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Financial Stability Policies for Shadow Banking

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Abstract

This paper explores financial stability policies for the shadow banking system. I tie policy options to economic mechanisms for shadow banking that have been documented in the literature. I then illustrate the role of shadow bank policies using three examples: agency mortgage real estate investment trusts, leveraged lending, and captive reinsurance affiliates. For each example, the economic mechanisms are explained, the potential risks emanating from the activities are described, and policy options to mitigate such risks are listed. The overarching theme of the analysis is that any policy prescription for the shadow banking system is highly specific to the particular activity.

Key words: shadow bank policies, systemic risk, financial intermediation

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1. Introduction

The Financial Stability Board (2011) defines shadow banking as the system of credit intermediation that involves entities and activities outside the regular banking system. Shadow credit intermediation thus takes place in an environment where prudential regulatory standards and supervisory oversight are either not applied or are applied to a materially lesser or different degree than is the case for regular banks engaged in similar activities. While the vast majority of shadow credit intermediation is regulated in some way, it is typically not subject to prudential supervision, which is the main objective to the regulation of the traditional banking system.

The majority of shadow banking activities are conducted outside of the commercial banking system. However, some activities take place under the umbrella of bank holding companies or insurance companies, and banks themselves feature prominently in the shadow banking system. For example, banks extend backup lines of credit that allow independent or off balance sheet entities to issue short-term liabilities. Furthermore, bank holding companies house money market funds, the triparty repo market, and many different types of activities related to securitization. The connection between bank and nonbank credit intermediation activities thus has to be one focus of shadow bank policies.

More generally, shadow banking can be defined as maturity transformation, liquidity transformation and credit risk transfer outside of institutions with direct access to government backstops such as depository institutions, i.e. traditional commercial banks. This definition encompasses a large section of the financial system, as is illustrated by Figure 1, which plots shadow bank liabilities and commercial bank liabilities as a fraction of the nominal gross domestic product since the 1960s. The figure illustrates that traditional bank liabilities have been roughly constant at around 70 percent of GDP over the past fifty years. Shadow credit intermediation, on the other hand, has grown from less than one percent of GDP in 1960 to over 70 percent today, with a peak close to 80 percent in mid 2007, just before the onset of the global financial crisis. In 2007, shadow bank liabilities were in fact larger than traditional commercial bank liabilities. Another sector plotted in Figure 1 are liabilities of bank holding companies and broker dealers. While large commercial banks in the U.S. are part of bank holding companies, they are separate legal entities with distinct regulations. Importantly, only commercial bank subsidiaries have access to the discount window and deposit insurance, not the bank holding company, or other subsidiaries such as broker dealer subsidiaries. Bank holding company and broker dealer liabilities have also grown in recent decades, though their size is relatively small.

The remainder of the paper is organized as follows. I explain seven economic mechanisms of shadow bank intermediation in some detail in section 2. Section 3 provides an overview of financial stability policies aimed at risks emanating from the shadow banking sector, following the seven economic mechanisms from section 2. Sections 4-6 provide three case studies of shadow banking activities. Section 4 explains agency mortgage real estate investment trusts, section 5 analyzes leveraged lending, and section 6 dives into the shadow insurance sector. Each of the three case studies presents the economics of the respective activity, the risks emanating from the activity, and finally policy options. Section 7 concludes.

2. The Economics Shadow Banking

The literature has identified seven distinct economic mechanisms that motivate shadow bank activities. I discuss each of these mechanisms in more detail, drawing on previous work by Adrian and Ashcraft (2012b) and Adrian, Ashcraft and Cetorelli (2013).

i) Specialization

Through the shadow intermediation process, the shadow banking system transforms risky, long-term loans (subprime mortgages, for example) into seemingly credit-risk-free, short-term, money-like instruments. Unlike the traditional banking system, where the entire process takes place within a single institution, the shadow banking system decomposes the credit intermediation into a chain of wholesale-funded, securitization-based lending. Shadow credit intermediation is performed through chains of nonbank financial intermediaries in a multistep process that can be interpreted as a "vertical slicing" of the traditional bank's credit intermediation process into seven steps. Pozsar, Adrian, Ashcraft, and Boesky (2013) explain the seven steps of shadow bank credit intermediation in detail.

1. Loan origination (loans and leases, nonconforming mortgages, etc.) is performed by non-bank finance companies.

2. Loan warehousing is conducted by single- and multi-seller conduits and is funded through asset-backed commercial paper (ABCP).

3. The pooling and structuring of loans into term asset-backed securities (ABS) is conducted by broker-dealers' ABS syndicate desks.

4. ABS warehousing is facilitated through trading books and is funded through repos, total return swaps, or hybrid and repo conduits.

5. The pooling and structuring of ABS into CDOs is also conducted by broker-dealers' ABS.

6. ABS intermediation is performed by limited-purpose finance companies (LPFCs), structured investment vehicles (SIVs), securities arbitrage conduits, and credit hedge funds, which are funded in a variety of ways including, for example, repo, ABCP, MTNs, bonds, and capital notes.

7. The funding of all the above activities and entities is conducted in wholesale funding markets by money market intermediaries (money market funds, enhanced cash funds) and direct money market investors such as securities lenders.

This intermediation chain closely intertwined with commercial banks, bank holding companies, and security broker dealers. The seven steps are furthermore complemented by risk repositories of insurance companies, which provide credit risk transfer at various stages of the intermediation chain.

ii) Mispriced Guarantees from Government Backstops

Since the creation of the Federal Reserve in 1914 and the Federal Deposit Insurance in 1935, the official sector has attempted to minimize the risk of runs in the banking system risk through the use of its own balance sheet by providing credit guarantees via deposit insurance and contingent liquidity via lending of last resort. However, the risk-insensitive provision of credit guarantees and liquidity backstops creates well-known incentives for excessive risk-taking, leverage, and maturity transformation, motivating the need for supervision and prudential regulation. The traditional form of financial intermediation, with credit being intermediated through banks and insurance companies, but with the public sector standing close by to prevent destabilizing runs, dominated other forms of financial intermediation from the Great Depression well into the 1990s.

Pozsar, Adrian, Ashcraft, and Boesky (2013) define shadow banking as credit intermediation without explicitly guaranteed liabilities. Credit intermediation outside of backstopped commercial banks grew significantly, as illustrated in Figure 1. Outside of commercial banks, institutions have varying degrees of connectedness to government backstops. For example, uninsured liabilities outside of commercial banks are part of the shadow banking system since they do not benefit from access to official sector liquidity, thus making them vulnerable to concerns about credit as well as runs by investors. However, some shadow banking liabilities have indirect access to backstops via credit lines of commercial banks. The pricing of credit lines, which benefit from the government backstops, therefore influences the pricing of such uninsured liabilities. As the distortionary impact from official backstops is primarily contained via constraints on risk taking (e.g. via capital requirements), the pricing of the credit line to the shadow banking institution can benefit from the government backstop of the commercial bank. Examples of distorted pricing of shadow banking activities due to the closeness to government backstops are widespread and include the pricing of intraday credit in the triparty repo market, the implicit guarantees of various shadow banking institutions under the umbrella of bank holding companies due to reputational reasons (for example structured investment vehicles and money market funds), or credit guarantees written by insurance companies that benefit from superior credit ratings due to state insurance funds.

iii) Regulatory Arbitrage

Among the motivations for shadow credit intermediation are regulatory and tax arbitrage. Regulation typically constrains institutions to behave in ways that they would privately not choose: pay taxes to the official sector, disclose additional information to investors, or hold more capital against financial exposures. The re-structuring of financial activity that aims at avoiding taxes, disclosure, and/or capital requirements, is referred to as regulatory arbitrage. While arbitrage generally refers to the simultaneous buying and selling of instruments for a riskless profit, regulatory arbitrage is generally a change in structure of activity which does not change the risk profile of that activity, but increases the net cash flows to the sponsor by reducing the costs of regulation.

An example of regulatory arbitrage is documented by Acharya, Schnabl, and Suarez (2011). The authors show that the rapid expansion of ABCP since 2004 was, at least in part, attributable to regulatory arbitrage triggered by a change in capital rules. In particular, Financial Accounting Standards Board

issued a directive in January 2003 (FIN 46) and updated the directive in December 2003 (FIN 46A) suggesting that sponsoring banks should consolidate assets in ABCP conduits onto their balanced sheets.[1] However, U.S. banking regulators clarified that assets consolidated onto balance sheets from conduits would not need to be included in the measurement of risk-based capital and instead used a 10 percent credit conversion factor for the amount covered by a liquidity guarantee. Acharya, Schnabl, and Suarez (2011) documented that the majority of guarantees were structured as liquidity-enhancing guarantees aimed at minimizing regulatory capital, instead of credit guarantees, and that the majority of conduits were supported by commercial banks subject to the most stringent capital requirements.

There is also a literature investigating the impact of taxes and tax avoidance activity on the recent financial boom and bust. Alworth and Arachi (2012) provide a broad discussion of the role of the tax advantages of home ownership, the use of debt in mergers and acquisitions by private equity, the use of hybrid debt instruments as capital by financial institutions, and the use of tax havens to structure securitization vehicles. Mooij, Keen, and Orihara (2013) documents an empirical link between corporate tax rates and the probability of crises. Finally, Davis and Stone (2004) document that the severity of crises is larger when pre-crisis leverage is higher, suggesting that tax policy could have effects both on incidence and severity of financial stress.

iv) Neglected Risk

Another economic role of shadow banking activity is related to aggregate tail risk. Because shadow banks are tailored to take advantage of mispriced tail risk, they accumulate assets that are particularly sensitive to tail events. Academic literature argues that such tail risk might be mis-priced ex-ante, either due to irrational or due to rational reasons. This literature is broadly referred to as "neglected risk."

The behavioral literature on neglected risk is rooted in the psychological observation that market participants are fundamentally biased against the rational assessment of tail risk. Gennaioli, Shleifer, and Vishny (2012) develop a theory of individual decision making based on the behavioral evidence, positing that actors neglect risk. Gennaioli, Shleifer, and Vishny (2013) apply this theory to the economics of the shadow banking system. They model a world where investors systematically ignore the worst state of the world, generating overinvestment and overpricing during the boom and excessive collapse of real activity and the financial sector during the bust. An early paper warning of the financial system's exposure to such tail risk was presented by Rajan (2005) who asked whether financial innovation had made the world riskier. Coval, Jurek, and Stafford (2009) point out that the AAA tranches of private label asset backed securities behave like catastrophe bonds that load on a systemic risk state. Neglected risk also manifests itself through over-reliance on credit ratings by investors. For example, Ashcraft, Goldsmith-Pinkham, Hull, Vickery (2011) document that subprime MBS prices are more sensitive to ratings than ex post performance, suggesting that funding is excessively sensitive to credit ratings relative to informational content.

[1] See http://www.fasb.org/summary/finsum46.shtml.

Dang, Gorton, and Holmström (2009) present an alternative theory that generates neglected risk within a rational setting. Their theory is one of information opacity that can serve as a rationalization of excessive risk taking in the shadow banking system. According to this theory, debt contracts are optimal because they generate opacity. Opacity, in turn, minimizes adverse selection and provides the least possible incentives to collect information. This insight justifies the growth of relatively opaque securitized products in the run-up to the crisis. Mortgages and loans were packaged into MBS and ABS and funded by CDOs, SIVs, and MMMFs that had relatively little information about the underlying credit quality. However, Dang, Gorton, and Holmström show that systemic risk is exacerbated once a bad shock hits informationally opaque, debt-funded economies. The intuition is that a bad shock leads to an increase in private information collection, which exacerbates the incorporation of adverse information in market prices. As a result, adverse selection starts to accumulate as systemic crises deepen.

v) Agency Problems

Ashcraft and Schuermann (2008) describe seven informational frictions in the securitization of subprime mortgage credit prior to the financial crisis, although these frictions can be generalized to all securitization transactions. They include asymmetric information problems between lenders and originators (predatory lending and borrowing), between lenders and investors, between servicers and investors, between servicers and borrowers, between beneficiaries of invested funds and asset managers, and between beneficiaries of invested funds and credit rating agencies. In addition, asymmetric information between investors and issuers results in risk-insensitive cost of funding. For example, Keys et al. (2010) document that mortgage borrowers with FICO scores just above a threshold of 620 perform significantly worse than borrowers with FICO scores just below 620. As it is more difficult to securitize loans below that threshold, the authors argue that this result is consistent with issuers exploiting asymmetric information, disrupting the otherwise monotone relationship between borrower credit scores and performance. Although securitization has a relatively short history, it is a troubled one. The first known securitization transactions in the United States occurred in the 1920s, when commercial real estate (CRE) bond houses sold loans to finance CRE to retail investors through a vehicle known as CRE bonds. Wiggers and Ashcraft (2012) document the performance of these bonds, which defaulted in large numbers following the onset of the Great Depression. Although the sharp deterioration in economic conditions played an important part in explaining their poor performance, so did aggressive underwriting and sales of the bonds in small denominations to unsophisticated retail investors. Over-reliance on credit ratings can create problems when the rating agencies face their own agency problems. For example, Mathis, McAndrews, Rochet (2009) analyze a dynamic model of ratings where reputation is endogenous and the market environment may vary over time. The authors' model predicts that a rating agency is likely to issue less accurate ratings in boom times than it would during recessionary periods. Moreover, the authors demonstrate that competition among rating agencies yields similar qualitative results. Xia and Strobl (2012) document that the conflict of interest caused by the issuer-pays rating model leads to inflated corporate credit ratings. Cohen (2011) documents significant relationships between variables that should not affect a CRA's view of the credit risk of conduit/fusion CMBS transactions issued during 2001-07, but that would affect issuers' and CRAs' incentives in an environment where rating shopping was present.

vi) Private Money Creation

Gorton and Metrick (2011, 2012) argue that an important aspect of shadow credit intermediation is its role in money creation. The creation of money like shadow bank liabilities complement traditional forms of money creation. High powered money can only be created by central banks. Commercial banks create broader forms of money, such as checking accounts and savings accounts. Treasury bills also have money like features due to their liquidity and safety. Shadow bank money creation occurs primarily in the commercial paper market and the repo market, and is funded by money market funds and short term investment funds. Money plays a crucial role in the economy, acting not only as a store of value, but also as a unit of account and means of exchange.

The role of shadow liabilities in the overall money supply is explored by Sunderam (2012), who analyses the extent to which shadow banking liabilities constitute substitutes for high-powered money. He shows in a simple model that shadow bank liabilities should constitute substitutes for money in the private sector's asset allocation. Empirically, Sunderam shows that shadow banking liabilities respond to money demand, extrapolating that heightened money demand can explain about half of the growth of ABCP in the mid-2000s. He also confirms that regulatory changes to ABCP played a significant role in the growth of the shadow banking system. Moreira and Savov (2012) study the impact of shadow money creation on macroeconomic fluctuations. Intermediaries create liquidity in the shadow banking system by levering up the collateral value of their assets. However, the liquidity creation comes at the cost of financial fragility as fluctuations in uncertainty cause a flight to quality from shadow liabilities to safe assets. The collapse of shadow banking liquidity has real effects via the pricing of credit and generates prolonged slumps after adverse shocks.

vii) Short-term Funding and Runs

The financial frictions that lead to excessive risk taking and exacerbated credit losses during downturns also interact with the fragility of funding. Per definition, funding sources for shadow banking activities are uninsured and thus runnable. In many ways, the fragility of shadow banks due to the run-ability of liabilities resembles the banking system of the 19th century, prior to the creation of the Federal Reserve and the FDIC. During that time, bank runs were common, and they often had severe consequences for the real economy.

The shadow banking system's vulnerability to runs bears resemblance to bank runs as modeled by Diamond and Dybvig (1983). Shadow banks are subject to runs because assets have longer maturities than liabilities and tend to be less liquid as well. While the fundamental reason for commercial bank runs is the sequential servicing constraint, for shadow banks the effective constraint is the presence of fire sale externalities. In a run, shadow banking entities have to sell assets at a discount, which depresses market pricing. This provides incentives to withdraw funding—before other shadow banking depositors arrive. However, the analogy between bank runs and shadow bank runs goes only so far. The reason is that shadow bank entities do not offer demand deposits, but instead obtain funding in wholesale money markets such as commercial paper or repo. Martin, Skeie, and von Thadden (2011) provide a model for a run in repo markets that takes the empirical facts of the Bear Stearns and Lehman crises as a starting point. In their model, repo borrowers face constraints due to the scarcity of

collateral and the liquidity of collateral. Under sufficiently adverse conditions, self-fulfilling runs can occur. The model focuses in particular on the differences between the tri-party repo market and the bilateral repo market (see Adrian, Begalle, Copeland, and Martin (2013) for an overview of both markets). Arguably, runs occurred in both markets, but they were of very different natures. While the run in the bilateral market was characterized by a sharp increase in haircuts (as documented by Gorton and Metrick (2012)), the run in the tri-party repo market materialized as a simple withdrawal of funding with a rather limited impact on the level of haircuts (see Copeland, Martin, and Walker (2011)). Runs in the ABCP market were equally characterized by a withdrawal of funding (see Covitz, Liang, and Suarez (2012)). Gallin (2013) provides a comprehensive map of the amount of short term funding from the shadow banking system to the real economy, based on the flow of funds statistics. Gallin's framework shows that much of the decline in credit supply in the crisis was due to the decline of short term shadow bank funding. Gallin's work can be used to quantify fragility in shadow bank funding over time.

3. Shadow Bank Policies

The discussion of the economics of shadow banking in the previous section has demonstrated that some shadow banking activities are just market based credit intermediation with specialized financial institutions, while others are regulatory arbitrage responses to particular regulations, and yet others are outcomes of market failures. Shadow banking activities are generally vulnerable due to the absence of government backstops, and such vulnerabilities can create externalities for other parts of the financial sector. The regulation of shadow banking activities aims to correct market failures, government failures, and other distortions. Of particular concern is the systemic nature of certain shadow banking activities, i.e. the potential of distress in the shadow banking system to cause distress in other parts of the financial system, and ultimately the real economy.

While the case studies in sections 4., 5., and 6. present specific policy options in three shadow credit intermediation examples, the current section will discuss general principals that are motivated from the previous discussion on the economics of shadow banking. I discuss policy options for each of the seven economic mechanisms that were presented in Section 2.

i) Specialization

Specialization has many economic benefits, and in well functioning markets, specialized intermediaries are likely to increase economic efficiency. However, credit intermediation chains in specialized institutions can be subject to externalities along the chain. While credit intermediation within one and the same bank internalizes some of these externalities, credit intermediation along a chain of intermediaries can pass market failures on from one part of the chain to the next. Financial stability policies thus have to aim at internalizing such externalities, which depends on specific forms of the externality at each step of the chain. Externalities in shadow banking can be generated by network externalities, runs, leverage cycles due to risk management constraints, among other. Policies to address such externalities are specific to each shadow banking activity. The case studies in sections 4-6 discuss specific examples.

ii) Mispriced Guarantees from Government Backstops

Government guarantees consist primarily of the liquidity backstop by the Federal Reserve, and the credit backstop by the Federal Deposit insurance. The backstops are created to ensure the stability of the traditional commercial banking system, particularly due to bank runs. The regulation of depository institutions by the Federal Reserve and the Federal Deposit Insurance Corporation is motivated by the moral hazard that is created by the backstops. Many shadow banking activities benefit indirectly from the backstops, via the pricing of tail risk for both liquidity and credit. To the extent that shadow banking institutions benefit indirectly from government backstops, without, however, being subject to the same prudential regulation as depository institutions, policies have to aim at either expanding the regulatory reach, or else at adjusting the pricing of government backstops.

In the aftermath of the financial crisis, both routes have been undertaken. The prudential regulatory reach has been expanded by the creation of the Financial Stability Oversight Council, as well as fundamental reforms to the regulation of banks, bank holding companies, and other credit intermediaries. In addition, the pricing of government guarantees has been adjusted. For example, the assessment fee of the Federal Deposit Insurance Corporation has been changed to better reflect the systemic footprint of member banks. Capital regulations have been tightened to reflect the size, interconnectedness, and complexity of financial institutions, leading to an increase in the pricing of government backstops that are passed to shadow banking activities.

iii) Regulatory Arbitrage

A number of shadow banking activities consist of regulatory arbitrage, primarily with the aim of minimizing capital requirements of core regulated institutions such as banks, dealers, or insurance companies. In the banking sector, capital requirements represent the primary regulatory tool, and much regulatory arbitrage activity aims at circumventing such requirements. The first order policy response to such regulatory arbitrage activity is, of course, to change capital requirements in such a way that the arbitrage will be prevented. Indeed, the Basel III capital regulation has closed many loopholes in capital regulation, preventing regulatory capital arbitrage. However, it is too early to tell to what extent new regulatory arbitrage activities will emerge in the future. In addition, new regulations such as liquidity rules might be arbitraged once fully implemented. The case study on shadow insurance in section 6 provides a discussion of policy actions that can mitigate a particular form of capital arbitrage in the insurance sector.

iv) Neglected Risk

Neglected risks can arise due to behavioral reasons, or as an equilibrium phenomenon due to adverse selection. In general, the excessive buildup of risk due to neglected risk can be mitigated with reporting requirements and shadow bank risk monitoring systems. Indeed, after the financial crisis, much effort has been put into better reporting systems. For the banking system, stress tests have become the primary tool to assess forward looking risks. The tests include, at least to some extent, stresses due to balance sheet exposures to the shadow banking system. For the broader financial system, the Office of Financial Research has as goal to collect and analyze data in order to assess system wide risk, including in the shadow banking system. Furthermore, the Dodd-Frank Act provides regulatory agencies in the

U.S. with a broad mandate to regulate risk in the system as a whole, not just the risk of individual financial institutions. Internationally, the Financial Stability Board (2013a) is leading a global effort to analyze and collect data on shadow banking activity, and to propose regulations to mitigate risks emanating from such activities. Of course, risk reporting systems only go so far in being able to mitigate systemic shadow banking risks: risk negligence might be an equilibrium outcome, either due to behavioral biases or due to adverse selection. A first order question is to what extent regulators are subject to the same behavioral biases as market participants.

Adverse selection can be an equilibrium outcome in response to market frictions, generating informational insensitivity. Intuitively, funding liquidity in good times is only possible when funding arrangements are informationally insensitive. However, adverse shocks can lead to an unraveling of theses arrangement, leading to information sensitivity. Such unraveling can be excessive, justifying public liquidity injections. Hence optimal policies relative to information insensitivity are ex-post backstops that mitigate market breakdowns due to adverse selection. Of course, the challenge of such policies are the information asymmetries that central bank faces. Gorton (2009) argues that the collapse of securitization activity was triggered by the emergence of synthetic products that allowed the shorting of the housing market. In particular, the ABX, a synthetic index of subprime mortgage-backed securities, was created shortly before the financial crisis. The ABX allowed market participants to take short positions in subprime mortgages, and lead to an unraveling of information opacity in securitized credit markets. One of the policy responses of the Federal Reserve to the collapse of securitization activity was the creation of the Term Asset-backed Securities Loan Facility (TALF) as described by Ashcraft, Malz, and Pozsar (2011). Under the program, the Federal Reserve extended term loans collateralized by securities to buyers of certain high-quality ABS and CMBS, with the intent of reopening the new-issue ABS market. Through the TALF program, the Federal Reserve was able to prevent the shutdown of lending to consumers and small businesses, while limiting the public sector's risk. While such backstops might be optimal ex-post, from an ex-ante perspective, tighter regulation is likely optimal (Farhi and Tirole 2012).

v) Agency Problems

Many reform efforts since the financial crisis have aimed at mitigating agency problems in the shadow banking system, particularly in the securitization process, and for credit rating agencies. The Dodd-Frank Act requires credit risk retention by securitizers (see Adrian, 2011). The risk retention is designed to reduce the moral hazard problem arising from the fact that mortgages and loans that are securitized are sold in the market place, and the underwriter thus generally does not have the right incentives to monitor underwriting standards. The risk retention provisions of the Dodd-Frank Act aims at investor protections and improvements to the regulation of securities. Securitizers are forced to retain not less than five percent of the credit risk of any asset that they sell through the issuance of an ABS, and prohibit securitizers from directly or indirectly hedging or otherwise transferring the retained credit risk. The issuer must disclose the amount and form of retention to investors, and must provide material assumptions which justify the aggregate face amount of liabilities. A menu approach to risk retention is offered where vertical, horizontal, or a mix of vertical and horizontal tranches can be retained. "Vertical" retention refers to holding a portion of all tranches, while under "horizontal" retention the securitizer retains a first-loss tranche restricted to receive only scheduled principal. The rule also includes a

"premium capture mechanism" that disallows securitizers from structuring interest only securities which transfer the full cash value to the equity tranche holder at the time of issuance. The premium capture mechanism prevents the structuring of the equity tranche in such a way that the incentive alignment is removed as cash flows are no longer sensitive to the credit quality of the underlying securities. If the issuer of the security is a bank, the capital requirement applied to the retained risk is a key consideration for the economic rationale of securitization.

The reform of credit rating agencies has aimed at lowering conflicts of interest. The Securities and Exchange Commission, which gained oversight of the credit rating agencies in 2006, has started to implement rules that aim at removing conflicts of interest since 2009 (see Adrian and Ashcraft 2012a for a discussion). For example, agencies are prohibited from structuring the same product that they rate, and analysts are not allowed to receive gifts exceeding $25 from companies that they rate. Furthermore, agencies are required to publish statistics about the performance of their ratings after 1, 3, and 10 years. Furthermore, the Dodd-Frank Act provided the Commission with greater authority over credit rating agencies with respect to disclosure, governance, and conflicts of interest. Credit rating agencies have to provide more granular information about their ratings methodology, and the assumptions underlying particular ratings. Material changes to ratings methodology need board approval. Furthermore, sales and analysis within credit rating agencies has been separated. Changes to the rating agency compensation model could furthermore have significant consequences. Investors are too small to have a meaningful influence over issuers to generate appropriately risk-sensitive funding, which suggests the need to either coordinate to have market power or have an agent negotiate with only their interests in mind. As coordination between investors might raise antitrust issue, hence making rating agencies effective representatives of investors is likely an important part of mitigating conflicts of interest. However, as long as agencies are chosen and paid by the issuer, it seems difficult to imagine them working exclusively as a fiduciary of investors. While a number of solutions are being discussed, the right conceptual model would appear to be rating agency risk retention. This might involve rating agencies being compensated for their services by the sponsor in the form of a vertical slice of securities rated. Alternatively, this might involve rating agencies having balance sheets, and only being permitted to disclose ratings to investors if they hold a vertical share of a security outstanding.

vi) Private Money Creation

One role of the shadow banking system, emphasized by Gorton and Metrick (2012), is the creation of safe collateral that can be used in money markets. In particular, AAA tranches of securitized products were used as collateral in repo markets, and ABCP funded conduits of long term, risky mortgage pools prior to securitization. The first order policy response to a shortage of risk free collateral is the regulation of aggregate liquidity through the management of the maturity structure of government debt, and the management of aggregate liquidity in the banking system. Stein (2012) develops a conceptual framework to assess these issues in the context of an equilibrium model. Stein argues that the central bank can regulate aggregate financial stability risk via the amount of reserves in the banking system. Shortages of collateral are met by the creation of short term wholesale shadow funding, which are subject to run risk, leading to inefficient fire sales. Demand pressures for short term debt can be measured via the spread between the interest on excess reserves, and the federal funds rate. By

supplying liquidity in the federal fund market, and setting the interest on excess reserves, the central bank can influence the availability of liquidity in the banking system and thus regulate incentives for shadow bank money creation. Stein, Hansen, and Greenwood (2010) investigate the role of the maturity structure of government debt for incentives of the private sector to generate risk free collateral. They document that corporations tend to issue risk free debt at times when there is a shortage of Treasury collateral. Sunderam (2012) uncovers a similar mechanism for asset-backed commercial paper issuers, who respond to shortages in money markets. Krishnamurthy and Vissing-Jorgensen (2012) show an explicit link between the shortage of money like assets and financial crises. Financial stability considerations in the creation of risk free collateral by the Treasury and the central bank to regulate the extent to which the shadow banking system creates potentially vulnerable substitutes thus seems to be a goal for shadow bank policies.

vii) Short-term Funding and Runs

Policy efforts with respect to runs in wholesale funding markets have been primarily concentrated on money market funds, and the triparty repo market. While some progress has been achieved since the financial crisis, the risk of runs has not been eliminated. A 2010 reform of the money market fund sector by the Securities and Exchange Commission has tightened liquidity risk and credit risk constraints. Currently, three main reform proposals are under discussion. The first consists of the abolishment of the stable net asset value. Purchases and redemptions in money market fund shares are rounded to the nearest penny, and are not marked to market, except when asset values fall below $0.995, at which point the fund breaks the buck. Due to this stable net asset value rule, investors treat money market funds like demand deposits. However, once a fund breaks the buck, there is no public backstop, making the funds vulnerable to runs. While the abolishment of the net stable asset rule is likely to reduce run risk, it is important to note, however, that money market funds in countries with floating net asset values have also experienced runs. The second reform proposal is to institute capital requirements for money market funds, similar to the capital requirements imposed on banks (see McCabe, 2011). Capital requirements move the default barrier of the funds, allowing some losses in their portfolios without triggering bankruptcy. The equity tranche of the funds could be publicly traded at different prices than the safe money market shares. While a capital requirement can make default less likely, it certainly does not rule it out, and thus does not eliminate run risk entirely. A third proposal consists of a liquidity requirement called “minimum balance at risk”, which consists of a liquidity buffer that minimizes incentives for runs (see McCabe, Cipriani, Holscher, Martin, 2012).

The triparty repo market reform addresses three shortcomings in the triparty repo market: 1) the heavy reliance of market participants on intraday credit extension, 2) the weaknesses in credit and liquidity risk management practices by market participants, and 3) the lack of a mechanism to ensure that tri-party repo investors do not conduct disorderly fire sales immediately following a dealer default. The reliance of market participants on intraday credit is addressed via technological changes by the tri-party repo clearing banks, which is expected to lead to an elimination of this type of credit by late 2014. Risk management practices of dealers have improved due to heightened supervision of the largest dealers, leading to a decline in the fraction of overnight repo funding. The risk of fire sales in the event of a dealer failure remains an open issue, without any obvious solution.

4. Case Study 1: Agency Mortgage REITS

A) Economics of Agency REITs

Real estate investment trusts (REITs) are investment vehicles that primarily invest in real estate related assets. Agency mortgage REITs (agency REITs) are specialized REITs that invest in mortgage backed securities (MBS) issued by U.S. government sponsored agencies (Fannie Mae, Freddie Mac, and Ginnie Mae). While there are hundreds of publicly listed REITs in the U.S., the publicly listed agency REIT market consists of only a handful of companies, the majority of which were created since the financial crisis (see Figure 2). In 2013, there were 14 publicly traded agency REITs in the U.S., owning over $350 billion of agency MBS. While the latter only represents around seven percent of the total outstanding agency MBS, the ownership share of agency REITs in that market has grown rapidly in recent years, as can be seen in Figure 3.

U.S. REITs are exempt from specific provisions of the Investment Company Act due to the large fraction of their assets invested in real estate related assets. In particular, the SEC requires REITs to invest at least 55 percent of their assets in mortgages or qualifying real estate interests, and at least 80 percent of assets in qualifying real estate interests and assets. Due to the exemption from the Investment Company Act, REITs in general, and agency REITs in particular, are exempt from limits of leverage and other SEC regulations though, as publicly listed entities, they are subject to the SEC's investor protection rules and have to file reports such as 10Qs. However, agency REITs aren't subject to prudential regulation.

REITs are also special with respect to their tax status. As long as REITs distribute at least 90 percent of their taxable net income annually, they avoid paying corporate taxes. To the extent that those distributions are done in the form of dividends, they are taxed at the shareholders' income tax rate, thus avoiding double taxation. The dividend yield of REITS in general, and agency REITs in particular, tend to be relatively high due to the high level of distributions required to avoid corporate taxation.

The business model of agency REITs relies on liquidity and leverage, but not credit transformation. Mortgage REITs obtain leverage in the bilateral repo market, from the broker-dealer sector. The repo contracts limit the amount of leverage that REITs can obtain. Since the financial crisis, haircuts for agency MBS have increased. The current level of leverage is between 6 and 10, down from 10 to 16 pre-crisis, according to the 10K filings of the largest agency REITs. There is no credit transformation, as agency MBS only contain interest rate, prepayment, and liquidity risk, but no credit risk. The rapid growth of assets under management in the agency REIT sector since the financial crisis can be primarily attributed to the interest rate environment. As expansionary monetary policy has resulted in low yields across the maturity spectrum, investors have been reaching for yield by allocating funds to levered investments. As a result, agency REITs, bond mutual funds (and particularly high yield mutual funds) as well as collateralized loan obligations have grown rapidly. The high degree of leverage and the above mentioned requirement to pay out at least 90 percent of net income in order to achieve tax exemption results allows agency REITs to generate dividend yields that are among the highest among traded stocks. For example, in recent years, the largest agency REITs have achieved dividend yields around 20 percent in recent years, despite longer term interest rates that are only around two to three percent.

B) Risks of Agency Mortgage REITs

Agency REITs are exposed to two main sources of risk, duration risk and liquidity risk. Duration risk arises as their assets are longer term MBS, while liabilities are repos. Hence when the slope of the yield curve steepens, agency REITs experience mark to market looses on their mortgage holdings. This can be seen from the historically tight relationship between return on assets and the slope of the yield curve (see Figure 4). A steeper yield curve thus generates losses, translating into a fall of the REITs' equity value. In addition to slope risk, agency REITs hold convexity risk. Convexity risk arises also in a rising yield environment. As agency mortgage pools consist of mortgages that can be prepaid, rising interest rates makes prepayment less likely, extending the duration of mortgages. The duration extension in a rising yield environment generates "negative convexity", meaning that the price of MBS is more and more sensitive to increasing rates, the higher rates are. Negative convexity has been linked to past bond market selloffs, particularly in 1994 and 2003.

Agency REITs are exposed to market liquidity and funding liquidity risks. Market liquidity risks arise in the agency MBS market during selloffs, as witnessed during the financial crisis in 2008 and the selloff in 2013. In selloffs, prices on agency MBS can be depressed due to fire sale externalities, leading to mark-to-market losses by agency REITs, and a corresponding decline in their book equity. The leveraged nature of agency REITs means that adverse price movements of agency MBS due to illiquidity have a magnified impact on their equity cushion: when leverage is 10, a one percent loss of agency MBS prices leads to a 10 percent loss of book equity.

Funding liquidity risk arises for agency REITs because their repo funding is short term, typically with either an overnight or a month long maturity. If money market investors suddenly withdraw funding to dealers, those can no longer pass funding onto agency REITs, exposing the REITs to liquidity risk. In addition, dealers might increase haircuts when liquidity and rate risk of agency MBS is judged higher, exposing REITs to the possibility of forced deleveraging. In fact, during the financial crisis, repo funding of agency MBS became severely distorted, leading the Federal Reserve to start a special financing program called "Term Securities Lending Facility." In addition, distress of the securities broker-dealer sector, as experienced in 2008, can further impact the funding liquidity of agency REITs.

Agency REITs can contribute to systemic risk during times of sharply increasing longer term interest rates by magnifying rates selloffs. Rising interest rates can force REITs to fire sale agency MBS, as agency REITs tend to manage their leverage ratio. Rising rates lead to market-to-market losses and hence a decline in their equity cushion, thus involuntarily increasing their leverage ratio. In order to restore target leverage, REITs have to sell MBS, thus contributing to market illiquidity and rising rates. The adverse rate and liquidity effects might spill over to other institutions, such as mutual funds, money market funds, insurance companies, and pension funds. Indeed, during the sharp rise in interest rates in the summer of 2013, agency REITs did sell significant amounts of agency MBS.

If the sector grows significantly larger in coming years, the high leverage and dependence on repo market funding might increase the systemic footprint of agency REITs. Endogenous adverse feedback loops in the agency MBS market might be exacerbated by the presence of leveraged investment vehicles that do not have access to lender of last resort facilities. The concern that risk management by REITs via

selloffs in a rising rate environment is further magnified by the relative size of their agency holdings in comparison to the dealer broker sector. Figure 5 illustrates that the size of agency MBS holdings by REITs has become very large relative to the agency MBS holdings of the securities broker-dealer sector.

C) Financial Stability Policies

Financial stability policies to address the systemic risks emanating from agency REITs can consist of policies aimed at improving the resilience of the repo market, enhanced disclosure requirements for REITs, and indirect regulation via supervised bank holding companies (BHCs).

A recent study by the Financial Stability Board (2013b) has explored policy options to ensure the stability of shadow bank intermediation in relation to repo and securities lending markets. The recommendations of the FSB include the collection of more granular data on such activities, regulatory regimes for securities lenders and their agents, limits on the rehypothecation of client collateral, minimum standards for collateral valuation, and the review of the law governing bankruptcies that involve repo contracts. All of these recommendations aim at making repo and the (closely intertwined) securities lending market more resilient, which in turn helps to solidify funding liquidity of agency REITs, among other repo market borrowers. Of course, policies that enhance the resiliency of the broker-dealer sector, the triparty repo market, and the money market fund sector will also enhance the funding liquidity of agency REITs. While such improvements of the repo market infrastructure benefit all repo market participants, agency REITs are likely beneficiaries due to their highly leveraged nature, and singular dependence on repo funding.

The second set of policies to mitigate systemic risks emanating from the agency REIT sector consists in data reporting and disclosure requirements. One of the cornerstones of regulations is the disclosure of data to investors, which allows market forces to constrain the behavior of financial institutions. The exemption of REITs from the Investment Company Act also implies exemption from more granular disclosure requirements that other investment vehicles are subjected to, such as disclosure of securities holdings and hedges. The Office of Financial Research, created by the Dodd-Frank Act, has an explicit mandate to collect data for institutions and activities that can potentially endanger the financial system, and whose data is not adequately collected by other agencies. The OFR has broad subpoena power that ensures its ability to collect data, even though it does not have any supervisory or regulatory authority.

A third avenue to address systemic risks emanating from the agency REIT sector is via the supervision of the counterparty credit risk management of the dealers that provide leverage via the bilateral repo market. As agency REITs rely on the dealers to obtain leverage, they are closely monitored by the counterparty risk management functions of dealers. This is putting constraints on the amount of interest rate risk, prepayment risk, and liquidity risk that the REITs can obtain. As most major dealers are now part of BHCs, Federal Reserve supervision has some indirect lever over the risk taking of the REIT sector. However, the constraint on this policy option is that there are major dealers that are not part of bank holding companies, as well as foreign dealers through which REITs can trade. Hence the effectiveness of the indirect supervision channel is limited at best.

5. Case Study 2: Leveraged Lending

A) The Economics of Leveraged Lending

Leveraged loans are loans extended to firms with credit ratings below investment grade. Leveraged loans are used to fund ongoing investments such as capital expenditures and working capital, and also to finance corporate events. The latter category includes leveraged buyouts of publicly listed firms. Leveraged loans are typically structured as floating rate balloon loans with limited amortization, making their performance highly dependent on refinancing conditions. The term of leveraged loans is usually between five and seven years. Defaults on leveraged loans is sensitive to macroeconomic conditions, varying between one and twelve percent annually depending on the state of the credit cycle. Leveraged loans are typically collateralized and senior to other debt instruments, yielding high recovery rates of 70 percent on average, which is higher than recovery rages for corporate bonds.

The shadow credit intermediation chain of the leveraged loan market is represented in Figure 6. Issuers consist of speculative grade corporations. Issuance is facilitated by the syndication desks of investment banks which also provide warehouse funding for loans that are securitized. Securitization of leveraged loans is via collateralized loan obligations (CLOs), which are portfolios of loans that are structured into different tranches according to their riskiness. The AAA tranche of a CLO makes up around 70 percent of total face value and is typically sold to banks. The mezzanine tranche makes up around 22 percent of the CLO and tends to be sold to insurance companies, pension funds, and asset managers. The equity tranche is around eight percent of the CLO and tends to be sold to hedge funds, private equity firms, or independent CLO managers. CLOs are leveraged structures that perform some maturity transformation, and can be used for risk arbitrage. Around 55 percent of leveraged loans were securitized by CLOs in 2013, while the remaining 45 percent were sold outright to insurance companies, asset managers, mutual funds, and exchange traded funds.

B) Risks in Leveraged Lending

Leveraged lending collapsed in 2008 after peaking in 2007 of $680 billion. In the aftermath of the financial crisis, leveraged lending rebounded quickly, reaching nearly $1 trillion in 2013 (see Figure 7). While issuance has been at record levels, part of that has been for purposes of refinancing. While the total amount of outstanding leveraged loans has been growing rapidly in the pat two years, the change from year to year is less than total issuance volumes (compare Figures 7 and 8). Refinancing activity reflects the low interest rates in recent years, as well as the rolling over of maturing loans. Leveraged buyouts are low by historical standards, and corporate events more generally have not been a primary source of leveraged lending activity. Credit metrics of leveraged buyouts have not deteriorated, with average Debt-to-EBITA and EBITA-to-debt service within historical norms to date. However, there is some evidence of increasing leverage as Debt-to-EBITA for the high yield sector that requires further monitoring.

The fraction of covenant lite loans has increased significantly from zero in 2010 to 60 percent in 2013, raising financial stability concerns. This deterioration in loan underwriting has come hand-in-hand with an increased presence of retail investors in the leveraged loan market primarily through mutual funds and exchange traded funds (see Figure 9). Such investors are relatively less sophisticated than banks and

hedge funds whose share in leveraged loan ownership is declining (though not necessarily their overall amount of holdings). The funding of leveraged loans by mutual and exchange traded funds represents a financial stability risk, as the loans have long maturities, are opaque and are inherently risky. Mutual and exchange traded fund shares, on the other hand, are demandable on a daily basis. These funds thus engage in maturity and credit transformation. The funding of leveraged loans on balance sheets that perform maturity and credit transformation makes the activity classifiable as shadow credit intermediation. While leveraged loan funds do use risk management techniques such as minimum liquidity holdings and backup lines of credit, such hedges are inherently expensive, and unlikely to withstand a major selloff of leveraged loans.

In the leverage lending intermediation chain presented in Figure 6, the largest leverage risk is found in hedge funds and in CLOs' equity tranches, exposing these investors to high losses. However, in both cases the maturity transformation is not high, as the liabilities are not of a short-term nature, so forced unwinding is generally not a concern. The largest liquidity transformation is found in mutual funds and ETFs, which have grown significantly. As liquidity is normally robust, investors expect to be able to sell out of positions in market downturns, but may find liquidity is absent when they most need it. CLOs engage in risk arbitrage to secure equity returns. CLO AAA spreads are materially wider than corporate AAA bonds, but also experienced significant spread widening during the crisis.

C) Leveraged Loan Policies

Banking agencies have recently issued new regulatory guidance on leveraged lending (supervisory rule 13-03[2]). The rule is important as it takes a macroprudential approach to the supervision of underwriting standards for leveraged lending. While supervision is historically concerned with the safety and soundness of individual institutions, the Dodd-Frank Act of 2010 has given regulatory agencies an explicit mandate to ensure the safety and soundness of the financial system as a whole. The way in which SR 13-03 implements that mandate is by requiring examiners of banks that underwrite leveraged loans to enforce underwriting standards even if those loans are not intended to be held by the bank in question. This is in contrast to some of the supervisory rules prior to the financial crisis, when poor underwriting of loans (or mortgages, for that matter) was not prevented as long as the loans under question were resold in the market place.

The rule provides specific guidance to examiners when reviewing leveraged lending, including standards for underwriting of specific loans, as well as overall risk management. The underwriting guidelines will raise scrutiny in the face of excessive leverage, limited amortization, and over-reliance on refinancing. As explained above, these underwriting standards apply both to loans intended for distribution as well as for the bank's own portfolio. Guidance related to risk management requires institutions to have a clearly articulated risk appetite, limits for pipeline and commitments, as well as for the aggregate book and individual borrower concentration. Banks must stress test both the pipeline and retained portfolio, and hold adequate capital against all positions.

[2] See http://www.federalreserve.gov/bankinforeg/srletters/sr1303.htm.

6. Case Study 3: Captive Reinsurance Affiliates

A) Economics of Reinsurance

Reinsurance is the sale of risk from an insurance company to a reinsurance company. There are several motivations for reinsurance. First, reinsurance helps an insurer avoid concentrations in its own portfolio, permitting it to underwrite larger insurance policies by relaxing regulatory and economic capital constraints. Second, solicitation of third-party evaluation and pricing of risk can supplement the insurer's own evaluation and pricing, reducing uncertainty about the risk. Third, when markets are segmented, the insurer can earn arbitrage profits. Segmentation can be driven by reinsurers who have more expertise, are better able to diversify, or have different funding sources. The usage of reinsurance by insurance companies can thus enhance their efficiency and competitiveness. While the usage of reinsurance can be advantageous from the point of view of individual insurers, it might be costly from society's point of view. In particular, the usage of reinsurance can lead to laxer regulation, excessive risk taking, and a potentially higher burden for taxpayers in the case of insurance company distress.

One particular form of reinsurance is captive reinsurance, where an insurance company purchases reinsurance from an affiliate, reducing the cost of regulation of the insurer. Captives are subject to different accounting rules that facilitate lower reserves. In addition, captives do not face regulatory capital requirements, thus offering a regulatory arbitrage opportunity for insurers. While insurance company regulation imposes restrictions on liquidity and credit risk taking, captives are generally not subject to these rules. Captives also face weaker transparency requirements limiting market discipline. Unlike insurance companies, captives are able to back reinsurance with low cost letters of credit or parental guarantees instead of more expensive capital. In a typical captive insurance arrangement, risk is transferred from the insurance company to the parent, which reduces the insurance company's regulatory capital requirements. The arrangement permits the consolidated organization to lower capital requirements, thus enhancing return on equity. Many captive reinsurance agreements are backed by letters of credit from the holding company to the captive reinsurer (see Figure 10). Alternatively, the captive reinsurer can be guaranteed with a letter of credit from a bank, which is in turn guaranteed by the holding company. The bottom line is that while risk is transferred out of insurance subsidiaries, it is still part of the holding company, i.e. it is not transferred out of the holding company. However, the required capital is lower for the captive.

Insurance company regulators have the authority to reject transactions with a captive. However, insurance companies are regulated at the state level, and not the holding company level. From the state's point of view, risk transfer to captives represents a reduction in the risk at the subsidiary, even though the risk at the holding company level might not experience a decline of risk, and typically experiences increased risk due to the lower capital requirement at the captive. Insurance companies argue that captive insurance is used to reduce the cost of excessively conservative regulation, which require them to hold reserves above the actuarial risk of their insurance policies. Moreover, captive reinsurance helps to protect the insurance company from the capital market volatility of variable-rate annuities. As the insurer provides a guaranty on the principal value of these investments, they are required to increase reserves when the market value of those investments declines in value, which

reduces earnings and capital of the insurance company. The use of a captive insurance reduces volatility in regulatory capital ratios of the regulated entity. Furthermore, insurer provides guaranty on the principal value of these investments, they are required to increase reserves when the market value of those investments declines in value, which reduces earnings and capital of the insurance company.

B) Risks of Captive Reinsurance

Life insurers' reinsurance to captives has grown significantly in recent years, from $11 billion in 2002 to an estimated $364 billion in 2012 according to Koijen and Yogo (2013), see Figure 11. Koijen and Yogo further document that captive reinsurance is primarily used by the largest insurance companies which are estimated to cede one quarter of all insured dollars to shadow reinsurers in 2012. Koijen and Yogo further estimate that risk based capital is reduced by 53 percentage points due to the usage of captives. They estimate that that the total amount of this risk transfer corresponds to a three notch ratings downgrade. The authors argue that the cost of life insurance is significantly impacted by the usage of captives, as is the risk of the companies who are using them. The usage of shadow insurance is thus quantitatively large, and has a potentially significant impact on the risks in the insurance sector.

The growth of captive reinsurers has been attracting the attention of regulators. For example, the New York State Department of Financial Services recently issued a report highlighting findings from a study of reinsurance captives.[3] The New York state regulators refer to the activity as "shadow insurance," noting broader financial stability concerns, and calling for a moratorium on new activity. In the report, the regulators note significant volume of activity, significant reductions in regulatory capital ratios, inconsistent and incomplete disclosure to the market and regulators, and evidence of a regulatory race to the bottom.

A December 2013 study by the Federal Insurance Office of the U.S. Treasury on the modernization and improvement of insurance regulation in the U.S. pursuant to the Dodd-Frank Act argues that reinsurance captives for life insurance companies represent two risks.[4] Reinsurance captives allow an insurer to receive credit against its reserve and capital requirements by transferring risk to the captive even though the captive is not bound by consistent capital rules across the states. Reinsurance captives can be established with a small percentage of the capital required to establish a commercial insurance license in the same state. In particular, the standards that govern the quality of capital that reinsurance captives must hold are not sufficiently robust. For example, some state laws currently allow intra-company letters of credit, parental guaranties, or intra-company guaranties to constitute capital for captives. These instruments may not be sufficiently loss-absorbing if a significant adverse event were to occur. In many cases, a significant adverse event would cause a captive to fail and spread losses retained within the holding company or to another affiliate within the group, thereby accentuating group risk.

[3] See http://www.dfs.ny.gov/reportpub/shadow_insurance_report_2013.pdf.
[4] See http://www.treasury.gov/initiatives/fio/reports-and-notices/Documents/How%20to%20Modernize%20and%20Improve%20the%20System%20of%20Insurance%20Regulation%20in%20the%20United%20States.pdf.

The Federal Insurance Office also points to the lack of transparency regarding the risk transfer to captives. The lack of transparency is not just vis-a-vis investors and the public, but also with regard to regulators. While financial statements of traditional insurers are made publicly available, the financial statements of captives are kept confidential between the captive manager and the domestic state. This is particularly troublesome in light of the limits on state regulatory authority, as state regulators must rely on information from another state in which a reinsurance captive is domiciled.

C) Financial Stability Policies for Insurance Captives

Insurance company regulators have the authority to reject transactions with a captive. However, the fragmented nature of insurance regulation in the U.S. represents a high hurdle. Disclosure requirements limit regulators ability to assess the extent to which insurance companies transfer risks to captives in other states. Furthermore, as captives tend to make the insurance subsidiary in a given state less risky, they tend to be approved, even if the holding company risk has not declined.

The Federal Insurance Office recommends for states to develop a uniform and transparent solvency and oversight regime for the transfer of risk to reinsurance captives. The oversight of captives should not only cover the liabilities transferred to a reinsurance captive, but also of the nature of the assets that support a reinsurance captive's financial status. In addition, the Office recommends for states to develop and adopt a uniform capital requirement for reinsurance captives, including a prohibition on those types of transactions that do not constitute a legitimate transfer of risk.

The National Association of Insurance Commissioners has put out a white paper with recommendations regarding the treatment of captives and other special purpose vehicles that includes accounting, confidentiality and reinsurance regulatory matters. However, the paper notes that state insurance regulators disagree about the regulation of captives, with some arguing for a nationwide level playing field, while others prefer the current regime of incomplete opacity and differential capital treatment.

Among the state regulator, the New York State Department of Financial Services has aggressively argues for a change in the regulation of life insurance captives by recommending disclosure requirements for captives of New York based insurers and their affiliates, by pressing the National Association of Insurance Commissioners to develop enhanced disclosure requirements for all jurisdictions. The New York regulator has also called for an immediate national moratorium on approvals of shadow insurance transactions until investigations are complete.

One avenue of regulation that is relevant for the captives of the largest, most systemically important insurance companies is the designation by the Financial Stability Oversight Council as systemically important financial institutions (nonbank SIFIs). Some of the largest insurance companies have recently been designated by the Financial Stability Oversight Council as systemically important, and will thus be subject to Federal Reserve supervision at the consolidated level. The designation of nonbank firms as systemically important is an important method of the Dodd-Frank Act to address the risk of so called "too big to fail" financial institutions.

The Dodd-Frank Act explicitly mandates that designated systemically important financial institutions have to be subject to *enhanced prudential standards*, which include enhanced risk-based capital and

leverage requirements, liquidity requirements, single-counterparty credit limits, stress testing, risk-management requirements, an early remediation regime, and resolution-planning requirements. Sections 165 and 166 of the Act also require that these prudential standards become more stringent as the systemic footprint of the firm increases. The Federal Reserve's proposed rules apply the same set of enhanced prudential standards to covered companies that are bank holding companies and covered companies that are nonbank financial companies designated by the Council.

In SR letter 12-23, issued on December 20, 2013, the Federal Reserve sets forth supplemental guidance regarding risk transfer considerations when assessing capital adequacy of large financial institutions. While the Federal Reserve generally recognizes that risk reducing transactions can represent sound risk management practices, the Fed points out that certain risk transfers to unconsolidated, sponsored affiliate entities give rise to supervisory concern as such transactions may result in a significant reduction of the capital requirements without a significant reduction of the firms' risk. To the extent that captive reinsurance affiliates lead to a reduction in regulatory capital for insurance holding companies, the Federal Reserve's treatment might become a binding constraint on the size of such affiliates.

7. Conclusion

Shadow banking activities evolve in response to changing regulations and market conditions. As a result of this evolution, policies towards financial stability for the shadow banking system need to adapt. While some of the risks that were relevant in the run-up to the financial crisis remain risks today, new shadow banking activities have emerged, requiring new policy approaches. For example, run and funding risks emanating from the triparty repo market and the money market fund sector remain current, while risks from ABCP conduits, SIVs, and CDOs have receded, in part due to regulatory and accounting changes. The discussions and case studies in this article also underline that shadow bank policies are highly specific to the particular activity under consideration. Policies cover areas as diverse as capital regulation, wholesale money market funding, insurance company structure, disclosure policies, underwriting standards, among many others.

Policies aimed at mitigating risks from shadow credit intermediation have to start with an analysis of the economic mechanism that motivates the particular activity. We have listed seven motivations for shadow credit intermediation. A major challenge for financial stability policies for shadow banking is the fragmented nature of the regulatory system in the U.S. The creation of the Financial Stability Oversight Council by the Dodd-Frank Act provides some additional scope for regulators to address threats from shadow banking, primarily via designation of nonbank financial institutions as systemically important. Policies will need to react dynamically to the changing financial landscape to contain threats effectively. Importantly, shadow bank policies need to take a system wide, macroprudential view, due to the tight interconnections and potentially powerful spillovers among shadow banking entities, and between shadow banks and core regulated financial institutions.

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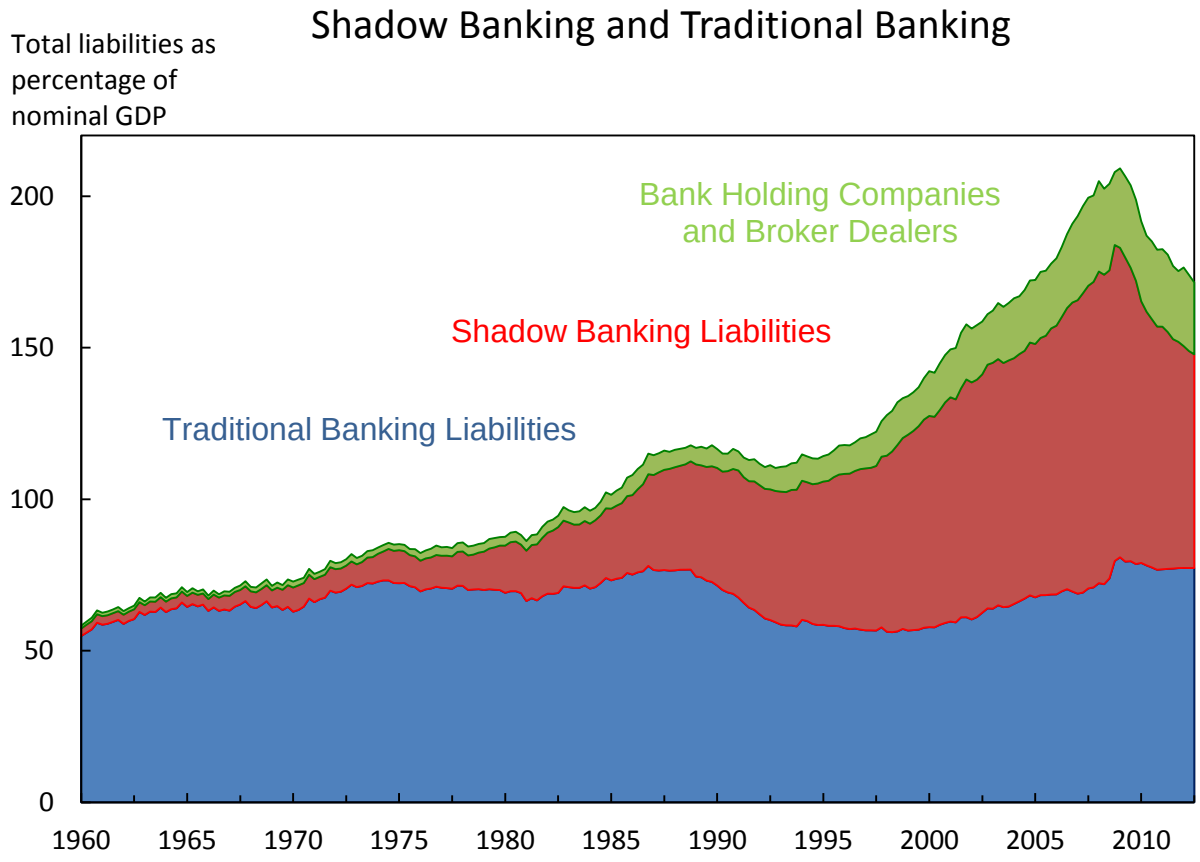
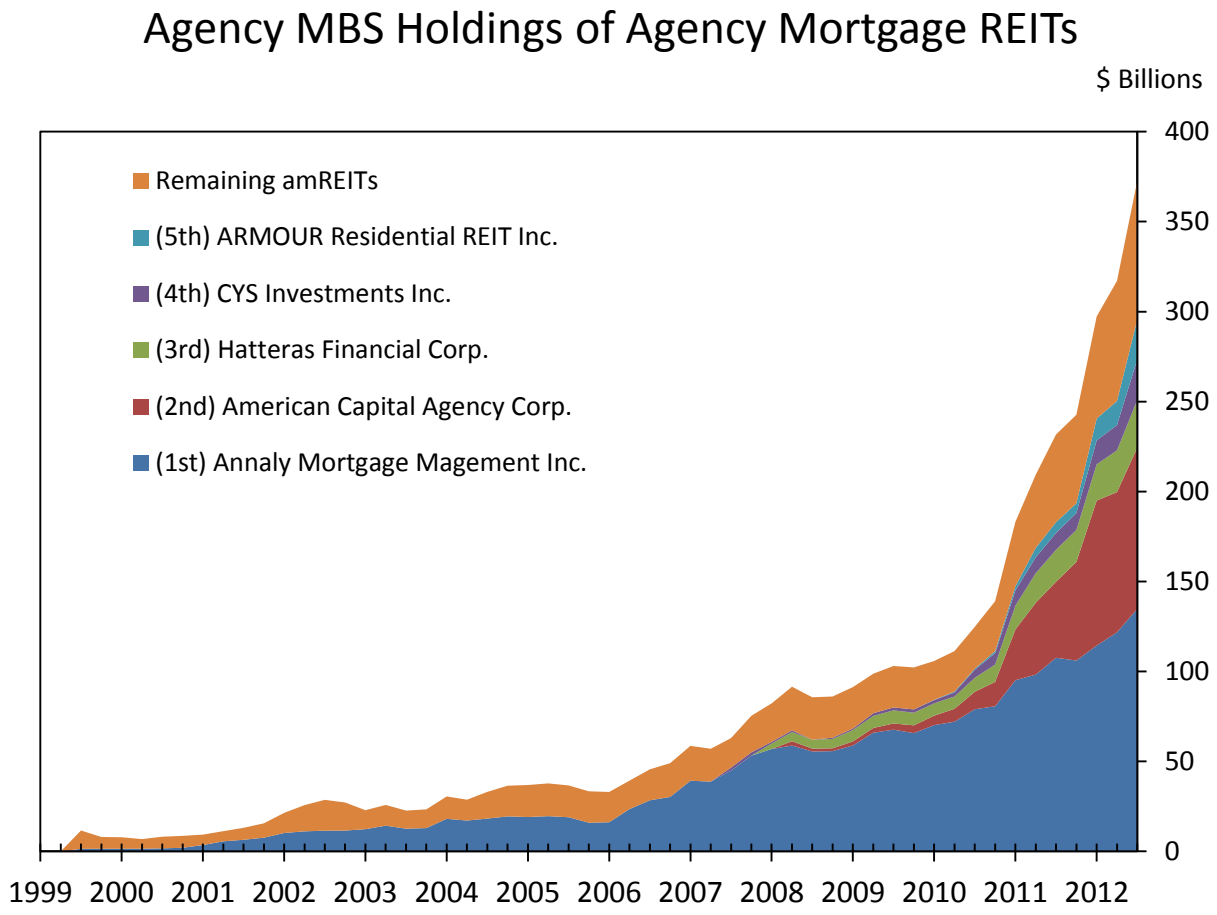
Figures and Tables

Figure 1



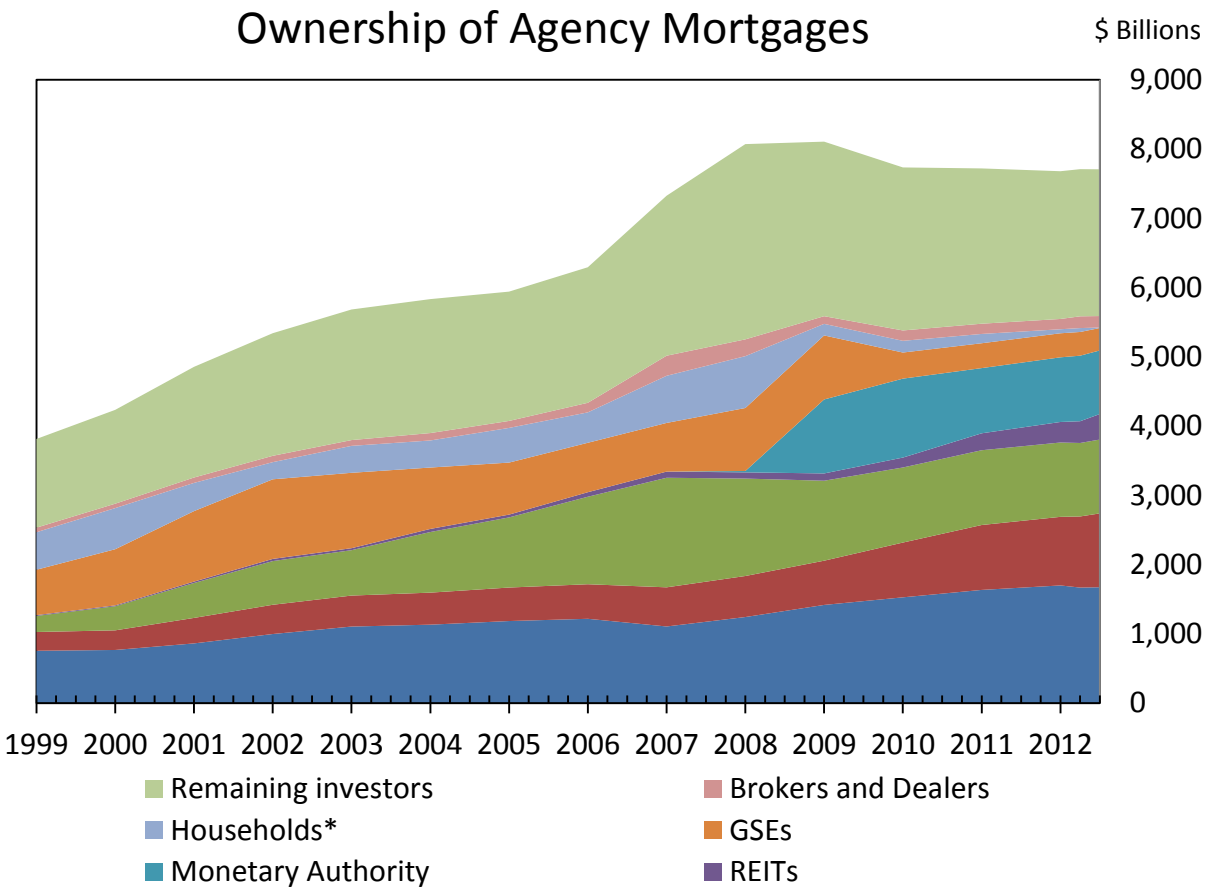
Note: The figure shows the evolution of total liabilities by shadow banks, traditional banks, and bank holding companies and broker-dealers, based on data from the U.S. Flow of Funds by the Board of Governors of the Federal Reserve, and the U.S. National Accounts by the Bureau of Economic Analysis. The figure illustrates the stability of the size of traditional bank liabilities relative to GDP around 70 percent since the 1960s, and the rapidly increasing size of the shadow banking system over the past fifty years. The collapse of shadow banking after the financial crisis of 2007-09 is also clearly visible. The plot is from Adrian, Covitz, Liang (2012).

Figure 2



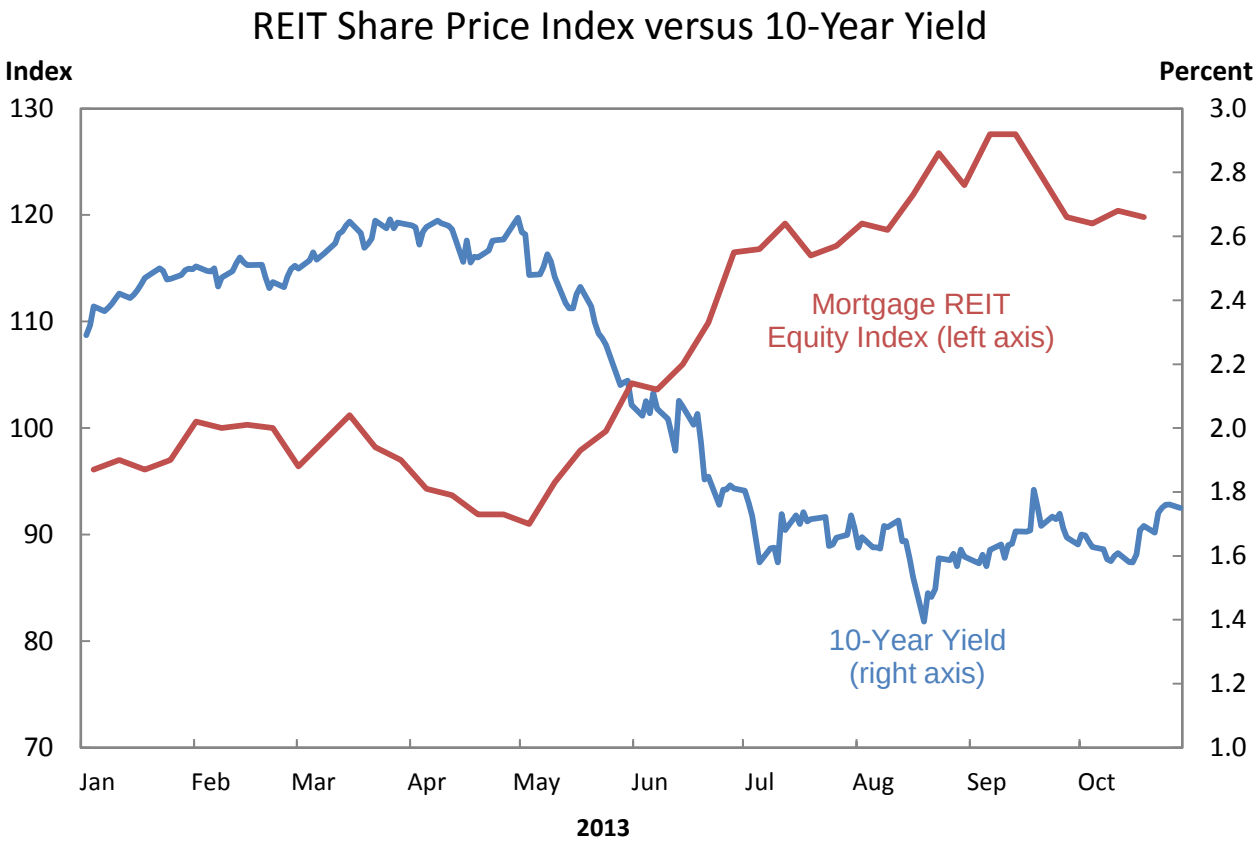
Note: The figure plots agency mortgage holdings by publicly listed agency mortgage REITs, based on 10K and 10Q filings with the Securities and Exchange Commission. The figure shows the rapid increase in the size of agency mortgage holdings by REITs, as well as the high degree of concentration in holdings by the top two firms.

Figure 3



Note: The figure plots ownership of agency mortgages by type of investors, based on data by the Board of Governors of the Federal Reserve. The chart illustrates that holdings by REITs have increased rapidly in recent years, but remain small in comparison to agency mortgage holdings by other investors.

Figure 4



Note: The chart shows the level of the 10-year Treasury yield, together with the share price of the agency mortgage REIT index based on data from the Board of Governors of the Federal Reserve and Bloomberg. The negative relationship between the yield and the REIT index reflects the mechanism through which agency REITs generate earnings: they borrow short (at low rates close to zero) and invest in longer term assets. When interest rates rise, REITs experience mark-to-market losses on their agency mortgage holdings, leading to lower earnings and a declining share price.

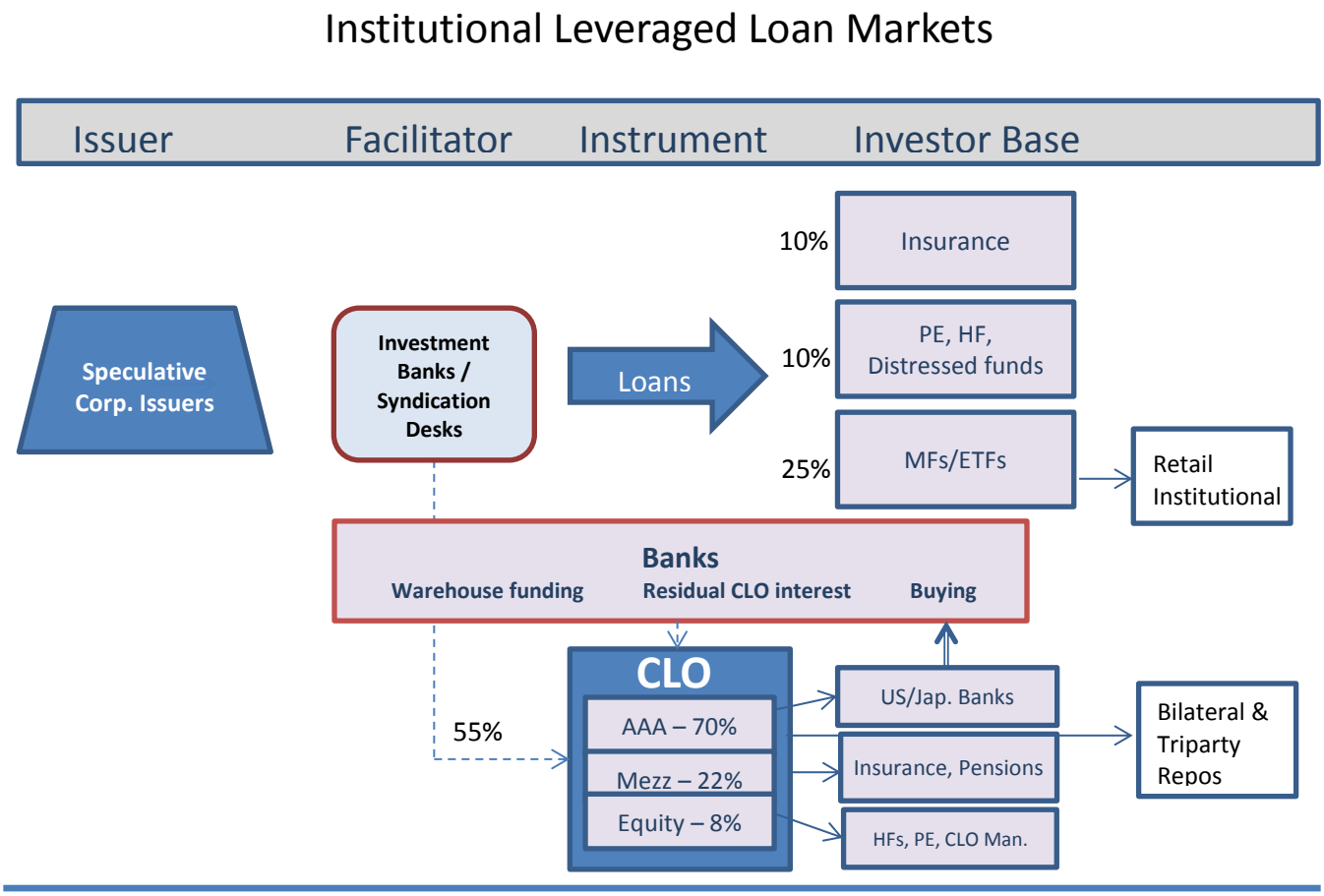
Figure 5

Agency Mortgage Holdings: Inventories of REITs and Broker-Dealers

	2007	2008	2009	2010	2011	2012
REITs	88.9	89.6	105.1	143.3	239.1	368.2
Broker-Dealers	290.2	242.6	110.9	149.8	166.8	165.5
Ratio	0.3	0.4	0.9	1	1.4	2.2

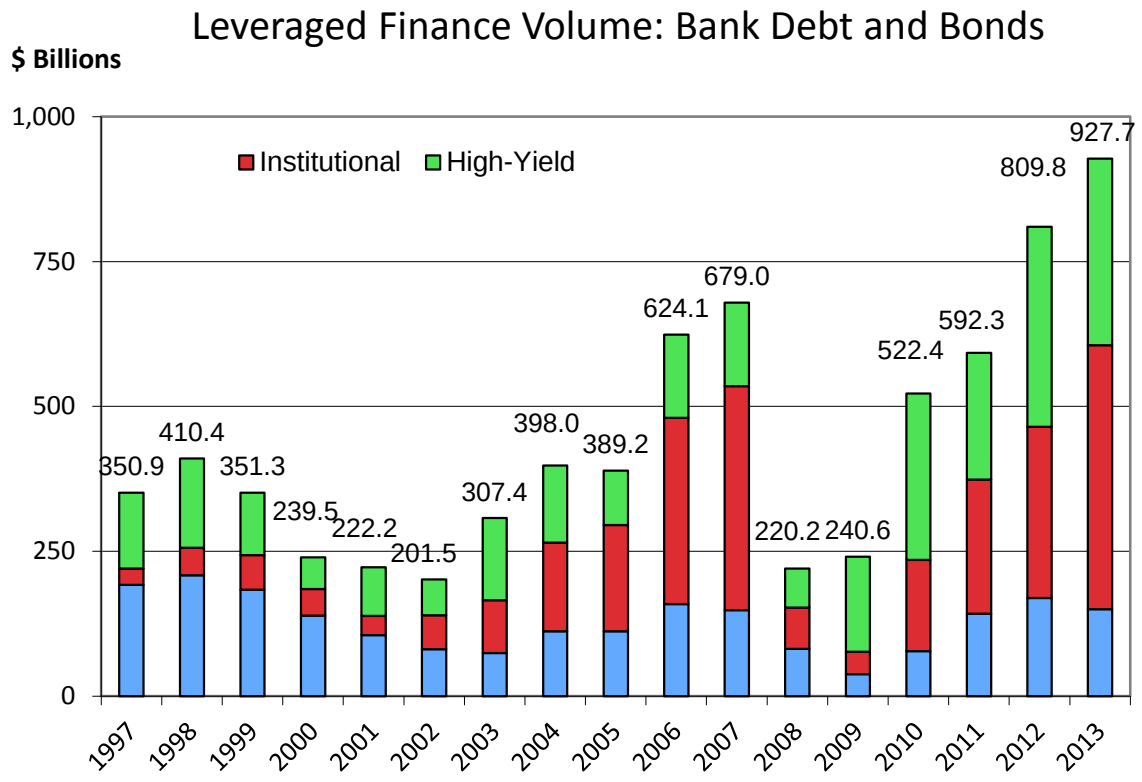
Note: The table shows the agency mortgage holdings by REITs and by security broker-dealers, based on data form the U.S. Flow of Funds of the Board of Governors of the Federal Reserve. The table documents that the fraction of agency bonds owned by REITs relative to broker dealers increased from one third to more than two between 2007 and 2013.

Figure 6



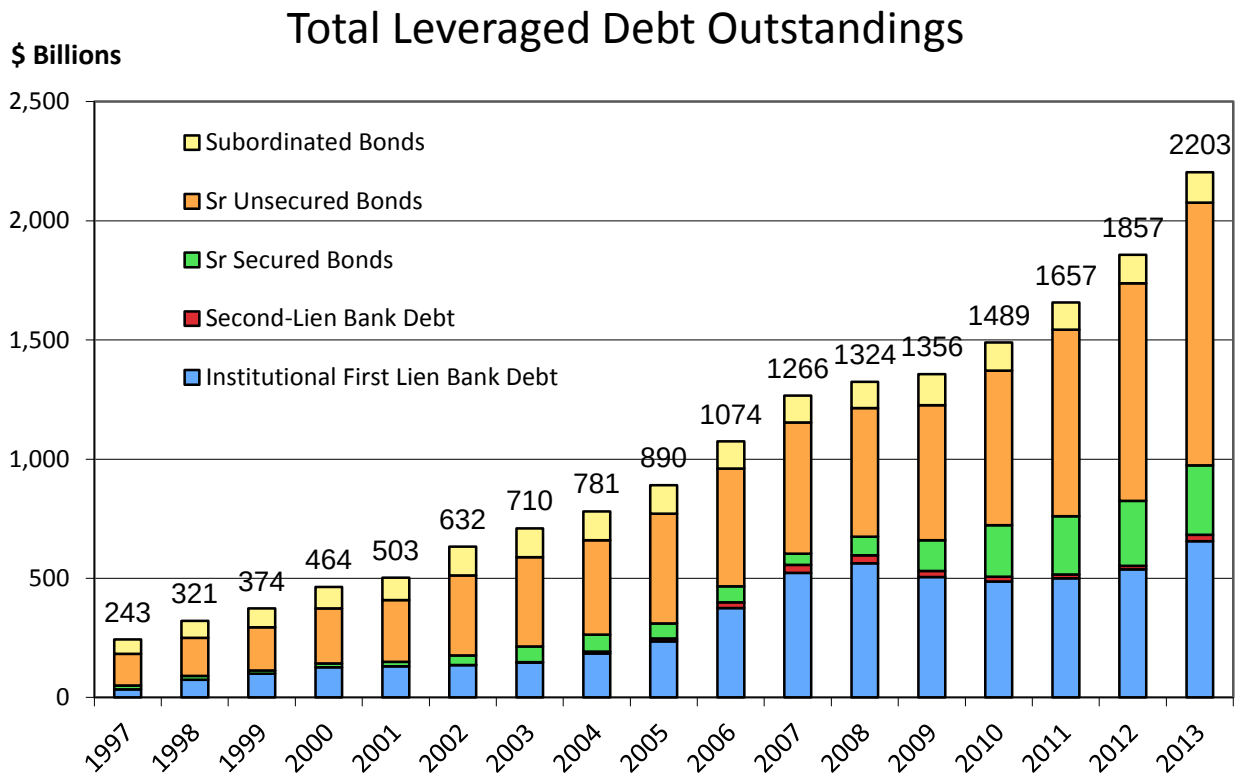
Note: The institutional leveraged loan market is comprised of bank syndicated loans distributed to institutional investors. CLOs represent the predominant investor in leveraged loans. Large US banks are at the heart of the originate-to-distribute model. They fund loan warehouses, take residual risk in CLOs, and buy AAA or AA tranches. The largest leverage risk is found in hedge funds and CLOs' equity tranches, exposing these investors to high losses. However, in both cases the maturity transformation is not high, as the liabilities are not of a short-term nature. The largest liquidity transformation is found in mutual funds and ETFs, which have grown significantly. As liquidity is normally robust, investors expect to be able to sell out of positions in market downturns, but may find liquidity is absent when they most need it. CLOs engage in risk arbitrage to secure equity returns. CLO AAA spreads are materially wider than corporate AAA bonds, but also experienced significant spread widening during the crisis.

Figure 7



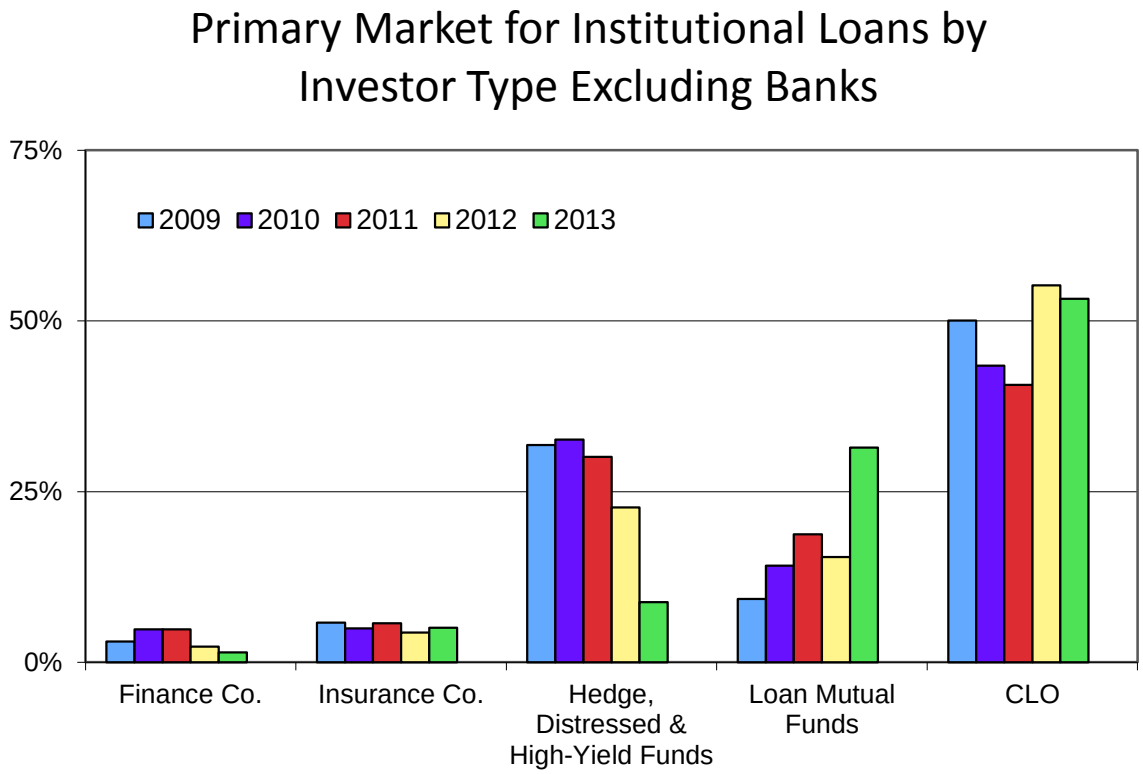
Note: The chart plots the leveraged finance issuance volume for leveraged loans (red), high yield, bonds (green), and pro-rata (blue), based on data from Standard & Poor's Capital IQ LCD. Issuance volume in 2012 and 2013 was at historical highs, exceeding volumes of 2006 and 2007, particularly in the high yield bond market.

Figure 8



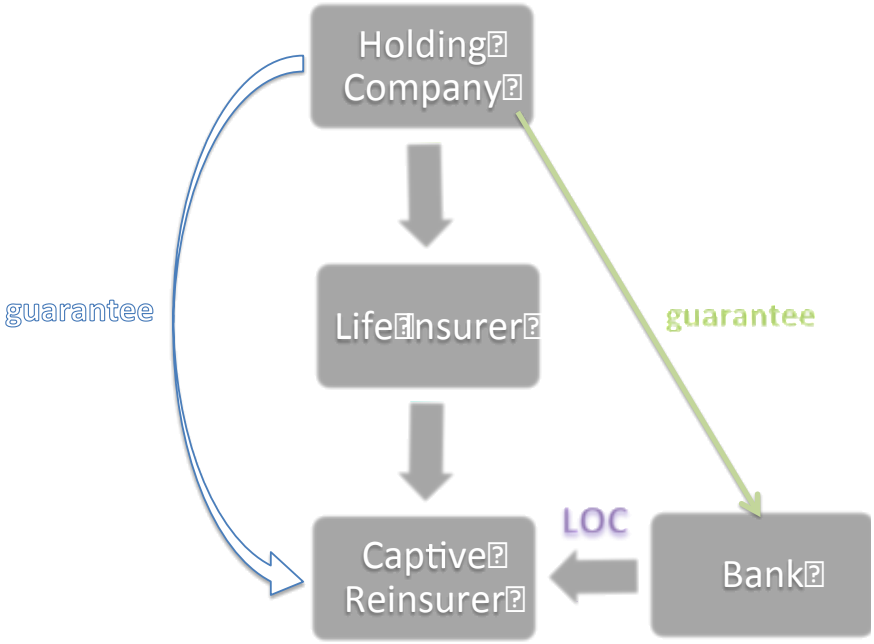
Note: The chart plots total leveraged debt outstandings, based on data from Bank of America/Merrill Lynch Global High-Yield Strategy and Standard & Poor's Capital IQ LCD. Total outstandings grew substantially in 2012 and 2013, reaching 2.2 trillion by the end of 2013.

Figure 9



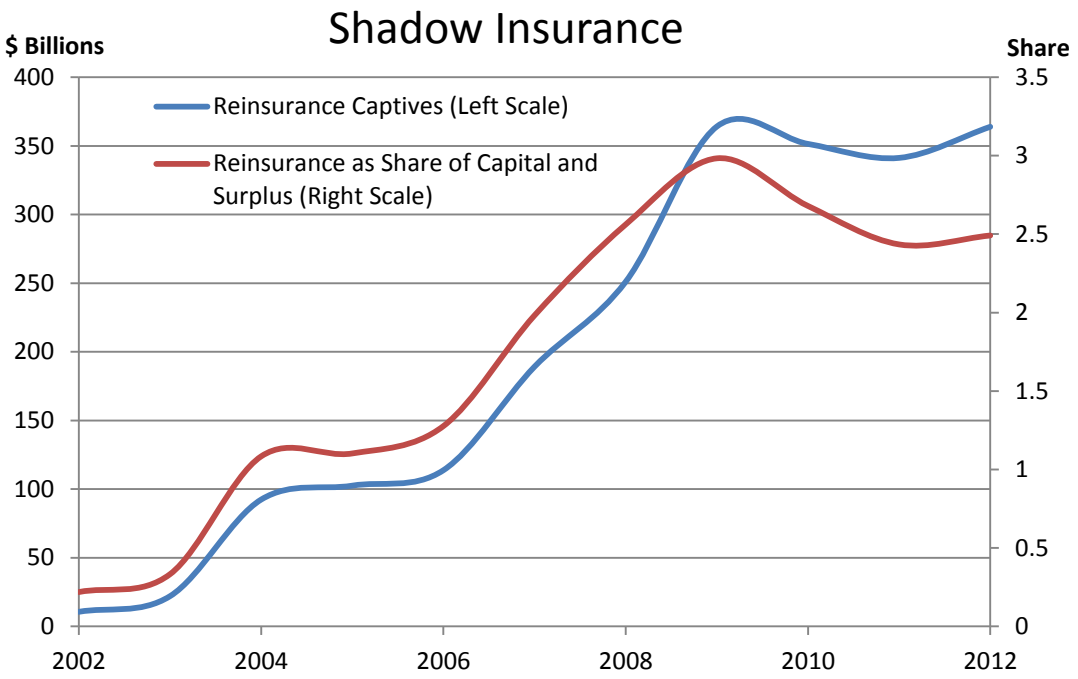
Note: The figure plots the share of investments in the institutional loan market by investor type since 2009, based on data by Standard & Poor's Capital IQ LCD. The chart shows the rapid growth of loan mutual funds among primary loan market investors. The growth of mutual fund investors is primarily offset by declining investments of hedge, distressed, and high yield funds.

Figure 10



Note: This figure shows the functioning of reinsurance captives for life insurance companies. Life insurance assets and liabilities are moved from the life insurance subsidiary to an affiliated captive reinsurer that typically resides in a different state with lower or no capital requirements. The holding company provides a guarantee either directly to the captive reinsurer, or to a bank that provides a letter of credit (LOC) to the captive. Hence risk is not transferred out of the insurance holding company, but total capital held by the holding company is lowered due to this capital arbitrage.

Figure 11



Note: This figure reports life and annuity reinsurance ceded by U.S. life insurers to shadow reinsurers, both in total dollars and as a share of the capital and surplus of the ceding companies, based on data from Koijen and Yogo (2013). Reinsurance ceded is the sum of reserve credit taken and modified coinsurance reserve ceded. Shadow reinsurers are affiliated and unauthorized reinsurers without an A.M. best rating.