

Regulating the Shadow Banking System*

Gary Gorton
Yale and NBER

Andrew Metrick
Yale and NBER

October 18, 2010

Abstract

The “shadow” banking system played a major role in the financial crisis, but was not a central focus of the recent Dodd-Frank Law and thus remains largely unregulated. This paper proposes principles for the regulation of shadow banking and describes a specific proposal to implement those principles. We first document the rise of shadow banking over the last three decades, helped by regulatory and legal changes that gave advantages to three main institutions of shadow banking: money-market mutual funds (MMMFs) to capture retail deposits from traditional banks, securitization to move assets of traditional banks off their balance sheets, and repurchase agreements (“repo”) that facilitated the use of securitized bonds in financial transactions as a form of money. A central idea of this paper is that the evolution of a bankruptcy “safe harbor” for repo has been a crucial feature in the growth and efficiency of shadow banking, and so regulators can use access to this safe harbor as the lever to enforce new rules. As for the rules themselves, history has demonstrated two successful methods for the regulation of privately created money: strict guidelines on collateral (used to stabilize national bank notes in the 19th century), and government-guaranteed insurance (used to stabilize demand deposits in the 20th century). We propose the use of insurance for MMMFs combined with strict guidelines on collateral for both securitization and repo as the best approach for shadow banking, with regulatory control established by chartering new forms of narrow banks for MMMFs and securitization and using the bankruptcy safe harbor to incent compliance on repo.

*Thanks to Stefan Lewellen, Marcus Shak, and Lei Xie for research assistance; Darrell Duffie, Victoria Ivashina, Robert Merton, Stephen Partridge-Hicks, Eric Rasmusen, David Romer, Nick Sossides, David Scharfstein, Andrei Shleifer, Carolyn Sissoko, Jeremy Stein, Phillip Swagel, David Swensen, Daniel Tarullo, Justin Wolfers and seminar participants at Brookings and MIT for many helpful comments and discussions; E. Philip Davis, Ingo Fender, and Brian Reid for assistance with data; and Sara Dowling for help with figures.

After the Great Depression, by some combination of luck and genius, the United States created a bank regulatory system that was followed by a panic-free period of 75 years – considerably longer than any such period since the founding of our republic. When this quiet period finally ended in 2007, the ensuing panic did not begin in the traditional system of banks and depositors, but instead was centered in a new “shadow” banking system. This shadow banking system performs the same functions as traditional banking, but the names of all the players are different, and the regulatory structure is light or non-existent. In its broadest definition, shadow banking includes familiar institutions as investment banks, money-market mutual funds, and mortgage brokers; rather old contracts, such as sale and repurchase agreements (“repo”); and more esoteric instruments such as asset-backed securities (ABS), collateralized-debt obligations (CDOs), and asset-backed commercial paper (ABCP).¹

Following the panic of 2007-2009, Congress passed major regulatory reform of the financial sector in the Dodd-Frank Act of 2010. Dodd-Frank includes many provisions relevant to shadow banking; for example, hedge funds must now register with the SEC, much of the over-the-counter derivatives trading will be moved to exchanges and clearinghouses, and all systemically important institutions will be regulated by the Federal Reserve. Furthermore, retail finance lenders will now be subject to consistent federal-level regulation through the new Consumer Financial Protection Bureau housed within the Federal Reserve.

While Dodd-Frank takes some useful steps in the regulation of shadow banking, there are still large gaps where it is (almost) silent. Three important gaps are in money-market mutual funds (MMMFs), securitization, and repurchase transactions (“repo”). These three areas played the central role in the recent crisis and are the main focus of the current paper. While Dodd-Frank did not focus on these key components of shadow banking, the Law did create a council of regulators with significant power to identify and manage systemic risks. Most importantly, this Financial Stability Oversight Council has the power to recommend significant changes in regulation, if such changes are deemed necessary for financial stability.²

¹ Shadow banking terms are defined later in the paper, and also in the glossary (Appendix A). In other work (Gorton and Metrick (2010a and 2010b)), we have referred to the specific combination of repo and securitization as “securitized banking.” With the broader focus of this paper to include other activities beyond repo and securitization, we are using the more common but less precise “shadow banking” name.

² This power – crucial for the future regulation of shadow banking – is given in Section 120 of the Dodd-Frank Law. While new regulations cannot exceed current statutory authority, this authority would still allow for significant new regulation of MMMFs, repo, and securitization without the need for new legislation.

MMMFs, securitization, and repo are key elements of “off-balance sheet” financing, which differs from the “on-balance-sheet” financing of traditional banks in several important ways. These differences are illustrated in Figures 1 and 2. Figure 1 shows the classic textbook picture of the financial intermediation of loans on-balance sheet by the traditional banking system. In Step A, depositors transfer money to the bank, in return for a checking or savings account that can be withdrawn at any time. In Step B, the bank loans these funds to a borrower. The bank then holds this loan on its balance sheet to maturity.

Traditional bank runs were ended in United States in the 1934 through the introduction of federal-government deposit insurance. With deposits insured by the federal government, depositors have little incentive to withdraw their funds. Deposit insurance works well for retail investors, but still leaves a challenge for large institutions. When deposit insurance was capped at \$100,000, institutions such as pension funds, mutual funds, states and municipalities and cash-rich non-financial companies did not have easy access to safe, interest-earning, short-term investments. One solution to this problem is the shadow banking system of off-balance-sheet lending illustrated in Figure 2.

Step 2 in Figure 2 is an analogue to Step A from Figure 1, but there is one important difference. In the traditional banking system shown in Figure 1, the deposits are insured by the government. To achieve similar protection in Step 2 of Figure 2, the institutional investor receives collateral from the bank. In practice, this deposit-collateral transaction takes the form of a repo agreement: the depositor deposits, say, \$X, and receives some asset as collateral from the bank with a market value of \$X; the bank agrees to repurchase the same asset at some time later (perhaps the next day) for \$Y. The percentage $(Y-X)/X$ is the “repo rate”, and is analogous to the interest rate on a bank deposit. Typically, the total amount of the deposit will be some amount less than the value of the asset used as collateral, with the difference called a “haircut”. For example, if an asset has a market value of \$100 and a bank sells it for \$80 with an agreement to repurchase it for \$88, then we would say that the repo rate is 10 percent $(= 88-80 / 80)$, and the haircut is 20 percent $(100 - 80 / 100)$. If the bank defaults on the promise to repurchase, then the investor keeps the collateral.³

³ As we discuss later, repo is carved out of the Chapter 11 bankruptcy process. It is not subject to the automatic stay rule. If one party to the repo transaction fails, the other party can unilaterally terminate the transaction and keep the cash or sell the bond, depending on their role.

The step that actually moves this financing off the balance sheet of the bank is Step 4, where loans are pooled and securitized. We will discuss this step in detail in Section I of the paper. For now, the key idea is that the outputs of this securitization are either purchased directly by institutional investors or used as collateral in Step 2. In effect, the bonds created by securitization are often the main source of collateral that provides insurance for large depositors.

Each of the components in this off-balance-sheet financing cycle has grown rapidly since 1980. The most dramatic growth was in securitization, where Federal Reserve Flow-of-Funds data shows that the ratio of off-balance sheet loan funding to on-balance sheet loan funding grew from zero in 1980 to over 60 percent in 2007. To illustrate the growth in MMMFs, Figure 3 shows total bank assets, bank demand deposits, mutual funds and MMMFs as percentages of total financial assets. The figure shows the bank share of total assets falling by about 20 percent since 1980.

As we discuss later, there is no comprehensive data measuring the repo market. Repo involves one party depositing money with a “bank” that provides collateral. The “banks” were essentially the old investment banks, or broker-dealers. In order for these institutions to act as banks and offer repo, they needed to hold bonds that could be used as collateral. The yield on the collateral accrues to the bank, which pays the repo rate. So, for example, if the bond is an asset-backed security with a coupon rate of 6 percent, and the repo rate is 3 percent, the bank earns the difference. This required that the balance sheets of broker-dealers grow significantly as the repo market grew. Figure 4 shows an index of asset growth (with March 1954=1). The figure displays the enormous growth of broker-dealer assets (while commercial bank assets essentially grew with GNP).

Why did shadow banking grow so much? We address this question in Section I. One force came from the supply side, where a series of innovations and regulatory changes eroded the competitive advantage of banks and bank deposits. A second force came from the demand side, where demands for collateral for financial transactions gave impetus to the development of securitization and the use of repo as a money-like instrument. Both of these forces were aided by court decisions and regulatory rules that allowed securitization and repo special treatment under the bankruptcy code. A central idea of this paper is that the bankruptcy “safe harbor” for repo has been a crucial feature in the growth of shadow banking, and so regulators can use access to this safe harbor as the lever to enforce minimum repo haircuts and control leverage.

If the growth of shadow banking was facilitated by regulatory changes, then why not just reverse all these changes? Would such reversals bring us back to a safer system dominated by traditional banks? We do not believe that such a radical course is possible even if it were desirable, which it is not in our view. The regulatory changes were, in many cases, an endogenous response to the demand for efficient bankruptcy-free collateral in large financial transactions: if repo had not been granted this status, then the private sector would have tried to create a less efficient substitute. In any case, we will not try to justify the existence of the shadow banking system in this paper. Instead, we take the broad outlines of the system as given, and ask how the current regulatory structure could be adapted to make the system safer without driving its activity into a new unregulated darkness.

In Section II, we discuss how the shadow-banking system broke down in the crisis. The features of this breakdown are similar to those from previous banking panics – safe, liquid assets suddenly appeared to be unsafe, leading to runs. MMMFs – which appeared to be as safe as insured deposits to many investors – suddenly appeared vulnerable, leading to runs on funds. Securitization – which had been trusted by investors for decades as creating an adverse-selection-free form of “information-insensitive” securities– suddenly lost the confidence of investors and caused hundreds of billions of dollars of information-insensitive “AAA” securities to become information-sensitive and costly to evaluate.⁴ Since the cost of evaluating all this paper was high, investors simply exited all securitizations. In this new environment, the high-quality collateral necessary for repo no longer existed. In Gorton and Metrick (2010a), we claim that the resulting “run on repo” was a key propagation mechanism in the financial crisis.

Section III applies lessons from successful regulation of traditional banking to infer principles for the regulation of shadow banking. History has demonstrated two methods for reducing the probability of runs in a system. The first method, standardized collateralization, was introduced after the panic of 1837 in the United States, when some states passed Free Banking laws under which state bonds were required to back paper bank notes. Despite an otherwise unregulated monetary environment, this collateralization largely ended runs on bank notes and enabled their use as money. Free Banking laws were the basis for the National Bank

⁴ The nomenclature of “information-sensitive” and “information-insensitive” comes from Dang, Gorton and Holmström (2010). “Information-insensitive” roughly means that the cost of producing private information about the payoff on the security is not worth bearing by potentially informed traders. Such securities do not face adverse selection when sold or traded. But, a crisis occurs when a shock causes production of such private information to become profitable.

Acts, which created national bank notes backed by U.S. Treasuries as collateral, the first currency in the U.S. to trade at par against specie. The second method, government insurance, was tried at the state level without great success before the Civil War and in the 1920s. But, success came when the FDIC was created to insure demand deposits after the Great Depression in the United States. This innovation stopped the cycle of runs on demand deposits and allowed them to be used safely as money. Now, we have repo as a new monetary form, and history gives us these two methods to consider for stabilizing its use. Of these two methods, we believe that insurance would be workable for MMMFs, but collateralization would be preferable to insurance for repo and securitization. The reasons for these preferences are discussed in Section IV.

Section IV describes our specific proposals. For MMMFs, the problems are straightforward, and have already been well addressed by other authors. We adopt the proposal of the “Group of Thirty” (Group of Thirty, 2009) for the regulation of MMMFs: with MMMFs having a choice of treatment as either (1) “Narrow Savings Banks” (NSBs) with a stable net asset values or (2) conservative investment funds with floating net asset values and no guaranteed return. Under this system, type (1) funds are clearly within the safety net, and type (2) funds are not.⁵

The narrow banks proposed by the Group of Thirty for MMMFs provides a model for regulation of securitization: the chartering of “Narrow-Funding Banks” (NFBs), as vehicles to control and monitor securitization, combined with regulatory oversight of acceptable collateral and minimum haircuts for repo. Under this regime, the rules for acceptable collateral play an analogous role to the state bonds backing bank notes in the Free Banking period, or U.S. Treasuries backing greenbacks during the National Banking Era, and minimum repo haircuts play the role of capital ratios for depository institutions. The danger of exit from this system – and the creation of yet another shadow-banking system -- is mitigated by only allowing licensed NFBs and repo the special protections under the bankruptcy code.

Section V concludes with a discussion of related topics in regulation and monetary policy. An appendix supplements the text with a glossary of shadow banking terminology used in the paper.

⁵ See Group of Thirty (2009) for a full list of their proposals. Their proposal uses the term “special purpose banks”, which we have replaced here with “Narrow Savings Banks” for terminological consistency with other parts of our proposal.

I. The Rise of Shadow Banking

Shadow banking is the outcome of fundamental changes in the financial system in the last 30 to 40 years, as a result of innovation and regulatory changes that led to the decline of the traditional banking model; in the face of competition from nonbanks and their products; the traditional banking business model became unprofitable. Faced by competition from junk bonds and commercial paper on the asset side of bank balance sheets and from money-market-mutual funds on the liability side, commercial banks became less profitable and sought new profit opportunities.⁶ Slowly traditional banks exited the regulated sector. In this section we briefly review the three of the most important changes in banking: money-market-mutual funds, securitization, and repo.

A. Money-Market Mutual Funds

Since in the 1970s, there has been a major shift in the source of transaction media away from demand deposits towards money-market-mutual funds (MMMFs).⁷ MMMFs were a response to interest-rate ceilings on demand deposits (Regulation Q). In the late 1970s MMMFs were around \$4 billion. In 1977 interest rates rose sharply and MMMFs grew in response, growing by \$2 billion per month during the first five months of 1979 (Cook and Duffield (1979)). The Garn-St. Germain Act of 1982, however, authorized banks to issue short-term deposit accounts with some transaction features, but with no interest-rate ceiling. These were known as “money-market deposit accounts.” Keeley and Zimmerman (1985) document that these accounts attracted \$300 billion in the three months after their introduction in December 1982 and argue that the response of banks resulted in a substitution of wholesale for retail deposits, and direct price competition for non-price competition, both responses resulting in increased bank deposit costs. MMMFs growth really took off in the mid-1980s, growing from \$76.36 billion in 1980 to \$1.85 trillion by 2000, an increase of over 2,000 percent. MMMFs reached a peak of \$3.8 trillion in 2008, making them one of the most significant financial product innovations of the last fifty years.

⁶ These changes have been much noted and much studied, so we only briefly review them here. See Keeley (1985), Bryan (1988), Barth, Brumbaugh, and Litan (1990, 1992), Boyd and Gertler (1993, 1994), Edwards and Mishkin (1995), and Berger, Kashyap, and Scalise (1995), among many others.

⁷ Money market funds are registered investment companies that are regulated by the Securities and Exchange Commission (SEC) in accordance with Rule 2a-7 adopted pursuant to the Investment Company Act of 1940.

The most important feature of MMMFs is that they seek to maintain a net asset value of \$1.00 per share, which is important for competing with insured demand deposits. MMMFs are closely regulated, and are required, for example, to only invest in high-quality securities that would seem to have little credit risk. The SEC has recently proposed a series of changes to MMMF regulation, these regulations, part of the Investment Company Act of 1940 (as amended), have come under review by a working group of regulators, but none of the recent proposals would change the fact that MMMFs are not explicitly insured. The maintenance of \$1.00 per share was almost universally successful in the decades leading up to the crisis, which may have instilled a false sense of security in investors, where an implicit promise came to be equivalent to the explicit insurance offered by deposit accounts. The difference, of course, is that banks pay for the insurance (and pass that cost along to depositors), whereas MMMFs have no cost for their promise. In the crisis, the government made good on the implicit promise by explicitly guaranteeing MMMFs, and it may not be credible for the government to commit to any other strategy in the future. As long as MMMFs have implicit and free government backing, they will have a cost advantage over insured deposits. We return to this point in Section IV, where we adopt the proposals of the Group of Thirty (2009) for MMMFs to either pay for explicit insurance or to drop the fiction of stable value.

B. Securitization

Securitization refers to the process by which traditionally illiquid loans are sold into the capital markets. This is accomplished by selling large portfolios of loans to special purpose vehicles (SPVs), legal entities that issue rated securities in the capital markets, securities that are linked to the loan portfolios. Figure 5 shows a schematic of how securitization works. An originating firm lends money to a number of borrowers. As discussed below, a portfolio of loans to be sold is then selected for the purpose of securitization. This step is the “pooling” of the loans into a portfolio. The portfolio is then sold to an SPV, a master trust in the figure. The SPV finances the purchases of these loans by selling rated securities in the capital markets. These securities, called tranches, are ranked by seniority and have ratings reflecting that. The whole process takes the loans that traditionally would have been held on-balance sheet by the originating firm and creates marketable securities that can be sold and traded via the off-balance sheet SPV.

Securitization is a large and important market. Figure 6 shows the annual issuance amounts of U.S. corporate bonds (including convertible debt) and all securitized product, in particular, non-agency mortgage-backed securities, as well as credit card receivables, auto loans, student loans – the major non-mortgage categories, and other asset classes. Starting at about the same issuance level in 1990, securitization grew, explosively starting around 2000, and exceeded corporate issuance significantly starting in 2003, until the crisis.

To understand the potential economic efficiencies of securitization, it is important to understand how the structure works. An SPV can only carry out some limited, specific, transaction, or series of transactions. SPVs have no purpose other than the transaction(s) for which they were created, and they can make no substantive decisions; the rules governing them are set down in advance and carefully circumscribe their activities. Indeed, no one works at an SPV and it has no physical location.⁸

Two other essential features of an SPV concern bankruptcy. First, SPVs are “bankruptcy remote,” that is, the insolvency of the sponsor (the bank or firm originating the loans) has no impact on the SPV. In particular, creditors of the bankrupt firm cannot claw back assets from the SPV. Secondly, the SPV itself is designed so that it can never, as a practical matter, become legally bankrupt. The most straightforward way to achieve this would be for the SPV to waive its right to file a voluntary bankruptcy petition, but this is legally unenforceable. So, the only way to completely eliminate the risk of either voluntary or involuntary bankruptcy is to design the SPV in a way that makes the risk of this very small.⁹

Why would a bank choose to move some assets off balance sheet via securitization? There are several costs and benefits for this decision, all of which have been changing rapidly over the last several decades.

- *Bankruptcy*

The most important design feature of securitization is that the asset-backed securities issued by the SPV do not trigger an event of default in the case where the underlying portfolio does not generate enough cash to make the contractual coupon payments on the outstanding bonds.¹⁰

⁸ The description of securitization and SPVs here is based on Gorton and Souleles (2006).

⁹ See Klee and Butler (2002) for some details on how SPVs are structured to avoid bankruptcy.

¹⁰ The LTV Steel case (*In re LTV Steel, Inc.*, No. 00-43866, 2001 Bankr. LEXIS 131 (Bankr. N.D. Ohio Feb. 5, 2001)) threatened the bankruptcy remoteness concept, but the parties settled prior to a court decision and the parties agreed that there had been a “true sale” of the assets to the SPV. Although the outcome was ambiguous, it did not

Instead of an event of default, there is an early amortization event. If the pool is not generating enough cash to make the coupon payments on the ABS bonds, then the cash that is available is used to make principal payments early, rather than coupon payments. This is not an event of default, but rather is “early amortization,” that is, the principal is paid back early.

Avoiding Chapter 11 is valuable. Plank (2007) compares securitization to what happens to a secured creditor in bankruptcy, concluding that “securitization reduces the bankruptcy tax on secured lenders to originators and owners of mortgage loans and other receivables, and therefore has reduced the bankruptcy premiums charged to obligors of mortgage loans and other receivables” (p. 654). Gorton and Souleles (2006) show empirically that this is an important source of value to securitization.

- *Taxes*

Debt issued off-balance sheet does not have the advantageous tax benefits of on-balance sheet debt. For profitable firms, this can make a large difference. For example, consider a bank that is deciding how to finance a portfolio of mortgage loans, where that portfolio has the same risk properties as the rest of the bank’s assets. Profitable firms with little chance of bankruptcy have a high-likelihood of using the tax shields of debt; so, for these firms it is optimal to finance on-balance sheet. Firms less profitable and closer to bankruptcy have a lower likelihood of using the tax shields. For these firms, it will be relatively more advantageous to finance off-balance sheet. Gorton and Souleles (2006) find this to be true empirically, in a study of credit-card securitizations. Using credit ratings as a measure of profitability and bankruptcy risk, Moody’s (January 1997 and September 1997) also reach this conclusion.

- *Moral Hazard*

Securitization is done through an SPV, and the SPV is governed by tightly drafted rules that permit very little discretion. Once the portfolio of loans is transferred to the SPV, there is no danger of other activities of the SPV imposing costs on the holders of the securitized bonds. In contrast, the expected bankruptcy costs to a bank bondholder are affected by the other actions of bank management.

hamper the growth of securitization. There are no other cases challenging bankruptcy remoteness. See, e.g., Kettering (2008), Schwarcz (2001), and Stark (2002).

Given the fiduciary responsibilities of corporate directors for equity holders, and the principal-agent problems among shareholders, directors, and managers, moral-hazard concerns will always be a potential issue for bank bondholders. But these concerns can be mitigated by the existence of “charter value” for the bank. As discussed by Marcus (1984), a positive charter value gives a bank an incentive to avoid risk-taking leading to bankruptcy and the loss of the charter. Bank regulations and positive charter values are complementary in that banks abide by regulations, i.e., they internalize risk management, when charter values are high. There is persuasive evidence that, historically, such charter value at banks did improve risk management, but that this value, and the protection it provided, has decreased over time. The competition from junk bonds and MMMFs, and deregulation (e.g., of interest rate ceilings), caused bank charter values to decline, which in turn caused banks to increase risk and reduce capital. This is documented by Keeley (1990), Gorton and Rosen (1995), Demsetz, Saldenberg and Strahan (1996), Galloway, Lee, and Roden (1997), and Jie (2004), among others.

Given the decline in charter values and resulting increase in risk-taking, bondholders would face higher moral-hazard costs for on-balance sheet financing and demand higher returns to compensate. This would be a cost advantage for securitization that has been growing over time.

- *Regulatory Costs*

One regulatory response to increased risk-taking by banks was the introduction of specific capital requirements. In 1981 regulators announced explicit capital requirements for the first time in U.S. banking history: all banks and bank holding companies were required to hold primary capital of at least 5.5 percent of assets by June 1985. Banks did meet these capital requirements by 1986, but it is interesting how this was accomplished. Banks that were capital deficient when the new requirements were announced grew slowly compared to capital rich banks (Keeley (1988)).¹¹

If bank regulators impose capital requirements that are binding, i.e., require more capital than what would be privately set in equilibrium, when there is low charter value, then bank capital

¹¹ Another important change occurred in 1999, when Congress passed the Gramm-Leach-Bliley (GLB) Act. This act permitted affiliations between banks and securities firms; it created a special type of bank holding company (BHC), called a financial holding company, which is allowed to engage in a wider range of activities (e.g. insurance underwriting and merchant banking) or under less stringent regulations (e.g. securities underwriting and dealing) than traditional BHCs. Before that, the ability of banks to engage in such activities was strictly constrained by the Glass-Steagall Act and the Bank Holding Company Act.

will exit the regulated bank industry. Banks exit the regulated sector via off-balance sheet securitization, which has no requirements for regulatory capital.

- *Adverse Selection*

It is sometimes alleged that an investor in securitized bonds faces an adverse-selection problem, with the concern that the arranger may have private information about the loans, and might try to put the worst loans into the portfolio being sold to the SPV. Aware of this problem, investors and sponsoring firms have designed several structural mitigants to any potential adverse-selection problem. First, loan originators have limited discretion in selecting loans for the portfolio to be securitized. The loans are subject to detailed eligibility criteria and specific representations and warranties. Once eligible loans have been specified, the selection is either random or all the qualifying loans are put into the portfolio. Second, originators of securitizations retain residual interests in their transactions, essentially equity positions. In principle, interests between securitization investors and the loan originators are aligned; see Gorton (2010). Leaving aside subprime mortgages, securitization has worked well. If the entire asset class turns out to be suspect, as with subprime-mortgage securitization, then there is clearly a problem, but it is not adverse selection. With respect to subprime securitizations, the evidence on adverse selection remains ambiguous.¹²

- *Transparency and Customization*

For any given bank, evaluation of its creditworthiness requires analyses of its balance sheet, operations, management, competitors, and so on. Each of these elements is only partially disclosed (at best) to bank investors, and even in the absence of moral-hazard problems, creditworthiness can vary over time from changes in ordinary business operations.¹³ In comparison, an SPV's portfolio is completely known, and any changes over time are noted in the trustee reports. While the underlying SPV portfolio may contain thousands of individual assets and is by no means simple to evaluate, this portfolio is considerably more transparent than a corresponding bank balance sheet, which may have many such collections of assets and zero disclosure of individual loans.

¹² The recent allegations about the Goldman Sachs Abacus transactions concern synthetic CDOs, not traditional securitization. Synthetic securitizations were not quantitatively large.

¹³ Indeed, Morgan (2002) provides evidence that banks are more opaque than nonfinancial firms.

With the ability to disclose specific assets underlying securitized bonds, off-balance-sheet financing can allow customization of such bonds for any niche of investors. Investors desiring exposure (or hedges) to mortgages, auto loans, or credit-card receivables can purchase exactly what they want through securitized bonds, without having to take on the risk to any other type of asset. Furthermore, while banks can and do offer their own debt at different levels of seniority, the transparency of SPV portfolios allows for easier evaluation. One specific type of customization is used to create safe senior tranches that can trade as information-insensitive “AAA” securities. The production of these senior tranches was (in part) an endogenous response to a rising demand for safe collateral in repo and other financial transactions. We discuss this special case in the next subsection.

C. Repo

In this subsection we discuss the increased use of repo. One key driver for this increase is the rapid growth of money under management by institutional investors, pension funds, mutual funds, states and municipalities, and nonfinancial firms. These entities hold cash for various reasons, but would like to have a safe investment, which earns interest, while retaining flexibility to use the cash, in short, a demand deposit-like product. In the last thirty years these entities have grown in size and become an important feature of the financial landscape. For example, according to the BIS (2007): “In 2003, total world assets of commercial banks amounted to USD 49 trillion, compared to USD 47 trillion of assets under management by institutional investors” (p. 1 footnote 1). Figure 7 shows this increase as a ratio of GDP in five large economies: the median ratio more than tripled from 1980 to 2007. These institutions all hold cash balances and need some safe place to keep them.

For large depositors, repo can act as a substitute for insured demand deposits because repo agreements are explicitly excluded from Chapter 11: that is, they are not subject to the automatic stay. Instead, repo, like derivatives, has a special status under the U.S. Bankruptcy Code. The contract allows a party to a repurchase agreement to unilaterally enforce the termination provisions of the agreement as a result of a bankruptcy filing by the other party. The depositor, for example, can unilaterally terminate the agreement with the bank when the bank

becomes insolvent, and sell the collateral. Without this protection, a party to a repo contract would be a debtor in the bankruptcy proceedings.¹⁴

Repo collateral can be rehypothecated, that is, the collateral received in from a repo deposit can be freely re-used in another transaction, with an unrelated third party. For example, the bonds received as collateral could be posted to a third party as collateral in a derivatives transaction; that party could then borrow against the collateral, and so on. As the BIS (1999) pointed out, this results in “high levels of ‘velocity’ in repo markets. This occurs when a single piece of collateral is used to effect settlement in a number of contracts on the same day. It allows the daily repo trading volume of a particular note issue to exceed the outstanding amount of the issue, as participants are able to borrow and lend a single piece of collateral repeatedly over the course of a day”. Singh and Aitken (2010) argue that measures of repo are significantly larger when rehypothecation is taken into account.¹⁵

The legal infrastructure facilitating repo as money has evolved as repo has grown. Since 1978, the year a new bankruptcy code was adopted, both the U.S. Bankruptcy Code and the Federal Deposit Insurance Act have long provided exemptions for certain kinds of financial contracts. In 1984 there was an amendment to the 1978 Bankruptcy Code that allowed repurchase agreements to be protected, that is, it allowed parties to repo to seize collateral and liquidate without going into bankruptcy, i.e., no automatic stay.¹⁶ But this only applied to repo based on Treasuries, agencies, bank CDs, and bankers’ acceptances.¹⁷ In 2005 the Bankruptcy Reform Act was passed. This act expanded the definition of a “repurchase agreement” to make transactions based on any stock, bond, mortgage or other securities eligible for bankruptcy safe-harbor protection (Krimminger (2006), Garbade (2006), Smith (2007), Sissoko (2010), Johnson (1997), Schroeder (1996), and Walters (1984)).

¹⁴ See, e.g., Johnson (1997) and Schroeder (1999). The safe harbor provision for repo transactions was recently upheld in court in a case involving American Home Mortgage Investment Corp. suing Lehman Brothers. See Schweitzer, Grosshandler, and Gao (2008).

¹⁵ Rehypothecation creates a multiplier process for collateral, like the more familiar money multiplier. Since there are no official data on repo, the size of this money multiplier is not known. Fegatelli (2010) looks at this issue using data from Clearstream, a Luxembourg based clearinghouse. Also, see Adrian and Shin (2008) who link the use of repo to monetary policy.

¹⁶ The 1984 amendment was motivated by the Lombard-Wall decision that held that an automatic stay provision prevented the depositor who held the collateral from selling the collateral without court permission. See, e.g., Garbade (2006) and Krimminger (2006).

¹⁷ It is important to note that it is not clear that actual market practice was limited to this set of securities. In fact, the evidence is that it was not. For example, according to the Bond Market Association *Research* (February 1998, p. 2): “In recent years market participants have turned to money market instruments, mortgage and asset-backed securities, corporate bonds and foreign sovereign bonds as collateral for repo agreements.” No court cases tested this.

The unfortunate reality is that there is no official data other than what the Federal Reserve collects with regard data to the repo amounts done by the 19 primary-dealer banks. According to Fed data, primary dealers reported financing \$4.5 trillion in fixed income securities with repo as of March 4, 2008. But, we know that this covers only a fraction of the market in the U.S.¹⁸ Bank for International Settlements economists Hördahl and King (2008) report that repo markets have doubled in size since 2002, “with gross amounts outstanding at year-end 2007 of roughly \$10 trillion in each of the U.S. and Euro markets, and another \$1 trillion in the UK repo market” (p. 37). They report that the U.S. repo market exceeded \$10 trillion in mid-2008, including double counting.¹⁹ The European repo market, generally viewed as smaller than the U.S. market was EUR 4.87 trillion in June 2009, having peaked at EUR 6.78 trillion in June 2007, according to the International Capital Markets Association (ICMA) European Repo Market Survey (2010). According to the figures published in the ICMA European Repo Market Survey of June 2009, the repo market globally grew at an average rate of 19% per annum between 2001 and 2007. While the available evidence is very suggestive that the repo market is very large, it is impossible to say how large the repo market is in the U.S.

We have described repo as essentially a deposit market, but it is important to recognize that repo has a number of other significant uses as well. Repo is used to hedge derivative positions and to hedge primary-security issuance. Also, repo is important for maintaining “no arbitrage” relationships between cash and synthetic instruments. A very important feature of repo is that it can be used to facilitate taking “short” positions in securities markets. By using a repo a market participant can sell a security that he does not own by borrowing it from another party in the repo market. Without a repo market (or an analogous market transaction using collateral), securities-market participants would be unable to establish short positions. Repo is an important mechanism for obtaining leverage, especially for hedge funds. There are many such examples. It is for all these reasons that repo has been described as the “life blood” or the core of the financial system (Comotto (2010)).

¹⁸ Federal Reserve Flow of Funds data only covers the U.S. primary dealers and so is even lower than the Federal Reserve numbers.

¹⁹ “Double counting” refers to counting both repo and reverse repo in the same transaction. The extent of this issue is unclear as there is no data on the extent of involvement in repo of non-financial firms and only financial firms have been counted, estimated, or surveyed. Again, anecdotally, many non-financial firms’ treasury departments (e.g., Westinghouse, IBM, Microsoft) invest in repo as do institutional investors, and states and municipalities, as discussed above.

II. The Role of Shadow Banking in the Financial Crisis

The chronology of events of the financial crisis of 2007-2008 is well known, and the crisis is documented and analyzed by Brunnermeier (2009), Adrian and Shin (2010), Krishnamurthy (2010), He, Khang, and Krishnamurthy (2010), Gorton and Metrick (2010), and Gorton (2010), among many others. There is also a growing number of theory papers on the crisis.²⁰ In this section, we very briefly summarize the crisis as a run on various forms of “safe” short-term debt.

A proximate cause of the crisis was a shock to house prices, which had a large detrimental effect on subprime mortgages. Asset-backed securities linked to subprime mortgages quickly lost value. This shock spread quickly to other asset classes as entities based on short-term debt were unable to roll the debt, or faced withdrawals. Essentially, there was a bank run on short-term debt. The epicenters were the sale and repurchase market, the market for asset-backed commercial paper, and MMMFs. We briefly discuss each in turn.

Gorton and Metrick (2010a,b) and Gorton (2010) have argued that the core problem in the financial crisis was a “run on repo.” The panic occurred when depositors in repo banks feared that one or more banks might fail and they would have to sell the collateral in the market to recover their money. There was also the possibility that the collateral value might go down when it was sold. In reaction, investors increased repo haircuts. Dang, Gorton, and Holmström (2010a,b) argue that a haircut amounts to a tranching of the collateral to recreate an information-insensitive security in the face of the shock, so that it is liquid.

An increase in a repo haircut is a tantamount to a withdrawal from the bank. Think of a bond worth \$100 that was completely financed in the repo market with zero a haircut. Then a 20 percent haircut on the same bond requires that the bank finance \$20 some other way. The withdrawal is \$20. If no one will provide financing to the bank via new security issuance or a loan, then the bank has to sell assets. The withdrawals forced via an increase in repo haircuts caused deleveraging, spreading the subprime crisis to other asset classes.

It was not only in the repo market that problems occurred. There were also runs on other types of entities that were heavily dependent on short-term debt and held portfolios of asset-

²⁰ Some examples are Acharya, Gale, and Yorulmazer (2009), Brunnermeier and Pedersen (2009), Geanakoplos (2009), Dang, Gorton and Holmström (2010a,b), He and Xiong (2009), Pagano and Volpin (2009), Shleifer and Vishny (2009), Uhlig (2009), and Martin, Skeie, and von Thadden (2010).

backed securities. Asset-backed commercial paper conduits (ABCPs) and structured investment vehicles (SIVs) are operating companies that purchased long-term ABS and financed it with short-term debt, largely commercial paper. Just before the financial crisis began ABCP had about \$1.4 trillion in total assets (Carey (2009) et al.). Most ABCP programs were sponsored by banks. ABCP conduits and SIVs issue short-term debt to finance the purchase of longer-term bonds. Covits, Liang and Suarez (2009) report that: “More than half of ABCP daily issuance has maturities of 1 to 4 days (referred to as “overnight”), and the average maturity of outstanding paper is about 30 days“(p. 7). (Also, see Carey, Correa, and Kotter (2009).) Our reform proposals below also address ABCP conduits and SIVs.

MMMFs were also hit hard during the crisis. MMMFs are not just a retail product; they managed 24 percent of U.S. business short-term assets in 2006 (Investment Company Institute (2009)). At that time, just before the crisis, these funds held liabilities of asset-backed commercial paper conduits, structured investment vehicles, and financial firms that were troubled, e.g., Lehman Brothers. Concern that these funds would have trouble maintaining their implicit promise of a \$1 net asset value induced some investors to withdraw their funds. When these entities faced runs, and were forced to sell assets at fire-sale prices, they suffered losses. (Report of the Money Market Working Group (2009)). There was a flight to quality – investors moved their deposits out of non-government MMMFs to MMMFs that primarily invested in U.S. Treasury debt. From September to December 2008, there was a net cash outflow of \$234 billion from non-government MMMFs and a net inflow of \$489 billion into U.S. government-based MMMFs during that time period (Investment Company Institute (2009)). On September 19, 2008, the government announced its Temporary Guarantee Program for Money Market Funds; this temporarily guaranteed certain account balances in MMMFs that qualified.

In summary, the financial crisis was centered in several types of short-term debt (repo, asset-backed commercial paper, MMMFs shares) that were initially perceived as safe and “money-like”, but later found to be imperfectly collateralized. In this way, the crisis was a banking panic, structurally similar to centuries of panics safe, money-like instruments like bank notes and demand deposits. To regulate this new form of banking, we turn next to the lessons of history.

III. The Regulation of Shadow Banking: Lessons from History and Principles for Reform

Bank regulation has been at the forefront of public-policy issues since the founding of the United States. The essential feature of banking is the provision of “money,” that is, transaction media that can be used to easily conduct transactions without losses to insiders. Throughout U.S. history, a central aim of government involvement has been to provide a regulatory structure that ensured the existence of such a safe medium of exchange and to avoid systemic banking crises. Prior to the enactment of deposit insurance by the federal government in 1934, the government’s efforts to ensure safe bank-produced media of exchange took two primary forms. First, there was the idea that the collateral backing for bank money should be safe and transparent. Instead of backing bank money with opaque long-term loans, perhaps bank money should be backed by specified securities. Second, various kinds of insurance schemes were tried by states. It is also worth commenting briefly below on the role of private bank clearinghouses, which developed into institutions safeguarding the credibility of bank money. In this section, we briefly review these regulatory attempts.

Prior to the U.S. Civil War the predominant form of bank money was privately issued bank notes. Bank notes were issued by banks at par but when used at distances from the issuing bank they were only received at a discount. See, e.g., Gorton (1996, 1999). The early period of banking in the U.S. was plagued with difficulties, and there were a variety of proposed solutions. For the sake of brevity, we will start our examination with the Panic of 1837.²¹

The Panic of 1837 disclosed the defects of the New York Safety Fund System and ushered in the Free Banking Act of 1838.²² The Safety Fund had been established in New York in 1829 as an insurance system. Each bank was required to make periodic contributions as a percentage of its capital to a fund for the payment of the debts of any insolvent member bank, after its own assets had been exhausted. Of course, the problem was that the bank had to be insolvent in order for claims to be made on the fund, but at least in principle note holders would not suffer losses. The Panic of 1837 was the first test of the Safety Fund. Banks suspended convertibility of notes and deposits into specie in May of that year. Later that year came the first calls on the Safety Fund. In the end, the Fund was not adequate to meet all the demands made on it from the debt of insolvent banks, even with an extra tax on member banks. The Safety Fund

²¹ For earlier banking history see, e.g., Knox (1903).

²² New York was the most important state in many ways and for the sake of brevity we focus on New York. More generally see, e.g., Dewey (1910), Golembe (1960), and Rockoff (1974).

was basically abandoned though it continued for chartered banks until 1866, but with very few banks.²³

The Free Banking Act, imitated by many (but not all) other states introduced a fundamental idea into the design of banking: the use of explicit (and mostly) transparent collateral to back the issuance of private money.²⁴ The standard features of Free Banking laws were (1) free entry was relatively easy; no special legislation by the state legislature was required; (2) free banks were required to post eligible state bonds with the state auditor as collateral for notes issued (some states allowed federal bonds also); (3) free banks were required to pay specie on demand or else forfeit their charter (though there was a grace period which could be invoked); (4) free banks were limited liability firms. Our concern is with the bond collateral. The eligible bonds were publicly known, and what bonds were posted by each bank was also known. The state auditor kept the bank's printing plates and printed the notes.

The bond backing system worked in principle, but in practice the collateral – state bonds - was not riskless. Rolnick and Weber (1984) show that free bank failures occurred when the value of the bonds posted as collateral fell. The Panic of 1857, which largely involved another bank liability that had grown enormously, namely demand deposits, revealed the deficiencies of the system that backed note issuance with bank bonds.

The collateral logic of the Free Banking laws was the basis for the most successful financial legislation in U.S. history, the National Bank Acts. According to Davis (1910): “The success of [Free Banking] suggested that a uniform national currency might in the same way be provided through the emissions of special associations [national banks], which should secure their notes by the pledge of government securities” (p. 7). As part of financing the Civil War, Congress passed the National Bank Acts in 1863 and 1864 to create a uniform federal currency. National bank notes were liabilities of a new category of banks, “National Banks.” They could issue notes by depositing U.S. Treasuries with the federal government equal in face value to 111 per cent of the value of the notes issued (later reduced to 100 percent). After the Panic of 1873, in 1874 banks were further required to deposit in a Treasury run redemption fund. As Friedman and Schwartz (1963, p. 21) summarized: “Though national bank notes were nominally liabilities

²³ Prior to the Free Banking Act in New York in 1838 banking was based on receiving a “charter” granted by the state legislature. The Free Banking Act allowed for free entry into banking, but based on bond-backing for note issuance.

²⁴ Vermont, Massachusetts, Connecticut, New Jersey, Pennsylvania, Virginia, Tennessee, Florida, Louisiana, Ohio, Indiana, Illinois, Wisconsin, and Iowa adopted Free Banking laws prior to the Civil War.

of the banks that issued them, in effect they were indirect liabilities of the federal government thanks to both the required government bond security and the conditions for their redemption.” National bank notes circulated at par and there were none of the problems that had plagued the antebellum period. But, while these National bank notes remained safe, there were panics during the National Banking Period centered on *demand deposits* in 1873, 1884, 1893, 1907, 1914. It was these panics that eventually led to the creation of the federal deposit insurance through the FDIC, as discussed below.

Deposit insurance has a long history in the U.S., dating back to the Safety Fund System briefly discussed above. Prior to the passage of the FDIC, there were numerous state organized insurance schemes. Prior to the Civil War, in addition to New York, Vermont, Michigan, Indiana, Ohio and Iowa organized such systems. These systems were designed differently, and some of these systems can be described as successful (Indiana, Ohio, and Iowa); others were not successful. Although deposits were not insured under the National Banking System, following these Acts there was a halt to state insurance programs for almost fifty years. After the Panic of 1907, however, a number of states again introduced deposit insurance programs, notably Oklahoma, which was then followed by ten other states, including Texas, Mississippi, South Dakota, North Dakota, Washington, Kansas, and Nebraska. All these insurance funds collapsed during the 1920s, when agricultural prices fell. See Golembe (1960), Calomiris (1989, 1990).

During the National Banking Era private bank clearinghouses undertook the role of monitoring banks and, in the Panics of 1893 and 1907 they provided a kind of insurance. When suspension of convertibility occurred, organized by the clearinghouse, the clearinghouses would not exchange currency for checks. But they did issue clearinghouse loan certificates denominated as small bill that could be used as money in 1893 and 1907. These certificates were the joint liability of all the clearinghouse members (of that city). Thus, the fear of an individual depositor’s bank being insolvent was replaced with a claim on the group of banks. See Gorton and Mullineaux (1987) and Gorton (1985).

To summarize this history, collateral backing by specified eligible bonds when the National Bank Acts were passed after the Civil War solved the problems with money. But, that left demand deposits vulnerable to panic. The problem of demand deposit panics was only solved in 1934 with the passage of federal deposit insurance.

IV. The Regulation of Shadow Banking: Some Proposals

Our proposals are based on two themes developed in the paper:

- 1) An important cause of the panic was that seemingly safe instruments like MMMFs and AAA securitized bonds suddenly seemed unsafe. New regulation should seek to make it clear what instruments are truly safe – either through insurance or collateral – and which are not.
- 2) The rise of shadow banking was facilitated by a demand-driven expansion in the bankruptcy safe harbor for repo. This safe harbor has real value to market participants, and can be used to bring repo under the regulatory umbrella.

We use these themes to develop our specific proposals for MMMFs (Section IV.A), securitization (Section IV.B), and repo (Section IV.C).

A. Money-Market Mutual Funds: Narrow Savings Banks or Floating Net Asset Values

The central regulatory problem for MMMFs is simple: MMMFs compete in the same space as depository banks, provide an implicit promise to investors that they will never lose money (made explicit by the government in the crisis), and do not have to pay for this promise. These problems are well understood, and have been discussed for many years by academics and regulators. To solve this problem, we adopt the specific proposal of the Group of Thirty. Their proposal is concise enough that we quote it in full (Group of Thirty, 2009):

a. Money market mutual funds wishing to continue to offer bank-like services, such as transaction account services, withdrawals on demand at par, and assurances of maintaining a stable net asset value (NAV) at par should be required to reorganize as special purpose banks, with appropriate prudential regulation and supervision, government insurance, and access to central bank lender-of-last-resort facilities.

b. Those institutions remaining as money market mutual funds should only offer a conservative investment option with modest upside potential at relatively low risk. The vehicles should be clearly differentiated from federally insured instruments offered by banks, such as money market deposit funds, with no explicit or implicit

assurances to investors that funds can be withdrawn on demand at a stable NAV. Money market mutual funds should not be permitted to use amortized cost pricing, with the implication that they carry a fluctuating NAV rather than one that is pegged at US\$1.00 per share.

The logic of this proposal – the elimination of “free” insurance for MMMFs – seems powerful. So why has it not been adopted? One reason is that the \$4 trillion MMMF industry is reluctant to part with free insurance, and a \$4 trillion industry can make for a powerful lobby. A second reason is that 2010 still seems like a dangerous time to be disrupting such a large short-term credit market. We certainly are sympathetic to this second reason, but believe that any changes can be worked out now, with implementation to occur after the credit markets have recovered.

Our only tweak on the Group-of-Thirty proposal is that we call their special purpose banks “Narrow Savings Banks” (NSBs). We do this to provide an analogy to our “Narrow Funding Banks” (NFBs) for securitization, as described in the next subsection.

B. Securitization: Narrow Funding Banks

The basic idea of Narrow Funding Banks is to bring securitization under the regulatory umbrella. What may seem radical at first glance is based in the recognition that securitization is just banking by another name, and it makes sense to regulate similar functions with similar rules – the same logic used for the creation of Narrow Savings Banks for MMMFs. Narrow Funding Banks would be genuine banks with charters, capital requirements, periodic examinations, and discount-window access. All securitized product *must* be sold to NFBs; no other entity is allowed to buy ABS. (NFBs could also buy other high-grade assets, e.g., U.S. Treasuries.) NFBs would be new entities located between securitizations and final investors. Instead of buying asset-backed securities, final investors would buy the liabilities of NFBs.

Bank regulators would design and monitor the criteria for NFB portfolios. The bank regulator will determine what asset classes of ABS are eligible for purchase by NFBs and will determine the portfolio criteria with respect to proportions of asset classes in the portfolio and their ratings. NFBs will have access to the discount window. With these rules, the regulator would be setting collateral requirements for NFBs the same way that that the National Bank Act set collateral

requirements for bank notes in the 19th century, and the same way that bank regulators set capital requirements in the 21st century.

Note that the Group-of-Thirty proposal for MMMFs, which we call Narrow Savings Banks, would still use explicit government insurance, just like depository banks. The insurance is workable for NSBs because all holdings of these banks would have the same seniority, and the entire portfolio would be required to have low risk. Securitization is different, because of the existence of multiple tranches. We do not believe that insurance would be a practical solution for securitization: with multiple tranches, the subordinated components would have some risk and could not be insured, but the existence of insurance on senior components would exacerbate the information problems in the subordinated components. It would defeat the purpose of our proposed regulatory structure to create a new form of government guarantee, only to create a new form of adverse selection. Thus, we have proposed collateralization combined with supervision, but with the acknowledgement that this combination cannot provide the same 100 percent protection as government insurance. For that reason, NFB liabilities can never be considered as perfect substitutes for government debt, and the Federal Reserve will need to ensure a sufficient supply of non-NFB collateral. We return to this important point in Section V.

Our proposal does place new burdens on the regulatory system. The NFB regulator will have to monitor NFB portfolios and, perhaps, take corrective action. Some readers may wonder whether regulators will be up to this task. We believe that this task is no different from that faced by traditional bank regulators. NFB regulators will need to assess the risks of banking activities and evaluate the capital needed for those risks. If our regulatory system is not capable of performing this activity for NFBs, then we will be equally challenged if these activities remain on the balance sheets of traditional banks.

NFBs will be a different category of bank because their activities are so narrowly circumscribed; they will be rules-driven, transparent, stand-alone, newly capitalized, entities which can only buy ABS and issue liabilities. They cannot take deposits, make loans, engage in proprietary trading, or trade derivatives; they literally have no activities other than purchasing ABS. These limitations will result in a much lower risk profile than traditional banks, with lower earnings volatility and a much lower return on equity.²⁵

²⁵ In an effort to be concrete, we have provided an abbreviated sample term sheet indicating the main features of a NFB at <http://www.som.yale.edu/faculty/am859/nfb.html>. As indicated in this sample term sheet, if capital or

NFBs can be viewed as regulated collateral creators or repo banks. NFBs are allowed to fund themselves via repo. NFBs can engage in repo with private depositors; as discussed below, other entities can also engage in repo. Since all asset-backed securities would have to be sold to NFBs, NFBs would subsume ABCP conduits, SIVs, and related limited-finance companies. These other entities could become NFBs but would have to sever ties with bank sponsors and meet the other NFB requirements. Narrow Funding Banks will therefore be complimentary to traditional banks' origination and securitization activities. As in the pre-crisis economy, traditional banks will fund loans via securitization, but the resulting asset-backed securities must be purchased by NFBs.

B. Repo: Licenses, Eligible Collateral, Minimum Haircuts

There are two sides to a repo contract; there are the depositors who provide cash to the bank in exchange for interest, and who receive collateral (“reverse repo”), and there is the bank which receives the money and which initially holds the bonds that are used as the collateral (“repo”). In the crisis the problem was that the housing price shock caused securitized products, asset-backed securities, to become information-sensitive leading to withdrawals from the repo market, forcing banks to liquidate collateral. This would suggest that we focus new regulations on the banks – the providers of collateral – rather than on the depositors. Indeed, we want to provide a safe deposit-type account for the bulk of the repo depositors. The problem is that repo has many other uses as well, including shorting bonds for the purpose of hedging and conducting arbitrage to keep derivative and cash prices (the “basis”) in line. So, any regulation of repo must, on the one hand, make repo safe for depositors while, on the other hand, allowing for the use of repo for other purposes. This is the basis for our two-pronged repo proposal.

Banks: Specifically, NFBs, NSBs, and commercial banks. They are allowed to engage in repo financing, that is, the activity of borrowing money, paying interest, and providing collateral.

other triggers are hit, then the company automatically goes into a limited “No Growth Mode” and if it does not recover then it automatically goes into wind-down, “Natural Amortization.” This “living will” governs all the points of transition between operating states. There cannot be bailouts of NFBs.

Other Non-Bank Entities: Other entities can also engage in repo, but this requires a license, and these entities face other constraints, as discussed below.

Eligible Collateral for Banks: Repo collateral is restricted to “eligible” collateral, which consists of U.S. Treasury securities, liabilities of NFBs, and such other asset classes as the regulator deems appropriate.

Eligible Collateral for Non-Bank Entities: Other entities can engage in repo using any security as collateral, but this is subject to minimum haircuts and position limits as specified below.

Minimum Repo Haircuts: There are minimum haircuts on all collateral. Haircuts can be specific to the identities of the two parties and the collateral.

Position Limits for Non-Bank Entities: The extent of repo usage, either repo or reverse repo, is limited. Positions on gross notional amounts are to be set by the regulator as a function of firm size and the collateral used.

Rehypothecation: Is limited by the minimum haircuts.

Eligible collateral for banks would be any bond that the regulators approve for eligibility for their portfolio, so that would include approved asset-backed securities, government bonds, and possibly the debt of government-sponsored entities. As with the regulations on NFBs, the rules here for eligible collateral are analogous to 19th century rules for collateral on bank notes.

Because of position limits and possibly higher minimum haircuts, repo outside of banks is constrained. So, there is an advantage so being a bank. The advantages of banks, and constraints on other entities, keeps this type of money creation mostly within the regulated sector, but does not prevent the use of repo for a broader range of purposes other than as a deposit.

NFBs are not required to finance all, or even part, of their portfolios using repo. Indeed, we would expect that NFBs would issues a combination of longer-term debt, for institutional investors, and use some repo financing as well, with the relative proportions determined by supply and demand.

Non-bank licensed entities that would be allowed to engage in repo would include, for example, hedge funds, which usually finance themselves via leverage obtained in the repo market. So, they are borrowing against securities posted as collateral; they are not acting as repo depositors. The other side of the transaction is a bank (or other entity) that is lending against the collateral, and which may then borrow against this same collateral with a third entity. Suppose none of these three entities is a bank. Our proposal constrains this type of transaction with position limits with regard to total repo (regardless of direction) on each of the three entities. Haircuts depend on the identities of the parties to a repo, in bilateral repo, and on the type of collateral (see evidence in Dang, Gorton, and Holmström (2010b)). Minimum haircuts may not be binding on some transactions, but they are likely to be meaningful because of the restriction to eligible collateral. Minimum haircuts would not prevent all runs; they would, however, limit leverage and reduce rehypothecation.

In summary, these proposed rules would create two types of allowable repo. The first type, done by commercial banks and NFBs (“banks”), captures the monetary function of repo and is regulated analogously to 19th century bank notes (with regards to collateral) and 21st century depository institutions (by using minimum haircuts as an analogue to capital requirements). The second type may be done by any institution with a license, and is regulated so as to be more expensive than the first type. Lawmakers and judges can prevent a third type of totally unregulated repo, by making clear that the special bankruptcy protections offered to repo would simply not apply outside of the first two types. Repo owes much of its existence to its special protections under the bankruptcy code – if those protections are only offered to regulated repo, then leakage from the regulated system can be minimized.

V. Discussion

Repo and securitization should be regulated because they are new forms of banking, but with the same vulnerability as other forms of private bank-created money. Like previous reforms of banking, we seek to preserve banking and bank-created money, but eliminate bank runs. Our proposals are aimed at creating a sufficient amount of high-quality collateral that can be used for repo safely. NFBs are to be overseen to assure the creation of safe collateral, and repo is to mostly be restricted to banks. Our proposals are built on the idea that these activities are

efficient, in part, because of safe harbor from bankruptcy, and the maintenance of this safe harbor is the incentive for agents to abide by the proposed rules.

The vulnerability of bank-created money to banking panics has a long history, and also a long history of attempts to eliminate this problem. Historically, collateralization has been one successful approach. Off-balance sheet banking has become the source of collateral and needs to be overseen. We propose that NFBs become the entities that transform asset-backed securities into government-overseen collateral. Repo then can be backed by high-quality collateral.

In this paper, we have not provided all the details necessary for determining acceptable collateral or for setting minimum haircuts. These details would need to be worked out in conjunction with rules for bank capital, with which they would be closely intertwined. While it is clear that setting the rules for shadow banking would make new demands of regulators, these demands would be analogous to those needed to set rules for banks. Whether we keep risks on balance sheet or allow them to go off, there is no escaping the requirement for regulators to evaluate these risks. If we fear that regulators are not up to the task, then we must pay them more and train them better. We do not see any pure private-sector solutions to ensure the safety of the banking system, so the role of regulators will remain essential. To the extent that this role is found to be impossible, then we are either destined to have more crises or forced to live with a greatly constrained financial system.

There are a number of important issues that we have not presented, due to space constraints. We cannot mention all of them, but only briefly focus on two. One issue concerns the question of whether there may be a shortage of collateral under our proposals, as there apparently has been in the past. As the crisis showed, if there is an insufficient amount of U.S. Treasuries outstanding for use as collateral, then there is an incentive for the private sector to try to create substitutes, e.g. AAA bonds. But this is problematic because the substitutes cannot always be information-insensitive. In 2005 the issue of the U.S. Treasury providing a backstop facility, a “securities lender of last resort” was broached. Our view is that this facility might need to be available on a basis, but that it should be run by the Fed, which may need to provide “Fed Notes” to be exclusively used as repo collateral. The Fed needs to focus more carefully on the provision (and measurement) of liquidity, and it is the job of the Fed to provide collateral.

A second issue concerns monetary policy generally. Because of the lack of measurement by the authorities, we do not know the size of the repo market or the extent of rehypothecation. It

seems that U.S. Treasuries are extensively rehypothecated and should be viewed as money. Krishnamurthy and Vissing-Jorgensen (2010) provide evidence for this. This means that open market operations are exchanging one kind of money for another, rather than exchanging money for “bonds.” “Quantitative easing” may well be the monetary policy of the future.

Appendix: Glossary of Shadow-Banking Terms

Asset-Backed Commercial Paper (ABCP), ABCP conduit: Asset-backed commercial paper refers to commercial paper issued by a bankruptcy-remote special purpose vehicle, or conduit, which uses the proceeds to purchase asset-backed securities. Such a vehicle is owned and actively-managed by a management company. See Fitch Ratings (November 8, 2001).

Asset-Backed Securities (ABS): An asset-backed security is a bond which is backed by the cash flows from a pool of specified assets in a **special purpose vehicle** rather than the general credit of a corporation. The asset pools may be residential mortgages, commercial mortgages, automobile loans, credit card receivables, student loans, aircraft leases, royalty payments, and many other asset classes.

Collateralized Debt Obligation (CDO): A CDO is a special purpose vehicle, which buys a portfolio of fixed income assets, and finances the purchase of the portfolio via issuing different tranches of risk in the capital markets. These tranches are senior tranches, rated Aaa/AAA, mezzanine tranches, rated Aa/AA to Ba/BB, and equity tranches (unrated).

Rehypothecation: In the context of repo, rehypothecation refers to the right to freely use the bonds received as collateral for other purposes.

Sale and Repurchase Agreement (“repo” and “reverse repo”): A sale and repurchase agreement, known as a “repo” for short, is a deposit of money in a “bank” for a short period of time, for interest, where the depositor receives (and takes physical possession of) collateral valued at market prices. This is combined with an agreement of the bank to repurchase the same security at a specified price at the end of the contract. From the perspective of the bank, the transaction is a “repo” and from the perspective of the depositor, the transaction is a “repo”.

Securitization: The process of financing by segregating specified cash flows, from loans originated by a firm (the “sponsor”) and selling claims in the capital markets that are specifically linked to these specified cash flows. This is accomplished by setting up another company, called a special purpose vehicle (SPV) or special purpose entity, and then selling the specified cash flows to this company, which purchases the rights to the cash flows by issuing (rated) securities into the capital market. The sponsor services the cash flows, that is, makes sure that the cash

flows are arriving, etc. The SPV is not an operating company in the usual sense. It is more of a robot company in that it is a set of rules. It has no employees or physical location. See Gorton and Souleles (2006).

Special Purpose Vehicle (SPV): An SPV or special purpose entity (SPE) is a legal entity which has been set up for a specific, limited, purpose by another entity, the sponsoring firm. An SPV can take the form of a corporation, trust, partnership, or a limited liability company. An SPV can only carry out some specific purpose, or circumscribed activity, or a series of such transactions. An essential feature of an SPV is that it be “bankruptcy remote,” that is, that the SPV never be able to become legally bankrupt. See Gorton and Souleles (2006).

Tranche: A tranche (French for “cut”) refers to a slice of a portfolio ordered by seniority, e.g., a senior tranche or AAA tranche is more senior than a junior tranche or BBB-rated tranche.

References

- Acharya, Viral, Douglas Gale, and Tanju Yorulmazer (2009), "Rollover Risk and Market Freezes," New York University, working paper.
- Adrian, Tobias and Hyun Shin (2010), "The Changing Nature of Financial Intermediation and the Financial Crisis of 2007-2009," Federal Reserve Bank of New York, Staff Report no. 439.
- Bank for International Settlements (2007), "Institutional Investors, Global Savings and Asset Allocation," Report submitted by a Working Group established by the Committee on the Global Financial System (February).
- Bank for International Settlements (1999), "Implications of Repo Markets for Central Banks," Report of a Working Group established by the Committee on the Global Financial System of the central banks of the Group of Ten Countries."
- Barth, James R., R. Dan Brumbaugh, Jr., and Robert E. Litan (1992), The Future of American Banking (London: Sharpe).
- Barth, James, Dan Brumbaugh, and Robert Litan (1990), Banking Industry in Turmoil: A Report on the Condition of the U.S. banking Industry and the Bank Insurance Fund, Report of the Financial Institutions Subcommittee of the House Banking Committee (Washington: Government Printing Office).
- Boyd, John and Mark Gertler (1994), "Are Banks Dead? Or, Are the Reports Greatly Exaggerated?" in The Declining Role of Banking? (Chicago: Federal Reserve Bank of Chicago).
- Boyd, John and Mark Gertler (1993), "U.S. Commercial Banking: Trends, Cycles, and Policy," in NBER Macroeconomics Annual 1993, edited by Olivier Blanchard and Stanley Fischer (MIT Press: Cambridge, MA).
- Brunnermeier, Markus (2009), "Deciphering the Liquidity and Credit Crunch 2007-08," *Journal of Economic Perspectives* 23(1), 77-100.
- Brunnermeier, Markus and Lasse H. Pedersen (2009), "Market Liquidity and Funding Liquidity," *Review of Financial Studies* 22(6), 2201-2238.
- Bryan, Lowell L. (1988), Breaking Up the Bank: Rethinking an Industry Under Siege (Dow Jones-Irwin; Homewood, Illinois).
- Calomiris, Charles (1989), "Deposit Insurance: Lessons for the Record," Federal Reserve Bank of Chicago, *Economic Perspectives* (May/June), 10-30.
- Carey, Mark, Ricardo Correa, and Jason Kotter (2009), "Revenge of the Steamroller: ABCP as a Window on Risk Choices," Board of Governors of the Federal Reserve System, working paper.
- Comotto, Richard (2010), "A white paper on the Operation of the European Repo Market, the Role of Short-Selling, the Problem of Settlement Failures and the Need for Reform of the Market Infrastructure," International Capital Markets Association, European Repo Council.
- Cook, Timothy and Jeremy Duffield (1979), "Money Market Mutual Funds: A Reaction to Government Regulations or a Lasting Financial Innovation?," *Economic Review* of the Federal Reserve Bank of Richmond (July/August), 15-31.
- Dang, Tri Vi, Gary Gorton, and Bengt Holmström (2010a), "Financial Crises and the Optimality of Debt for Liquidity Provision," working paper.

- Dang, Tri Vi, Gary Gorton, and Bengt Holmström (2010b), Repo Haircuts: No Title Yet, forthcoming working paper.
- Davis, Andrew McFarland (1910), The Origin of the National Banking System, National Monetary Commission, 61st Congress, 2d Session, Document No. 582 (Government Printing Office; Washington D.C.).
- Davis, E. Philip and Benn Steil (2001), Institutional Investors (MIT Press; Cambridge, Massachusetts).
- Demsetz, Rebecca, Marc Saidenberg, and Philip Strahan (1996), “Banks with Something to Lose: The Disciplinary Role of Franchise Value,” Federal Reserve Bank of New York *Economic Policy Review*, 1- 14.
- Dewey, Davis (1910), State Banking Before the Civil War (Government Printing Office: Washington D.C.).
- Fegatelli, Paolo (2010), “The Role of Collateral Requirements in the Crisis: One Tool for Two Objectives?,” Banque central du Luxembourg, working paper.
- Fender, Ingo (2003), “Institutional Asset Managers: Industry Trends, Incentives and Implications for Market Efficiency,” BIS *Quarterly Review* (September): 75-86.
- Fitch Ratings (2001), “Asset-Backed Commercial Paper Explained,” Asset-Backed Criteria Report, *Structured Finance*, November 8.
- Gan, Jie (2004), “Banking Market Structure and Financial Stability: Evidence from the Texas Real Estate Crisis in the 1980s,” *Journal of Financial Economics* 73, 567-601.
- Garbade, Kenneth (2006), “The Evolution of Repo Contracting Conventions in the 1980s,” Federal Reserve Bank of New York *Economic Policy Review* (May), 27-42.
- Gorton, Gary (2010), Slapped by the Invisible Hand: The Panic of 2007 (Oxford University Press).
- Gorton, Gary (1999), "Pricing Free Bank Notes," *Journal of Monetary Economics* 44: 33-64.
- Gorton, Gary (1996), "Reputation Formation in Early Bank Note Markets," *Journal of Political Economy* 104: 346-397.
- Gorton, Gary (1988), "Banking Panics and Business Cycles," *Oxford Economic Papers* 40:751-81.
- Gorton, Gary (1985), “Clearinghouses and the Origin of Central Banking in the U.S.,” *Journal of Economic History* 45: 277-83.
- Gorton, Gary and Andrew Metrick (2010a), “Securitized Banking and the Run on Repo,” Yale School of Management, working paper.
- Gorton, Gary and Andrew Metrick (2010b), “Haircuts,” Federal Reserve Bank of St. Louis *Review*, forthcoming.
- Gorton, Gary and Don Mullineaux (1987), “The Joint Production of Confidence: Endogenous Regulation and Nineteenth Century Commercial Bank Clearinghouses,” *Journal of Money, Credit and Banking* 19: 458-68.
- Gorton, Gary and Richard Rosen (1995), "Corporate Control, Portfolio Choice, and the Decline of Banking," *Journal of Finance*, Vol. 50, No. 5 (December 1995): 1377-1420.
- Gorton, Gary and Nicholas S. Souleles (2006), “Special Purpose Vehicles and Securitization,” chapter in The Risks of Financial Institutions, edited by Rene Stulz and Mark Carey (University of Chicago Press; 2006).
- Group of Thirty (2009), “Financial Reform: A Framework for Financial Stability”, see <http://www.group30.org/pubs/recommendations.pdf>
- He, Zhiguo and Wei Xiong (2009), “Dynamic Debt Runs,” Princeton University, Princeton, working paper.

- Hördahl, Peter and Michael King (2008), "Developments in Repo Markets During the Financial Turmoil," Bank for International Settlements *Quarterly Review* (December), 37-53.
- International Capital Market Association (2010), European Repo Market Survey Number 18-conducted December 2009.
- Johnson, Christian (1997), "Derivatives and Rehypothecation Failure: It's 3:00 p.m., Do You Know Where Your Collateral Is?," *Arizona Law Review* 30(949).
- Keeley, Michael (1990), "Deposit Insurance, Risk, and Market power in Banking," *American Economic Review* 80(5), 1183-1200.
- Keeley, Michael (1988), "Bank Capital Regulation in the 1980s: Effective or Ineffective?," Federal Reserve Bank of San Francisco *Economic Review* (Winter), 3-20.
- Keeley, Michael and Gary Zimmerman (1985), "Competition for Money Market Deposit Accounts," Federal Reserve Bank of San Francisco *Economic Review* 2: 3-27.
- Klee, Kenneth and Brendt Butler (2002), "Asset-Backed Securitization, Special Purpose Vehicles and Other Securitization Issues," *Uniform Commercial Code Law Review*, 35(2), 23-67.
- Krimminger, Michael (2006), "The Evolution of U.S. Insolvency Law for Financial Market Contracts," Federal Deposit Insurance Corporation; available on SSRN.
- Krishnamurthy, Arvind, 2010, "How Debt Markets Have Malfunctioned in the Crisis," *Journal of Economic Perspectives*, Vol. 24, No. 1, pp. 3–28.
- Krishnamurthy, Arvind and Annette Vissing-Jorgensen (2010), "The Aggregate Demand for Treasury Debt," Kellogg School, Northwestern University, working paper.
- Letter to Barney Frank, Chris Dodd et al. (2010) from mutual fund companies; see <http://common.money-media.com/php/image.php?id=12264&ext=.pdf>.
- Marcus, Alan (1984), "Deregulation and Bank Financial Policy," *Journal of Banking and Finance* 8, 557-565.
- Martin, Antoine, David Skeie, and Ernst-Ludwig von Thadden (2010), "Repo Runs," Federal Reserve Bank of New York, Staff Report No. 444.
- Moody's Investors Service (September 1997), "Alternative Financial Ratios for the Effects of Securitization," in "Securitization and its Effect on the Credit Strength of Companies: Moody's Perspective 1987-2002," *Special Comments* (2002).
- Moody's Investors Service (January 1997), "The Costs and Benefits of Supporting 'Troubled' Asset-Backed Securities: Has the Balance Shifted?," in "Securitization and its Effect on the Credit Strength of Companies: Moody's Perspective 1987-2002," *Special Comments* (2002).
- Morgan, Donald (2002), "Rating Banks: Risk and Uncertainty in an Opaque Industry," *American Economic Review* 92, 874-88.
- Plank, Thomas (2007), "Toward a More Efficient Bankruptcy Law: Mortgage Financing Under the 2005 Bankruptcy Amendments," *Southern Illinois University Law Review* 31: 641-668.
- Report of the Money Market Working Group* (2009), submitted to the Board of Governors of the Investment Company Institute (March 17, 2009).
- Rolnick, Arthur and Warren Weber (1984), "The Causes of Free Bank Failures: A Detailed Examination," *Journal of Monetary Economics* 21: 47-71.
- Schroeder, Jeanne (1996), "Repo Madness: The Characterization of Repurchase Agreements Under the Bankruptcy Code and the U.C.C.," *Syracuse Law Review* 46, 999-1050.

- Schweitzer, Lisa, Seth Grosshandler, and William Gao (2008), "Bankruptcy Court Rules that Repurchase Agreements Involving Mortgage Loans are Safe Harbored Under the Bankruptcy Code, But That Servicing Rights Are Not," *Journal of Bankruptcy Law* (May/June), 357-360.
- Schwarcz, Steven (2001), "Impact of Bankruptcy Reform on True Sale Determination in Securitization Transactions," *Fordham Journal of Corporate and Financial Law* 7: 353-364.
- Schweitzer, Lisa, Seth Grosshandler, and William Gao (2008), "Bankruptcy Court Rules that Repurchase Agreements Involving Mortgage Loans are Safe Harbored Under the Bankruptcy Code, But That Servicing Rights Are Not," *Journal of Bankruptcy Law* (May/June), 357- 360.
- Shleifer, Andrei and Robert Vishny, 2009, "Unstable Banking", NBER working paper 14943.
- Simmons, Edward (1954), "Sales of Government Securities to Federal Reserve Banks under Repurchase Agreements," *Journal of Finance* 9: 23-40.
- Singh, Manmohan and James Aitken (2010), "The (Sizeable) Role of Rehypothecation in the Shadow Banking System," IMF Working Paper, WP/10/172.
- Sissoko, Carolyn (2010), "The Legal Foundations of Financial Collapse," *Journal of Financial Economic Policy*, forthcoming.
- Smith, Edwin (2007), "Financial Contracts under the Bankruptcy Code," see <http://www.acfalaw.org/elements/uploads/files/fileManager/FinancialContractsBankruptcy.pdf>
- Stark, Robert (2002), "Viewing the LTV Steel ABS Opinion in its Proper Context," *Journal of Corporation Law* 27: 211-230.
- Uhlig, Harald (2009), A Model of a Systemic Bank Run," University of Chicago, working paper.
- U.S. Treasury (2005), "TBAC Discussion Charts, November 1, 2005," see <http://www.treas.gov/offices/domestic-finance/debt-management/adv-com/minutes/dc-2005-q4.pdf>
- U.S. Treasury, Securities and Exchange commission, Board of Governors of the Federal Reserve System, The Joint Report on the Government Securities Market; see <http://www.ustreas.gov/offices/domestic-finance/debt-management/gsr92rpt.pdf>
- Walters, Gary (1984), "Repurchase Agreements and the Bankruptcy Code: The Need for Legislative Action," *Fordham Law Review* 52: 828-849.

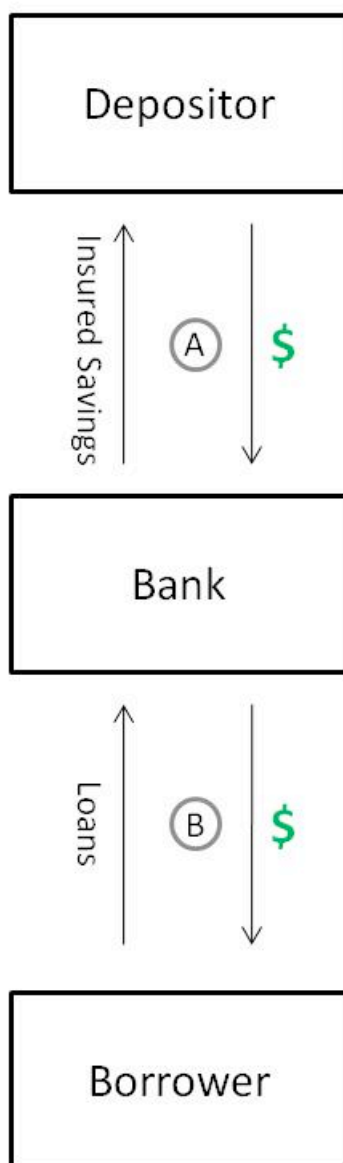
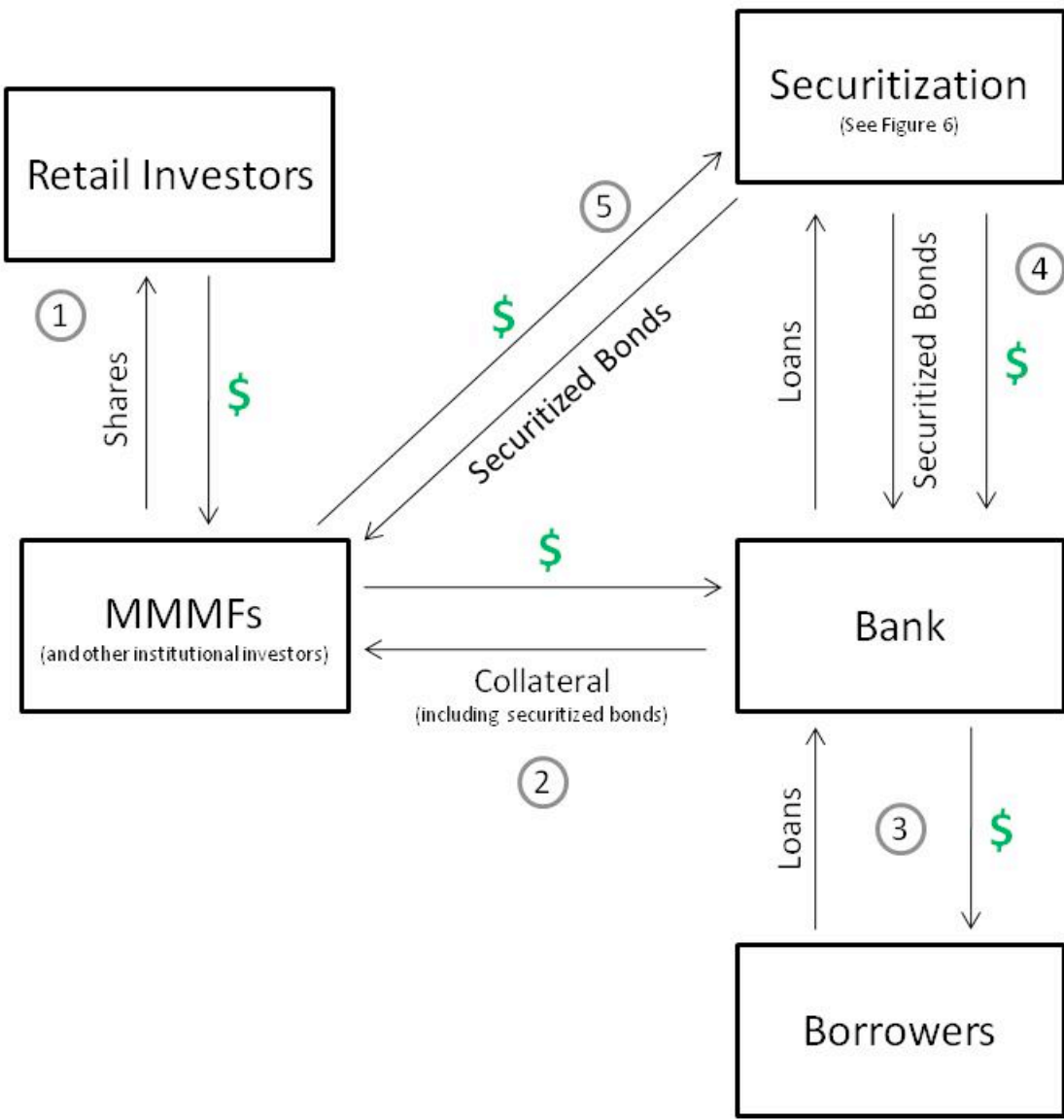
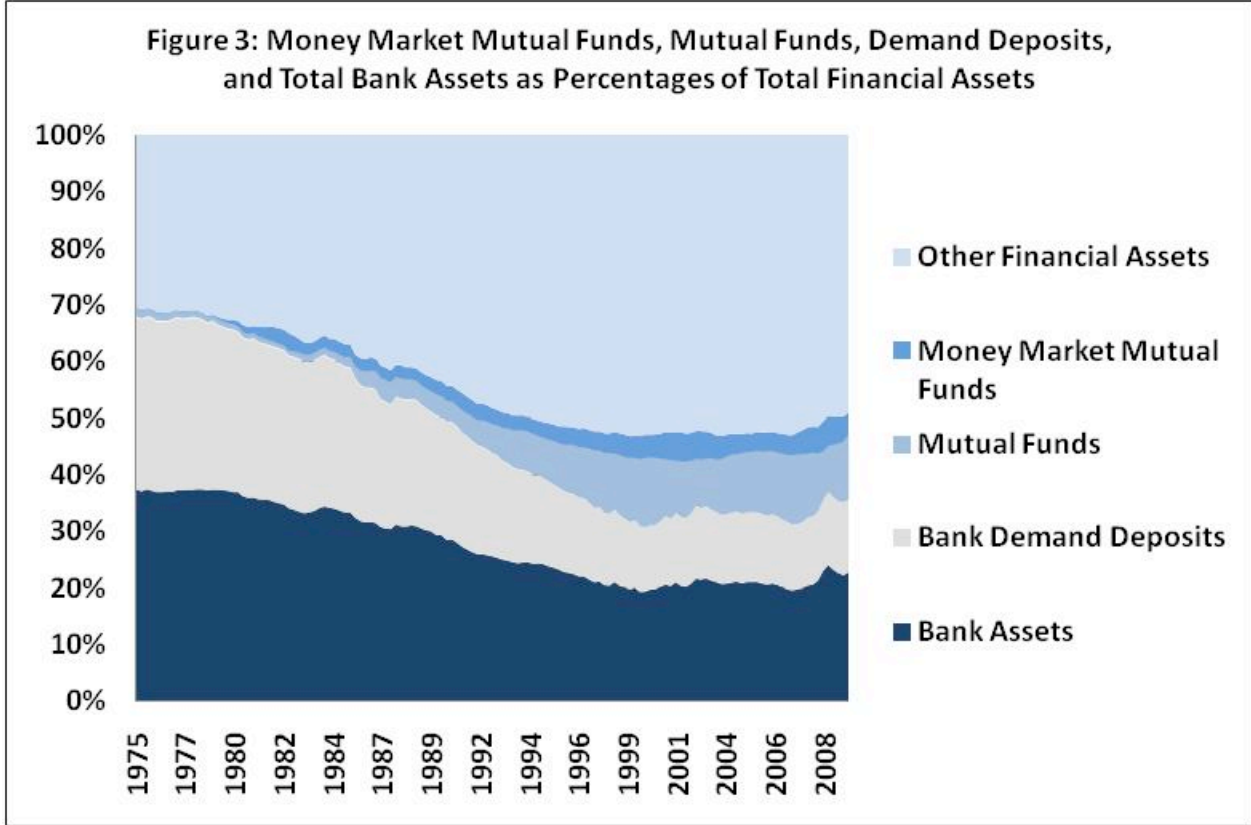
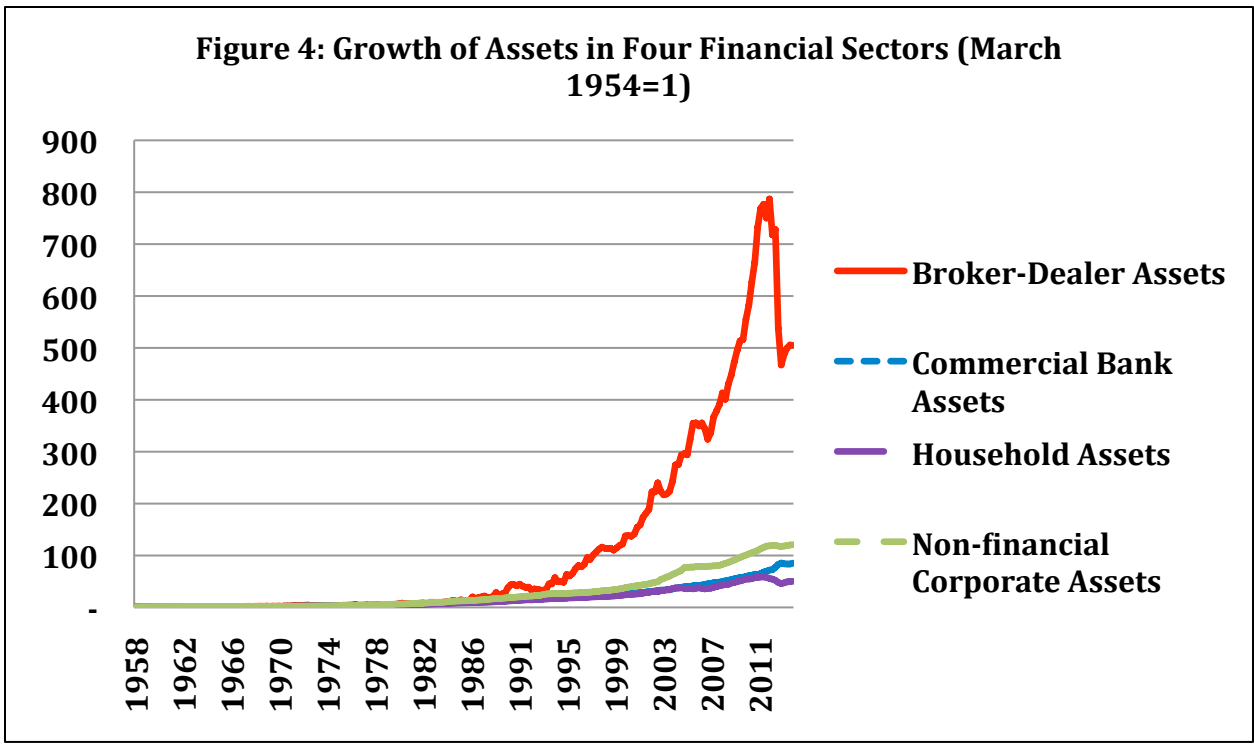
Figure 1: On-Balance-Sheet Financing

Figure 2: Off-Balance-Sheet Financing

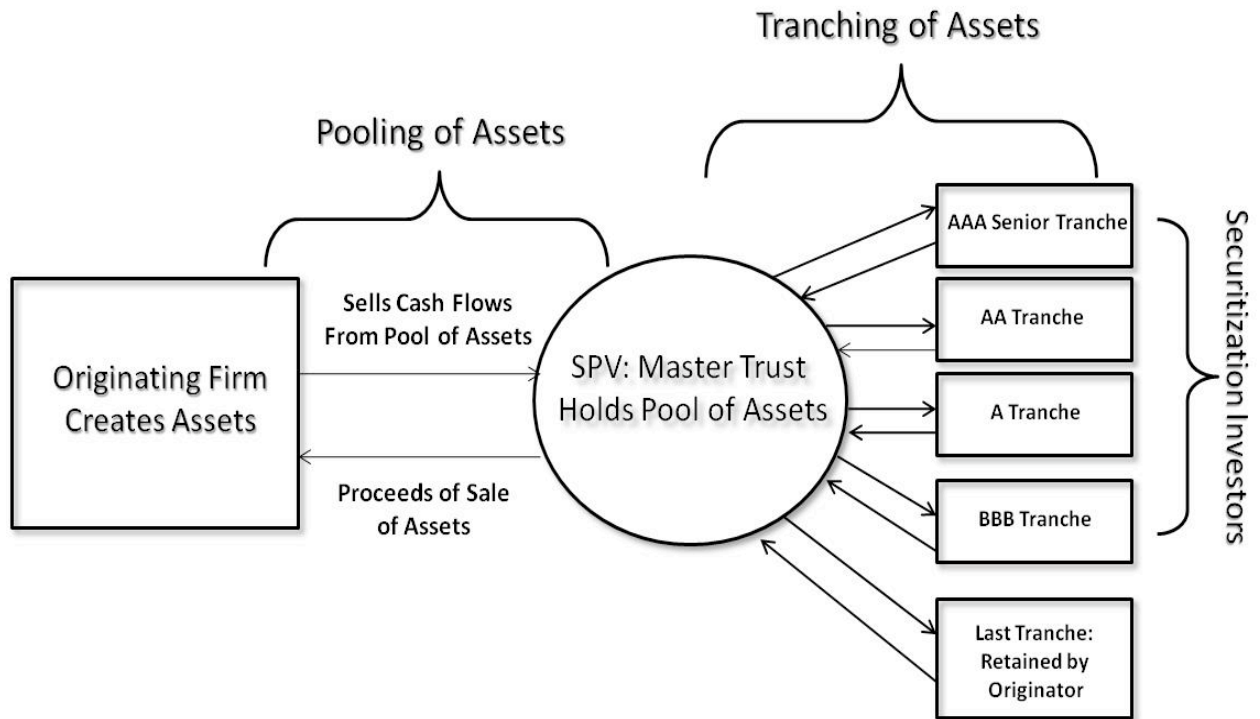


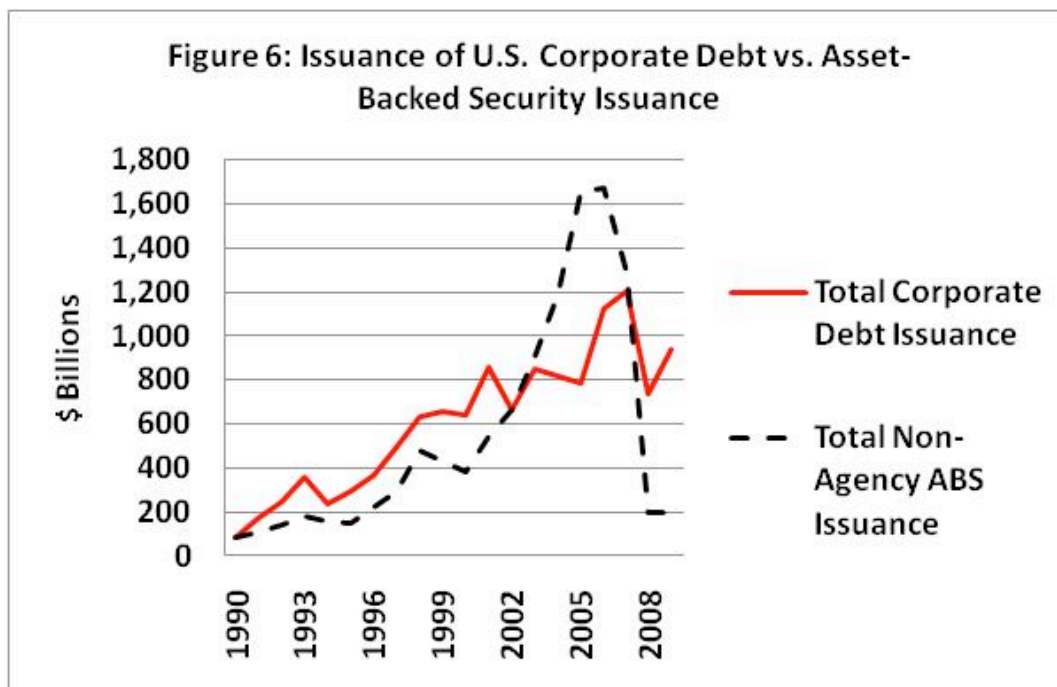


Source: Flow of Funds.

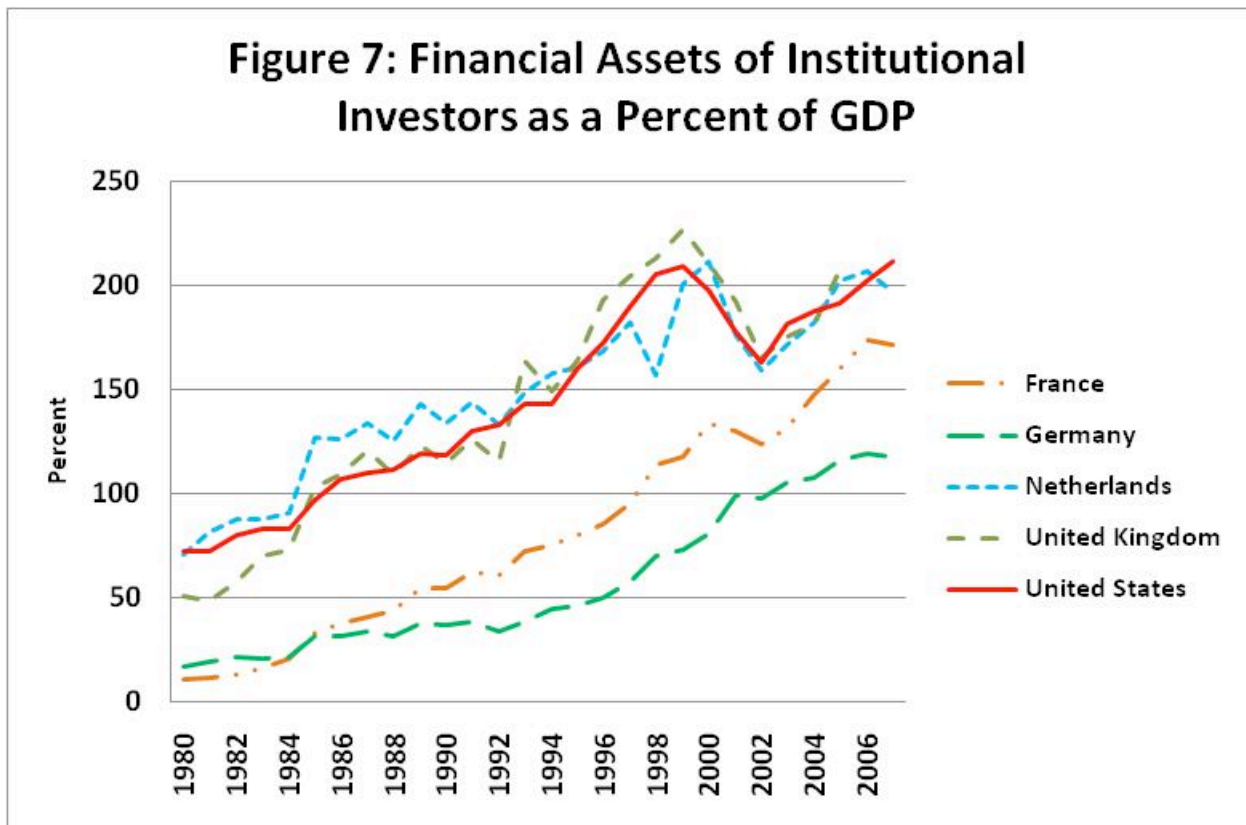


Source: Flow of Funds.

Figure 5: The Securitization Process



Source: Thomson Reuters.



Source: OECD.