.e., investment banks or broker-dealers (Figure 6)**
 - **To act as banks, had to offer repos, hence needed bonds as collateral; yield on collateral accrues to bank which then pays repo rate – hence growth in balance sheets**
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Securitized Banking

Figure 5: US Financial Assets, 1975-2008

Percent of total financial assets

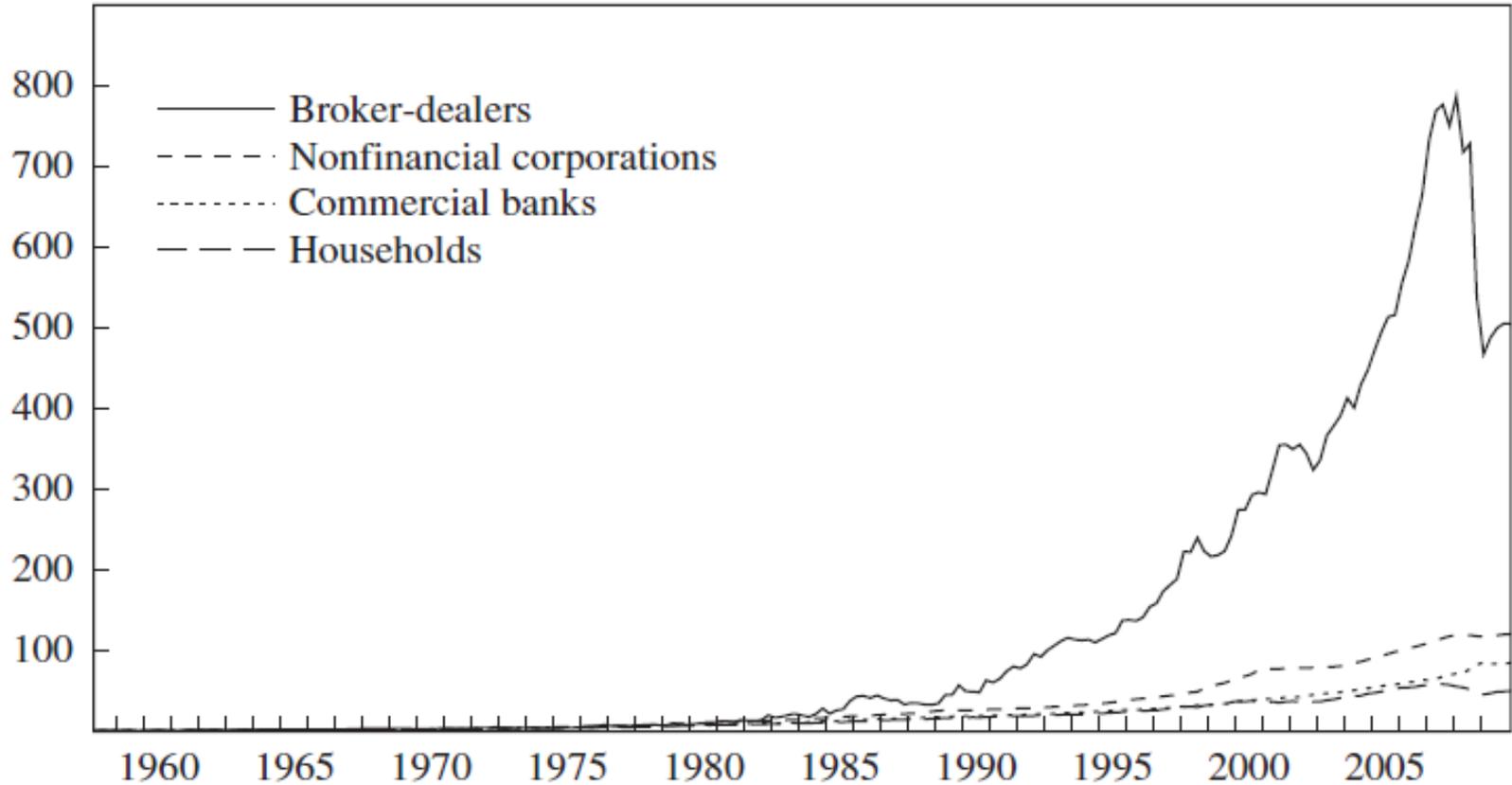


Source: Federal Reserve

Securitized Banking

Figure 6: Assets in US Financial Sector, 1958-2010

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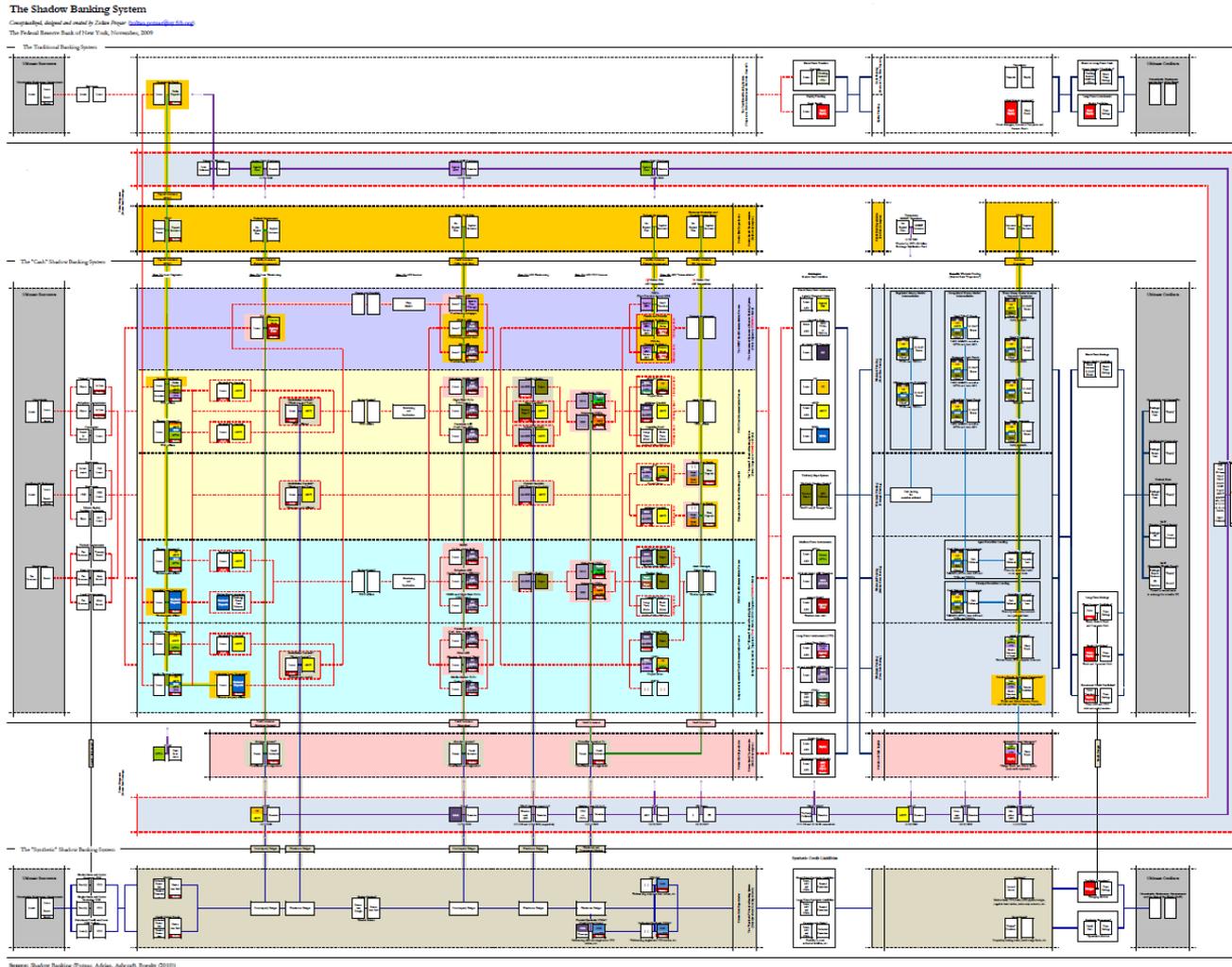


Source: Federal Reserve

Shadow Banking

- In its broadest definition, shadow banking includes institutions such as: MMMFs, mortgage brokers, sale-and-repurchase agreements (repos), ABSs, collateralized debt obligations (CDOs), and asset-backed commercial paper (ABCP)
- Shadow banking, or securitized banking can be thought of in terms of issuance of short-term money market instruments based on ABSs
- Institutions such as investment banks seek to borrow money short-term, where transaction is collateralized with securitized assets, while other players such as MMMFs want to invest in assets with short-term maturities
- By March 2008, total liabilities of US shadow banking sector stood at \$20 trillion, and even though this declined \$16 trillion by 2010 – still greater than traditional banking system (Pozsar et al., 2010)

Shadow Banking According to Federal Reserve Bank of New York!



Source: Pozsar et al. (2010)

Shadow Banking

- Rise of shadow banking occurred over past 30-40 years, and is outcome of fundamental changes in US financial system due to private innovation and regulatory changes leading to decline in traditional banking, firms exiting regulated sector
- Commercial banking became less profitable due to competition from junk bonds and commercial paper and MMMFs on the assets and liabilities sides of their balance sheets respectively
- There have been three particularly important developments in shadow banking:
 - MMFS: since 1970s, shift away from demand deposits to such funds due to interest rate ceiling on former – by 2008, MMMFs had grown to value of \$3.8 trillion – a significant financial innovation in past 50 years

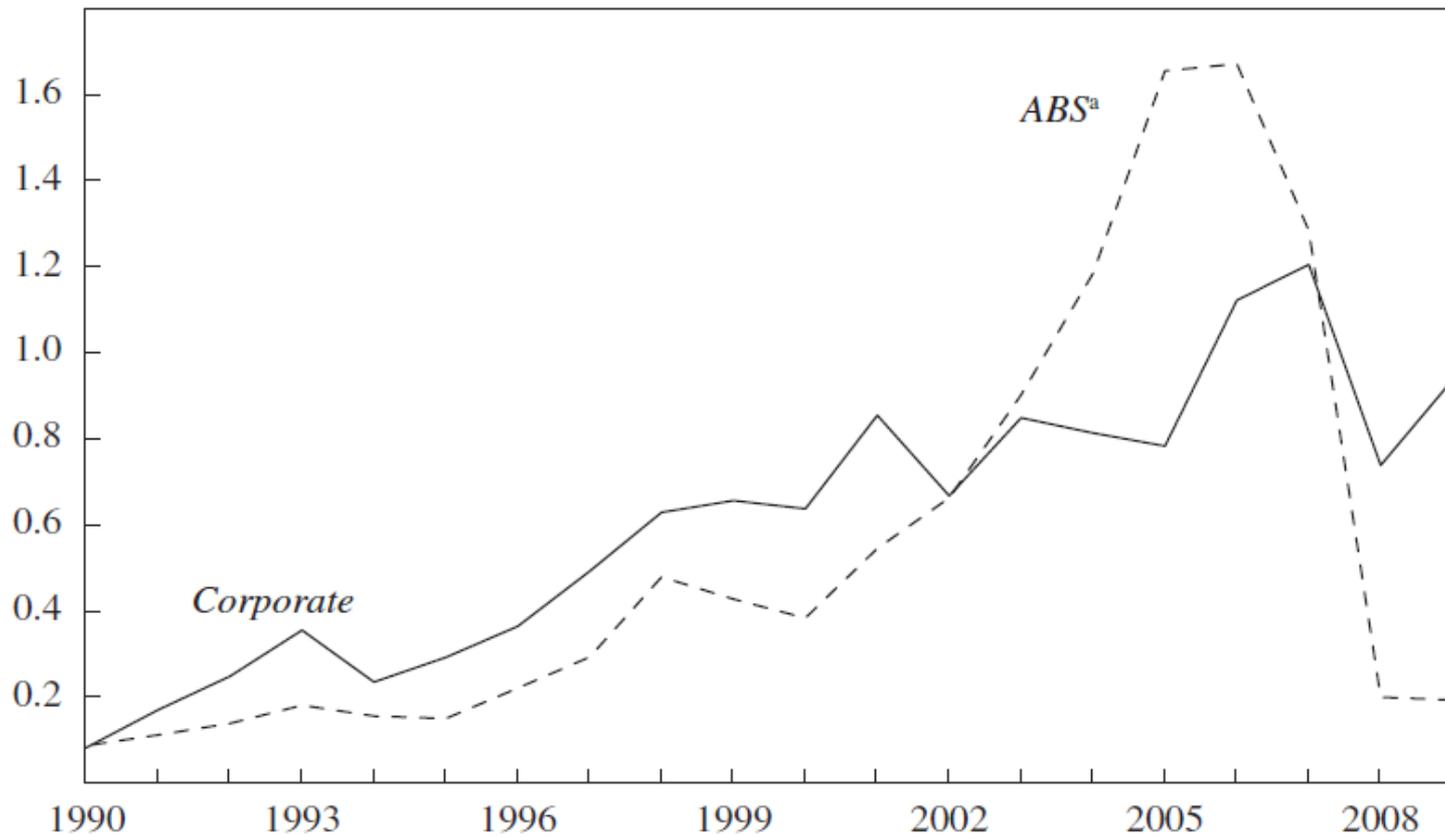
Shadow Banking

- **Closely regulated:** required to invest only in high-quality securities that have little credit risk
- **Important feature of MMMFs** is they seek to maintain net asset value of \$1/share – hence ability to compete with demand deposits; maintenance of this share price successful up to crisis, perhaps instilling false confidence among investors
- **Banks** of course pay deposit insurance, whereas **MMMFs** pay nothing to offer share price of \$1 – in crisis, **MMMFs** explicitly guaranteed by government, which if continued, gives **MMMFs** cost advantage over insured deposits
- **Securitization:** has become a large and important market (see Figure 7) – compared to corporate debt, securitized debt exploded after 2000, and then collapsed during crisis

Securitization

Figure 7: Issuance of Corporate Debt and ABSs, 1990-2009

Trillions of dollars



Source: Thomson Reuters

Shadow Banking

- To understand potential efficiencies of securitization, important to understand how SPV structure works: it has no other purpose than transaction or transactions for which it was created – no one actually works at SPV and it has no physical location
- Two essential features of SPVs concern bankruptcy:
 - they are “bankruptcy remote”, insolvency of sponsor (bank or loan originator) has no impact on SPV, creditors not being able to claw back assets from SPV
 - designed so that it can never actually become legally bankrupt
- Several costs and benefits in choosing to move some assets of banks’ balance sheets:

Shadow Banking

- **Bankruptcy:** ABSs issued by SPV do not trigger default in case where underlying portfolio does not generate enough cash to make coupon payments on bonds – instead cash is used to make principal payments early
- **Taxes:** debt issued off balance sheet does not have advantageous tax benefits of on-balance-sheet debt, i.e., less profitable and close to bankrupt firms more likely to finance off balance sheet
- **Moral Hazard:** once portfolio of loans transferred to SPV, no danger of other SPV activities imposing costs on holders of securitized bonds, compared to holder of bank bonds who is exposed to other actions of bank management
- **Increased capital requirements on banks will force off-balance sheet securitization**

Shadow Banking

- **Adverse Selection:** concerns raised that loan originators who have better information on loans than investor will put worst loans into portfolio sold to SPV

Several constraints imposed to mitigate adverse selection:

(i) Loans subject to eligibility criteria, and once eligible, either selected at random, or all qualifying loans placed in portfolio

(ii) Originators retain residual interest in securitizations – in principle aligns interests of investors and originators

Has worked well for most securitization except subprime mortgages, where there has clearly been a problem

- **Transparency:** underlying SPV portfolio, while not simple to evaluate, is more transparent than bank balance sheet

Shadow Banking

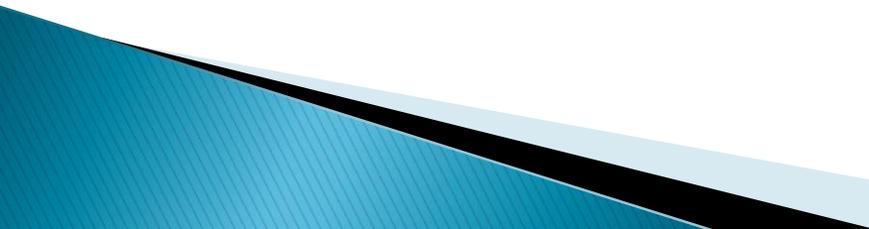
- **Customization: ability to disclose specific assets underlying securitized bonds allows customization of bonds for niche investors**

Investors desiring exposure to (or hedges against) mortgages, auto loans or credit card receivables can purchase exactly what they want through securitized bonds without taking on exposure to other types of asset

Although banks do offer own debt at different levels of seniority, transparency of SPV portfolios allows for easier valuation of different tranches

Can even create safe senior tranches that can trade as informationally-insensitive, AAA-rated securities – partly a response to rising demand for safe collateral in repos and other financial transactions

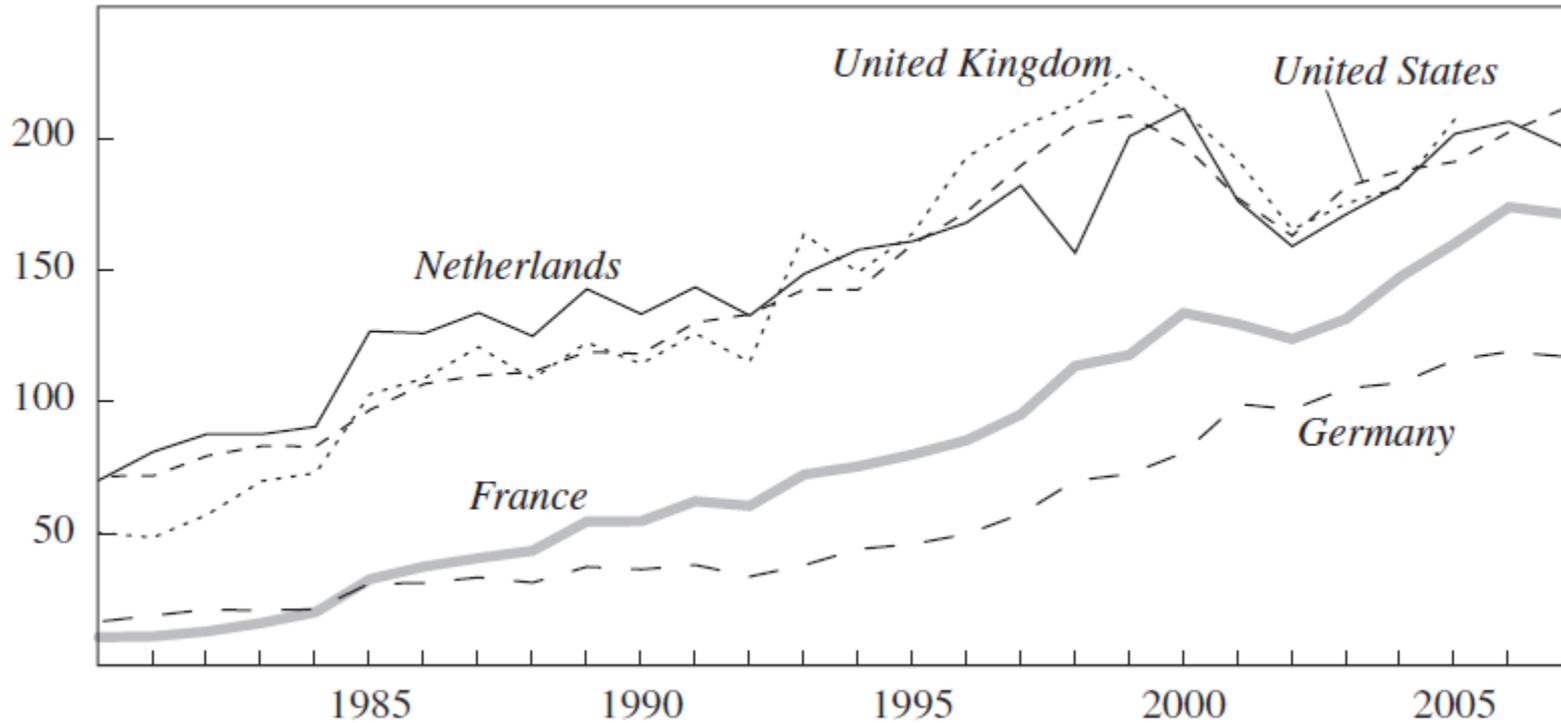
Shadow Banking

- **Repos: key driver of increased use of repos is rapid growth of money managed by institutional investors, pension funds, mutual funds, states and municipalities, and nonfinancial firms**
 - **Entities hold cash for various reasons, but would like safe investment earning interest, while retaining flexibility to use cash when needed, i.e., demand deposit-like product**
 - **These assets have grown in size and become important part of landscape in last 30 years - ratio to GDP grew significantly between 1980 and 2007 in several developed economies (see Figure 8)**
 - **Repos act as substitute for insured demand deposits because they are excluded from Chapter 11: not subject to automatic stay, i.e., creditors not prevented from taking action**
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Securitization

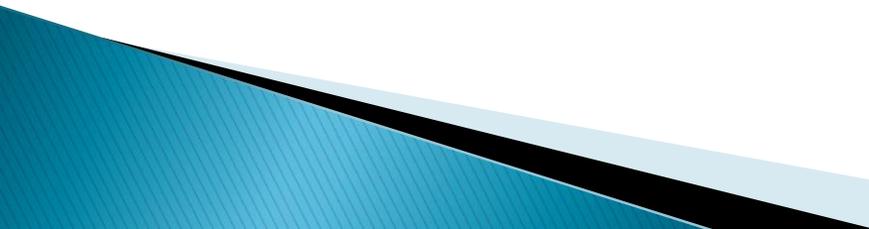
Figure 8: Financial Assets of Institutional Investors, 1980-2008

Percent of GDP



Source: Bank for International Settlements

Shadow Banking

- Depositor can unilaterally terminate repo when bank becomes insolvent, and sell collateral – without this, party to repo contract would be just another creditor waiting to be repaid
 - Repo collateral can be re-hypothecated – collateral received in repo deposit can be freely used in another transaction with unrelated third party, e.g., bonds posted as collateral can then be used as collateral in derivatives transaction
 - Results in high levels of “velocity” in repo markets – single piece of collateral used to effect settlement in number of contracts on same day
 - Allows daily repo trading of a specific note to exceed outstanding amount of issue – measures of repo market likely much higher when re-hypothecation taken into account
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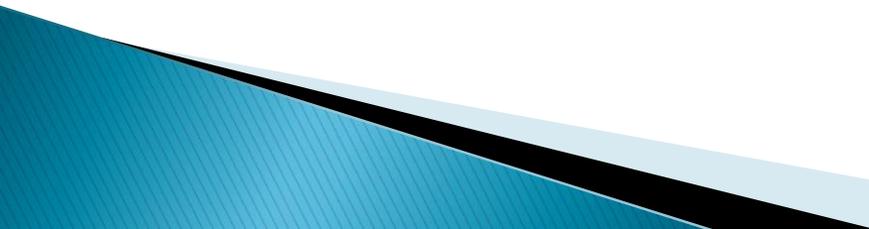
Shadow Banking

- No official data exist on repos other than what Federal Reserve collects for amounts transacted by 18 primary dealer banks – only captures fraction of US market at \$4.5 trillion in fixed income securities in 2008

Hördahl and King (2008) estimate US repo market was worth \$10 trillion in mid-2008, while that in euro area was also roughly \$10 trillion, with another \$1 trillion in UK market

- Repos have functions other than as deposit market, and described as core of financial system:
 - used to hedge derivatives positions
 - market participants can take short positions by selling security they do not own by borrowing from another party in repo market
 - mechanism for obtaining leverage, especially for hedge funds

The Run on Shadow Banking

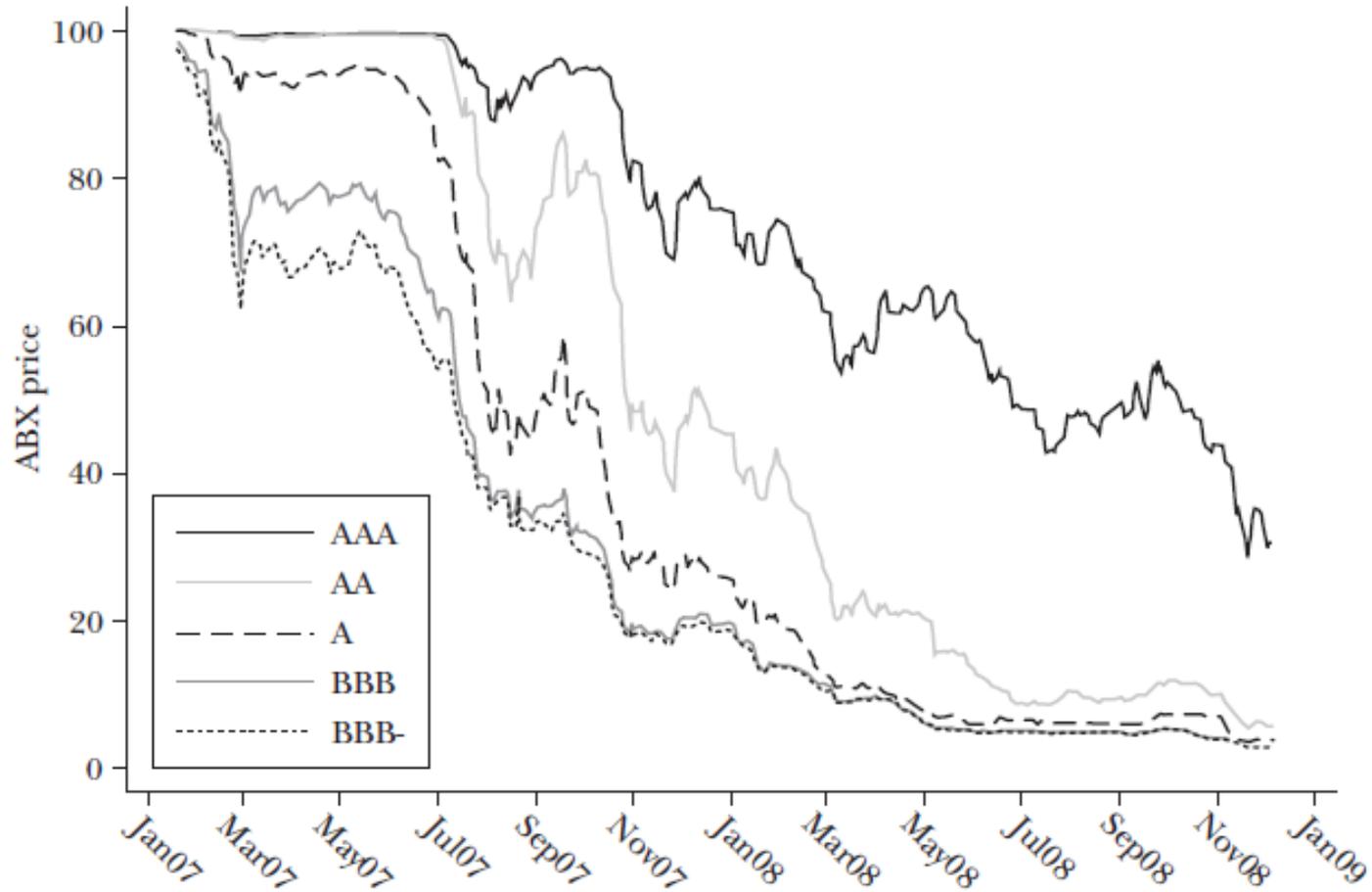
- In buildup to financial crisis, not only were a large proportion of subprime mortgages financed through securitization, but most importantly less senior tranches ended up in bonds given AAA ratings
 - Stein (2011) describes how lower-rated tranches rather than original mortgages were themselves used in re-securitizations, which were then rated AAA, despite risk of default
 - Consequently, when scale of subprime mortgage became common knowledge, it created serious problem of adverse selection – investors in ABSs had little knowledge of riskiness of loans they contained
 - Run on shadow banking sector initially triggered by increase in subprime mortgage defaults in early 2007
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The Run on Shadow Banking

- February 2007, ABX index* began to decline, indicating cost of insuring basket of mortgages of specific rating against default was increasing
 - Essentially, shock, combined with lack of information about location and size of exposure to subprime mortgage risk, as well as uncertainty about whether system would be backstopped by Federal Reserve, caused run on repo market
 - As a consequence, price of haircuts rose, forcing banks to over-collateralize on any cash deposits they took in, i.e., they had to hold more equity in collateral they were using in repo agreements
 - Gorton and Metrick (2010) report haircuts were set at 0% for all classes of ABS in early-2007 (Figure 10)
- * Each ABX index is based on basket of 20 credit default swaps

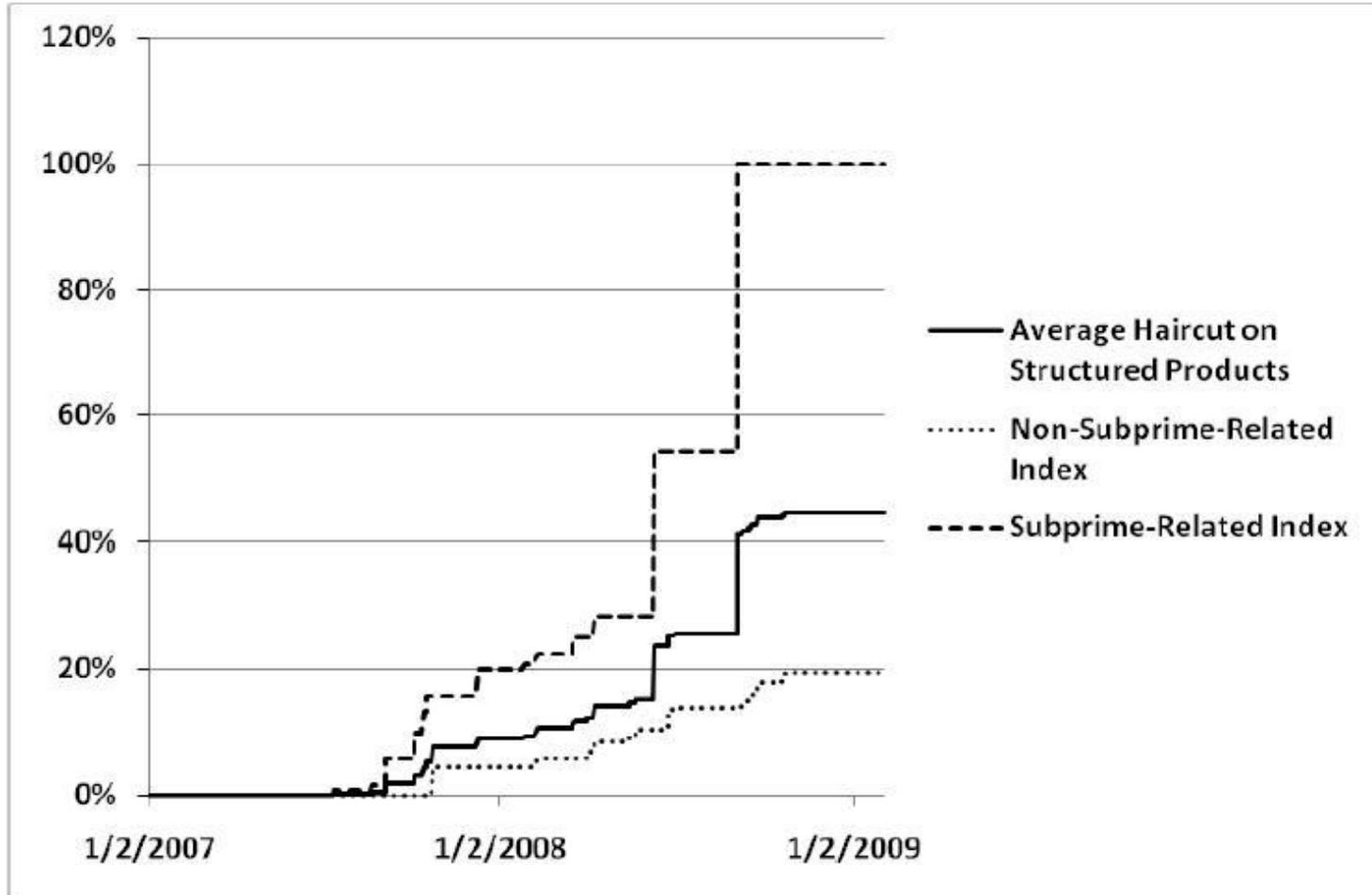
The Run on Shadow Banking

Figure 9: Decline in Mortgage Credit Default Swap ABX Indices



Source: LehmanLive

The Run on Shadow Banking



Source: Gorton and Metrick (2010)

The Run on Shadow Banking

- By early-2009, average haircut on all ABSs had risen to just over 40%, while haircut rose to 100% on ABSs containing subprime mortgages
- If US repo market was worth \$10 trillion in 2008, and if average haircut rose to 40%, this meant an additional \$4 trillion had to be raised by banks in order to fund their assets
- Argued haircuts are way of tranching collateral to recreate informationally-insensitive debt in face of shock, so that it is liquid again (Dan et al., 2010)
- Increase in haircuts represented huge reduction in liquidity, and only way to deal with it was for banks to shrink asset side of their balance sheets by selling ABSs
- As a result, price of securities fell in *fire-sale*, and in turn same securities became less valuable as collateral in repo agreements, resulting in further sales and so on

The Run on Shadow Banking

- Problems occurred in other parts of shadow banking as well as repo market – runs on entities heavily dependent on short-term debt and held portfolios of ABSs, e.g., asset backed commercial paper (ABCP) conduits and structured investment vehicles (SIVs)
- MMMFs also hit hard by crisis – not just a retail product, but also managed 24% of US short-term assets in 2006 – before crisis held liabilities of ABCPs, SIVs and firms such as Lehman Brothers
- Fears they would have trouble maintaining \$1 dollar net asset value induced investors to withdraw funds after Lehman failure – forced to sell assets in fire-sale, and there as flight to quality as investors switched to MMMFs holding US Treasuries
- MMMFs suffered considerable cash outflow in 2008, resulting in government implementing Temporary Guarantee Program

Regulation of Shadow Banking

- If growth of shadow banking was central to crisis and was facilitated by regulatory changes, why not reverse all changes?
- Even if it was desirable to make such changes, unlikely that it would actually be possible
- Regulatory changes in many cases an endogenous response to demand for efficient, bankruptcy-free collateral in large financial transactions
- If repo had not been granted this status, private sector would have sought another substitute, which might well have been less efficient
- Key question then is: how can current regulatory structure be adapted to make shadow banking system safer without driving its activity into “unregulated darkness”? (Gorton and Metrick, 2010)

Regulation of Shadow Banking

- **Proposals revolve around two key ideas:**
 - **Important cause of panic was suddenly seemingly safe bonds such as MMMF shares and AAA-securitized bonds were deemed unsafe**

New regulation should seek to make it clear, through insurance or collateral, which instruments are truly safe and which are not
 - **Role of repos has real value to market participants, but it needs to be brought under regulatory umbrella**
- **MMMFs: compete with deposit banks, but essentially have had free insurance to back up claim they will never lose money – this should be eliminated**

However industry is reluctant to give this up, and they represent a powerful political lobby

Regulation of Shadow Banking

- **Securitization: through Narrow Funding Banks (NFBs), bring securitization under regulatory umbrella**
 - **As securitization is just banking by another name, it should be regulated in same manner, NSBs having charters, capital requirements, periodic examinations, and access to discount window of Federal Reserve**
 - **All securitized products should be sold to NSBs, and they would become new entities between securitization and final investors, i.e., rather than buying ABSs, they would buy NFB liabilities**
 - **NFB regulator would design and monitor criteria for NFB portfolios – determining classes of ABSs they could buy, allowed proportions of different asset classes in portfolio, and proportion of assets of different ratings**
 - **Regulator setting collateral requirements for NFBs which become repo banks**

Regulation of Shadow Banking

- **Repos: any regulation of repos must make them safe for depositors while at same time allowing for other uses of repos**
 - **NFBs and commercial banks would be allowed to engage in repo financing, along with non-bank entities**
 - **Eligible collateral for banks would be restricted to US Treasuries, liabilities of NFBs, and assets deemed appropriate by regulator**
 - **Eligible collateral for non-bank entities could be any type of security**
 - **Minimum haircuts would be required on all collateral used in repos, and could be specific to parties and collateral offered**
 - **Position limits would be set for non-bank entities in terms of gross amounts issued or held as a function of firm size and collateral used**

Regulation of Shadow Banking

- Proposed rules would create two types of repo:
- NFBs and commercial banks would capture monetary function of repos and would be regulated in manner similar to depository institutions – minimum haircuts would serve function of capital requirements
- Licensed institutions would be regulated as to make it more expensive than first type of repo
- Third, unregulated type would be prevented by policymaker/judiciary, if it were clear they would receive no special bankruptcy protection as offered to types one and two
- Repo market owes much to these protections, and so leakage from regulated system would be minimized

Regulation of Shadow Banking

- Repos and securitization should be regulated because they are, in effect, new forms of banking, but with same kinds of vulnerability as other types of bank-created money
 - Proposed regulations seek to preserve shadow banking and bank-created money by eliminating bank runs, and ensuring creation of high-quality collateral that is informationally-insensitive
 - Should also consider possibility of Federal Reserve being a “securities lender of last resort” where it issues own securities to be used as repo collateral if there is shortage of US Treasuries in a crisis
 - Monetary policy probably ought to take account of fact that US Treasuries are being re-hypothecated, and should be viewed as money, i.e., open market operations are actually exchanging one type of money for another rather than money for bonds
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