

Can Securitization Work?

Economic, Structural and Policy Considerations^{*}

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Abstract

Asset securitization creates potential benefits that can accrue to market participants, including liquidity provision, an increased ability to manage risk and value enhancement through the pooling and partitioning of cash flows. But the recent financial crisis has exposed a number of structural flaws, which has led some to question whether asset- and mortgage-backed securities should be classified as financial “weapons of mass destruction” that require strict containment and possibly even elimination. This paper considers the fundamental economic tradeoffs associated with securitization, with an eye towards policy development, concluding that securitization can work. But the question of whether it will actually work will depend on making appropriate modifications to the underlying loan-securities production process as well as improving transparency and monitoring at both the security and financial system levels.

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I. Introduction

My answer to the question of whether securitization can work is, perhaps not surprisingly, yes. But, securitization contributed significantly to the decline and fall of systemically important financial institutions, where the associated risks were greatly underappreciated prior to the meltdown. Consequently, given the central role that securitization played in the financial market meltdown of 2007-08, a number of structural changes will obviously be required.

The U.S., England and other “securitization-friendly” countries are in the process of implementing new regulations that will attempt to magnify benefits and minimize the costs of securitization. Other countries that participated less directly in the securitization of mortgages and other assets are paying close attention to the creation of a new regulatory framework, as many are attracted to the potential benefits that securitization can provide. But these countries are also understandably gun-shy due to the collateral damage that securitization caused in the U.S. and global economy.

This paper will provide an historical perspective and a conceptual framework for understanding the economic benefits and costs of securitization relative to traditional lending. By traditional lending, I mean a vertically integrated loan production and servicing process in which the lender underwrites the loan, funds the loan from its own resource/deposit base, continues to own the loan as an asset on its balance sheet, services the loan, and addresses issues of borrower financial distress should the situation arise.

Securitization breaks some or all of the links in the production chain. Most critically, a necessary condition for securitization to occur is that the loan is effectively sold, implying that the loan as previously constituted is removed from the balance sheet of the originating lender. The loan sale

may or may not have been anticipated at the time of loan origination.¹ Securitization often, but not always, also assigns other functions such as loan underwriting and servicing to a specialist.

A loan sale is not sufficient for a securitization to occur, however. The liquidated loan must also be legally transformed into something other than the original mortgage loan. One typical characteristic of the transformation process is the creation of a special purpose vehicle (SPV), or bankruptcy remote entity, which houses the loan as an asset in preparation for securitization. Thus, a loan that is sold on the secondary market is not defined as a securitization if it is simply purchased and held “whole” in the portfolio of another financial institution (such as Fannie Mae). In this case it is a secondary market sale.²

Developing an historical perspective and a conceptual understanding of the economics of securitization is necessary to appreciate structural and policy implications going forward. In terms of assessing economic tradeoffs, discussion will be organized around three themes: the *good*, the *bad* and the *ugly* of securitization. The *good* considers the positives of securitization. The *bad* and the *ugly* focus on the negatives. The *bad* corresponds with challenges in managing a vertically disintegrated loan production and servicing process, and the *ugly* corresponds with securitization’s systemic linkages to the broader financial system.

Policy implications are considered in the context of answering the question: What conditions are necessary for creating a sustainable and value-enhancing framework for securitization? An efficient financial regulatory framework is one that, first, considers whether a financial mechanism such as securitization is, subject to a set of existing institutional-political constraints, capable of adding value in the real economy. If not, regulation should block market development. If so, as a second step, a regulatory structure should be implemented that maximizes that value subject to the existing set of constraints.

¹ When loans are originated with the intent of securitization, the loan is not necessarily legally owned by the originating retail lender or broker. Consequently, I am a bit loose in my description, assuming that the retail loan originator “owns” the loan until it is (oftentimes almost instantaneously) “sold” to a third party. The concept of initial ownership is, however, bolstered by the fact that if the retail loan originator fails to deliver a loan according to prescribed guidelines, it typically has an obligation to “buy back” the loan from the third party.

² Some might argue that a mortgage held on the balance sheet of Fannie Mae or Freddie Mac is bankruptcy remote due to government’s guarantee, but since there is no explicit transformation I will treat it simply as a secondary market sale. See Gorton (2009) for evidence on an increasing rate of non-mortgage loan sales in recent years.

Analysis in this paper will largely abstract from the institutional-political constraints that typically exist at the country level, and focus on generic policy instruments that can be used to address sources of market failure. During this discussion I will consider some of the proposals that have already been implemented or have been proposed in the U.S and England. I will also develop some new proposals of my own.

This paper contains seven additional sections. A direct focus on tradeoffs associated with securitization begins with section III. Prior to that section, in order to provide additional context, I offer a fairly extensive historical account of the development of securitization markets in the U.S. Consequently, for those less interested in historical development, section II can be skipped without much loss in continuity.

II. The Development of Securitization Markets in the United States

Secondary market loan sales have been around for centuries, often caused by an originating lender's demand for liquidity. Historically it has been a big step from the secondary market loan sale to securitization, however. There is evidence of West India plantation mortgage and high-risk (U.S.) government bond securitization occurring in Holland in the middle to late 1700s (Goetzmann and Rouwenhorst (2005, Chapters 1 and 15)), and mortgage securitization occurring in the U.S. as far back as 1850 (Riddiough and Thompson (2010)). Other pooled or single-asset mortgage securitizations occurred through the latter half of the 1800s and into the early 1900s, particularly in the 1920s (Goetzmann and Newman (2010)). But these securitizations have received relatively little attention, as they did not occur on a large enough scale or in such a way that they assumed systemic importance.

Securitization in fact did not cause the Great Depression; rather, the Great Depression caused securitization, as well as many other changes in the financial system in the U.S. The foundation for institutionalized securitization was laid with the creation of Fannie Mae, known initially as the Federal National Mortgage Association.³ Fannie Mae was at the time a government-owned enterprise set up to purchase qualified residential mortgages in the secondary market. As

³ See Green and Wachter (2005) for a detailed history of the development of the secondary mortgage market in the U.S.

originally structured, Fannie Mae was not in the business of securitizing the loans. Instead, Fannie Mae kept the purchased whole mortgages on its (that is, the U.S. government's) balance sheet.

Federally sponsored mortgage insurance was another innovation that came out of the Great Depression. This mortgage insurance, provided by the Federal Housing Association (FHA) and paid for by the borrower, allowed for smaller than a 20 percent downpayment on a mortgaged home purchase. The insurance guaranteed timely principal and interest payment to the lender in the event of borrower default on the loan, thus facilitating the sale of a mortgage into the secondary market. This particular insurance was (and still is) available only for first-time home buyers. By the early 1950s there was increasing pressure to create a secondary market for non-FHA mortgage loans. This led to the creation of private mortgage insurance companies, and ultimately the birth of a brother organization to Fannie Mae called Freddie Mac (originally the Federal Home Loan Mortgage Corporation).

By the late 1960s, as a result of increasingly large budget deficits from funding the Viet Nam war and Great Society initiatives of the Johnson administration, there was increased policy interest in removing the billions of dollars of mortgage loans from the balance sheet of the U.S. government. This caused Fannie Mae and Freddie Mac to be quasi-privatized, morphing into Government-Sponsored Enterprises (or GSEs). They assumed a corporate legal form, which allowed them to issue shares of stock, generate a profit, and pay dividends to shareholders based on the profits of the firm. Most importantly for our purposes, these two firms, along with Ginnie Mae, were also now allowed (in fact, encouraged) to repackage and resell their purchased mortgages to third-party investors. Thus, in 1970, 120 years after the first primitive attempts were made to package and sell mortgages on Wall Street, loan securitization began to happen in a big way in the U.S.

Mortgage-backed securities had very simple designs at first, more resembling a secondary market sale than a contemporary structured security. Thirty-year fixed-rate prepayable mortgages were pooled. Securityholders were offered pro rata shares (undivided interests) of the total cash flow pool. Because of mortgage insurance and the back-stop guarantee in the issuing GSE, securityholders did not have to concern themselves with the risk of principal loss due to

borrower default. Rather, in addition to the usual term risk associated with holding a fixed-rate security, the only risk to analyze was that of prepayment.

There was a natural market for these securities, that being financial institutions that operated in retail mortgage markets. In effect, these institutions engaged in a circular game of asset transformation and liquidity creation. Whole mortgage loans were delivered into the secondary market and transformed into mortgage-backed securities, only to be repurchased by the same originating lenders. Loan pooling added a measure of diversification to the loan portfolio, since the mortgages backing the securities were from a geographical cross-section of the U.S.

This transformation allowed lenders to manage their balance sheets in new and more flexible ways. For example, they could gain national mortgage loan exposure if they wanted it, but with the option to rebalance their asset portfolio at low cost if necessary due to there being an active secondary market for these security interests. Authors have empirically estimated the benefits of mortgage securitization as related to mortgage pooling and liquidity creation, and have found borrowing costs to be reduced by up to 50 basis points relative to costs associated with traditional portfolio mortgage lending (see, e.g., Hendershott and Shilling (1989)). This suggests significant economic benefits for consumers. There are additional social benefits to securitization on the capital supply side to the extent that liquidity creation and asset diversification benefits are public goods.

It is important to recognize that the liquidity gains were in part attributable to security investors avoiding adverse selection problems and other frictions associated with assessing the credit risks of assets backing the securities. As noted, there were two layers of credit insurance: the first being mortgage insurance on low-downpayment loans and the second being a back-stop provided by the issuing GSE. These GSEs were after 1970 considered to have the implicit backing of the U.S. government (this became explicit in 2008). Therefore, because the credit insurance costs were paid by the borrower in the loan rate and/or the cost of mortgage insurance, the only difference between investing in a GSE-issued MBS and a Treasury bond was to account for prepayment risk and then put a price on it. Although not a trivial pricing problem, it is a lot

simpler than putting a price on simultaneous prepayment and credit risks with adverse selection concerns to boot.⁴

The middle 1980s was a time of significant financial innovation on Wall Street. One of the most important innovations was the CMO—the collateralized mortgage obligation.⁵ This innovation made the critical distinction between principal and interest components of mortgage cash flow, creating securities whose payoffs specifically favored one or the other component part. The mortgage-backed interest-only (IO) and principal-only (PO) strip was thus invented, along with other new securities such as the inverse IO floater. It turned out, for example, that securities whose cash flows were tied to the interest payment component of cash flow had very different valuation characteristics as a function of interest rates than securities whose cash flows were tied to principal payments. This was important, as risk was now be divided and reallocated in ways that could not be effectively replicated with the existing set of securities available to investors.

With the CMO came the beginnings of structured finance and asset pool-based financial engineering. Markets could be readily found for most of these new structured securities, but not all. To see why, consider the analogy of cutting up a chicken. There are viable markets for the breast meat, the wings, the legs and thighs. But many fewer people are interested in the neck, the feet and the innards (at least in the U.S.). Consequently, these latter parts are often either thrown away or are hidden in some other concoction like a sausage. The high-risk residual pieces of structured financial products are analogous to chicken parts that nobody wants, and have been a persistent sticking point in the development of these markets. I will argue later that finding a dedicated market for these leftover parts is one of the keys to establishing a sustainable market for structured securities.

⁴ The totality of prepayment and credit risk is distributed between the investor and the insurers. Credit events, which are generally much rarer than prepayment events (the current environment excepted), are more complicated to analyze and control than prepayment. Consequently, the effect of an *insured* credit event on total prepayment risk is relatively minor, as a default-foreclosure outcome simply shows up as a prepayment to the investor. On the other hand, prepayment's effect on credit risk is major, since prepayment kills the option to default at the individual loan level and changes the nature of credit risk on the remaining mortgage pool. Furthermore, the insurer, whether it be one of the few private mortgage insurers, the FHA, or the GSE as the back-stop, is in a much better position than the security investor to address adverse selection problems associated with the sale of mortgages into the secondary market.

⁵ Invention of the CMO is attributed to Lewis Ranieri who then worked for Salomon Brothers. For an insightful and entertaining description of the details behind the creation of the CMO, see Lewis (1989).

A boom in commercial real estate construction occurred in the 1980s, and transformed the skylines of many U.S. cities. Regulatory changes in the early 1980s allowed Savings & Loans' to get into the commercial real estate lending business, which many did with gusto, and tax law changes created significant incentives for developers to construct buildings, which many did with gusto. Increased demand for capital happily met the increased supply of capital, and by the middle 1980s many real estate markets were seriously overbuilt. Then, by 1990 the commercial property market had fallen hard, with office vacancy rates exceeding 20 percent in a number of prominent markets. Many commercial property owners consequently found themselves underwater with respect to their mortgage balances. Because the entire sector was attempting to address these significant problems at the same time, and because traditional capital sources such as insurance companies and real estate oriented banks were also experiencing significant distress, there was no liquidity available to refinance the debt. Widespread pain was the result.⁶

Wall Street, which to that point had not been a major player in commercial property markets, loves a capital vacuum which it can step in to fill. And it did so with gusto. Led by Lehman Brothers and Nomura, Wall Street took the CMO pooling-structured finance concept, combined it with the junk-bond model of Michael Milken, and voilà—the commercial mortgage-backed security (CMBS) was created. The novelty with CMBS was the focus on credit risk, as opposed to prepayment risk, as commercial mortgages typically contain clauses that partially or completely eliminate the borrower's ability to prepay the loan prior to the maturity date.⁷

The issue now was how to efficiently cut up the chicken when credit rather than prepayment was the cardinal investment risk. After some experimentation with more complicated designs, security structure became more or less standardized with the use of a “tranching waterfall” design. With this structure the most senior bonds are given priority on the repayment of principal as it flows into the pool, while the more junior bonds receive interest only while they wait to move up the priority ladder. The most junior bonds, also known as the residual or equity

⁶ See Shleifer and Vishny (1992) and Brown, Ciochetti and Riddiough (2006) for additional background on these issues.

⁷ The practice of restricting prepayment derives from common law and an 1845 case (*Brown v. Cole*) which determined that early repayment was an extreme inconvenience to the lender. This restriction continued to grow from the middle 1850s when insurance companies became interested in lending on commercial property due to an ability to match long-term insurance liabilities with long-term debt asset maturities. To this day, if a mortgage contract is silent on the issue of prepayment, the borrower cannot prepay the loan prior to maturity. See Brueggeman and Fisher (1997, p.26).

tranches, bear the risk of loss resulting from any shortfalls in the recovery of principal. For example, suppose that a commercial mortgage with a face value of 100 is in default and is foreclosed upon. Resale of the property after expenses nets 60. The principal recovery of 60 goes entirely to the most senior securityholders, while the loss of 40 gets subtracted from the face value of the lowest-ranking residual-equity tranche.

Why this structure? In large part it is because commercial mortgages in the U.S., unlike residential mortgages, have no government-sponsored mortgage insurance market (the policy reasons are much less clear to make a market for insurance on commercial property relative to the residential property market). Nor has a viable loan-level private insurance market developed, which is primarily due to an inability to overcome adverse selection problems. With an inability to shift credit risk away from the mortgage itself, the financial engineering problem becomes one of reallocating credit risk within the structure in such a way as to create insurance for senior bondholders. That is, one can think of credit-based structured securitization as a problem of determining an optimal capital structure of a new “firm”, the assets of which are a static pool of loans, when separate markets (clienteles) exist for higher and lower credit quality securities.

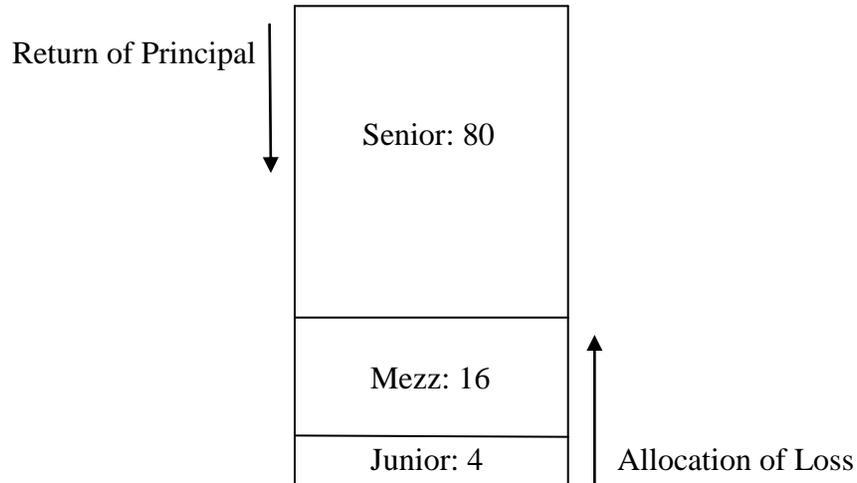
The resulting optimal capital structure is a priority-based pecking order that can be identified by the credit rating of the securities issued and backed by the commercial loan asset pool.⁸ The more senior securities are protected, or insured against, credit loss given their seniority to subordinate junior securities. Securityholders may also receive additional protection in the form of reserving, overcollateralization and excess spread.

An example will help illustrate the insurance mechanism, which is depicted visually in Figure 1. Suppose there is a pool of commercial mortgages with an aggregate face value of 100. Further suppose that three securities are issued that are backed by assets in the pool. The three securities are a senior bond (which we will say is AAA-rated), a mezzanine bond (which we will say is BBB-rated), and a junior bond (which we will say is NR, or non-rated). The “subordination level” for the senior bond is assumed to be 20, and is 6 for the mezzanine bond. This means that the face values are 80 for the senior bond, 14 for the mezzanine bond, and 6 for the junior bond.

⁸ Multiple securities are sometimes created with the same credit rating, the difference being in expected bond maturity. Multiple same-rated securities are most often seen at the higher credit rating levels.

Figure 1

Senior-Subordinated Security Structure



What is the insurance implication of having a subordination level of 20 for the senior bond? Suppose that, on average, a default results in a loss of 40 percent of the mortgage face value. This implies that greater than 50 percent of the loans in the pool would have to default in order the senior bondholder to realize any credit losses ($.50 \times .40 = .20$, or 20 percent subordination).⁹ Prior to the financial crisis, a 50 percent default rate would have seemed quite remote, thus providing a rationale for the AAA rating. As for the mezzanine bond, which is rated BBB, greater than 15 percent of the mortgages in the pool would have to experience default before a loss would be incurred ($.15 \times .40 = .06$, or 6 percent subordination). The BBB rating therefore corresponds to this (*ex ante*) unlikely, but not necessarily remote, possibility. Finally, the junior tranche would receive some return of principal as long as the default rate does not exceed 15 percent. If it does, interest is collected until all the principal is wiped out. Because of the considerable risks, yields on the junior bonds are generally quite high.

⁹ This assumes a weighted average default rate of 50 percent, where weights are determined by the size of the mortgage. This simple calculation also assumes no amortization of the mortgages over time. If the mortgages do amortize, and defaults happen over time, then the default rate must exceed 50 percent for the senior bondholders to be exposed to credit loss.

An important element to the development of the credit-based structured securities market was the expectation that the asset pool would be diversified with respect to credit risk, in the sense that adverse credit shocks would not affect all assets in the pool equally. Better asset pool diversification implies less required subordination for the higher-rated securities, and therefore greater investment proceeds for the issuer, to the extent that more AAA implies a lower weighted average return required across the entire asset pool. Expected benefits from a “diversified” asset pool were not realized in the financial crisis, and is another important issue to which I return in later discussion.

As the CMBS market grew and developed through the 1990s, an important companion market simultaneously developed for securitized *equity* interests in commercial real estate. The ownership vehicle for these equity interests, known as a Real Estate Investment Trust (REIT), had been around for several decades, but was almost never used by investors to hold assets. However, in the early 1990s, in tandem with the development of the CMBS market, Wall Street “reliquified” the commercial real estate market by pooling illiquid commercial real estate assets and then selling equity interests on the assets. Because they are publicly traded, REIT stock prices were (and still are) a valuable public good in the sense that they provided real-time information and transparency to an otherwise opaque market for thinly traded real assets. Development of the REIT market consequently fed back and aided in the development of the CMBS market. For example, REIT stock prices and CMBS prices are strongly contemporaneously correlated, and information contained in those prices have contributed to reduce boom and bust in the underlying asset market.¹⁰

As the 1990s progressed, other asset-backed securities markets were developed. Two of the most important were consumer-based: the markets for student loans and credit cards (see Gorton (2009) for a breakdown of annual asset-backed security issuance activity). The development of a securitized *private* student loan market is interesting and important, because it seemed to remedy market failure that existed with lending to students. The problem in that market is that the incentive to repay the loan declines significantly once the specific investment in human capital

¹⁰ At the time of this writing, commercial property markets are experiencing significant distress. Although the uses are different, residential and commercial property markets are clearly linked due to substitutability of use at a given location. But recent distress in the commercial property market is demand-side based, not supply-side based, and is the result of housing-caused problems filtering down to the macro economy, which then has caused commercial property prices to decline. See Gyourko (2009) for additional commentary and analysis.

has been made. Students typically can offer no collateral to offset the hold-up risk, and at the time of loan origination have a highly unpredictable income stream from which to repay the loan. The existence of debtor's prisons might seem to solve the collateral problem, but this recourse was eliminated in the U.S. by the middle 1800s (Mann (2002), Coleman (1999)). The Federally funded student loan market addresses the problems by requiring the student loan to survive bankruptcy. This priority is not as strict in the private market, however.

Securitization offers at least a partial solution to the collateral hold-up problem. By pooling cash flows from these risky loans and then tranching their cash flows, information and credit risk can be shifted within a structure and allocated to those who are capable of assessing and assuming the risk. The market for credit card backed securities has certain similar characteristics, where many master trust structures offer a dynamic pooling feature in which assets are substituted in as other assets disappear and balances change unpredictably.

The sub-prime residential mortgage-backed securities market began its modern development in the U.S. during the 1990s, and in a sense is the younger consumer-based sibling of the high-yield corporate bond market. The foundation for the development of the sub-prime market was created by changes in bank regulation. Regulatory changes in the 1970s allowed banks to offer alternative mortgage instruments, and further changes in the 1980s and 1990s created incentives for banks to originate home mortgage loans for borrowers traditionally excluded from the prime mortgage market. In the early days of sub-prime mortgage market development (during the middle 1990s), mortgages were standard 30-year maturity fixed rate or adjustable rate loans. Because these were non-prime loans, mortgage insurance generally could not be obtained at the individual loan level. The development of the CMBS market had shown, however, that structure could be introduced to address the missing insurance market problem. With these developments came the birth of the market that would play a central role in the financial crisis of 2007-08.¹¹

Although the sub-prime mortgage product itself was not terribly complex at first, the existence of both prepayment and credit risk made for a more complicated securitization problem. Initially the solution was for the issuer to retain most if not all of the credit risk, oftentimes with a layer of

¹¹ Sub-prime tends to be a catchall term for all non-prime mortgage loans (loans eligible for purchase by Fannie Mae and Freddie Mac. There is actually two categories of non-prime loans: sub-prime and alt-A. Alt-A loans are higher quality non-prime loans and sub-prime are lower quality non-prime loans. The alt-A market was actually as large or larger than the sub-prime mortgage market.

pool-level mortgage insurance added on, in order to protect security investors. This system worked well for all parties, as it facilitated market development and issuers suffered only miniscule credit losses as house prices started their meteoric rise in the middle 1990s.

The market began to grow and evolve very quickly. Changes at first were mostly to the mortgage product offered to borrowers rather than in the structure of the structured securities. Changes in sub-prime mortgage product design happened because, by the late 1990s and early 2000s, house prices continued to rise dramatically in certain parts of the U.S. to make housing increasingly unaffordable to first-time homebuyers. “Jumbo” and “alt-A” non-prime lending increased dramatically.¹² New sub-prime mortgage products soon evolved into the hybrid and option adjustable-rate mortgages.

The design of these new mortgage products was to encourage prepayment after two to three years under the presumption of continued increases in house prices. These more complex mortgage instruments resulted in more complicated securities. Then, as the 2000s progressed with continued increases in house prices, underwriting standards tended to soften. Finally, beginning around 2003, more complex security designs were introduced in which credit risks (in addition to prepayment risks) were contained in some or all of the sub-prime mortgage-backed securities.

A final wave of new “securitized” products became important by the middle 2000s. The two most prominent were the collateralized debt obligation (CDO) and the credit default swap (CDS). Although neither was a brand new innovation, they had had relatively little impact in the market prior to 2004. The CDO was a hit largely because it provided a mechanism to manufacture AAA-rated securities (for which there seemed to be insatiable demand) out of non-AAA-rated securities. These innovations were also successful because they addressed two nagging and closely related problems in the primary securitized market—liquidity and hedging demand.

Although there was decent to very good secondary market liquidity with the AAA-rated asset-backed securities, the lower-rated securities were generally illiquid. Illiquidity resulted for two

¹² Jumbo loans exceed the allowable size limit imposed on Fannie Mae and Freddie Mac, and became more common as house price increases in many markets exceeded the rate of increase in the size limit.

reasons: information sensitivity and scale. The non-AAA-rated securities were often hard to evaluate after issuance, and most were too small to make it worth incurring the cost of evaluation. CDOs provided a solution to the liquidity problem. A batch of similar lower-rated securities could be pooled, with their cash flows tranching to create new AAA-rated securities that could be sold at attractive prices.

A residual issue (pun intended) was that the lower-rated CDO tranches were difficult to value and sell. As a result, these securities generally ended up in one of three places: 1) They were retained on the balance sheet of the owner-issuer, which implied even greater risk for each dollar invested; 2) They were sold to wealthy investors, either directly or through a hedge fund vehicle; or 3) They were dumped into some other pooled fund such as a high-yield bond mutual fund, and sold to less sophisticated retail investors.

The second nagging problem was hedging demand. Prior to the creation of CDS, only imperfect hedging instruments were available with which to insure an inventory of credit-risky assets waiting to be securitized. A similar problem was the inability to hedge illiquid asset-backed securities that existed on an investor's balance sheet. The hedging problem slowed market development, also making it difficult to speculate and thus facilitate price discovery. The CDS, which is a contingent claim that pays off when loan defaults are of sufficient magnitude to trigger a loss on an underlying referenced asset pool, filled in the missing insurance market and increased liquidity. CDS that are based on a basket of similarly-rated securities, the so-called CDX markets, soon generated much more trading volume than the underlying asset-backed securities themselves. This development was important for reasons similar to the development of the REIT market in conjunction with the CMBS market—it provided real-time price discovery on assets that were otherwise opaque and infrequently traded.

All of the historical developments discussed above were aided by a legal structure in the U.S. that limits borrower liability (at least to some extent), and that allows for the low-cost creation of bankruptcy remote entities within which the securitized asset pool can reside. These limited liability mechanisms might seem to cause more harm than good (especially today), since limits on liability imply that the costs of financial distress and bankruptcy are directed towards the lender-investor. But limited liability in fact facilitates securitization, since clear boundaries on liability simplify the assessment of credit risk. For example, unlimited liability to the assets of a

residential or commercial property owner will reduce the likelihood of default, but it complicates the analysis of estimating recovery conditional on default. It may also complicate estimation of default probability. The same principal is at work with the bankruptcy remoteness of the investment vehicle, as the security investor does not want financial distress of an issuer outside the asset pool to affect the performance of the asset pool itself. We note that creating and implementing low-cost bankruptcy remote structures has worked with other well countries, but that limiting borrower liability is something that many countries do not enforce.

The financial meltdown of 2007-08 was triggered by a decline in U.S. house prices that started in the middle of 2006. This led to turmoil in the mortgage-based repo and sub-prime asset-backed securities market as investors began revising their expectations regarding securities performance, which then started a chain reaction that led to the broader meltdown. Even at this point it is unclear whether securitization was a primary cause of meltdown or merely an accomplice. For example, foreign capital inflows, monetary policy and flawed financial market and institution regulation seem to be deeper, more structural causes of the crisis, with securitization being a convenient vehicle with which to channel capital flows and allow private market actors to work around a weak regulatory framework.¹³

On the other hand, even if securitization is not the deeper cause of the crisis, it nonetheless may be too dangerous to have around—being something of an uncontrollable wild beast that is upsetting the natural order of things in unpredictable and sometimes devastating ways. Some would argue that the only way to deal with the beast is to kill it off or cage it up. Others take a more benign view, arguing for more or less restrictive fencing, allowing the beast some room to maneuver freely. Support for one view or the other necessarily requires an assessment of economic tradeoffs associated with securitization, which we undertake in the following sections.

III. Economic and Structural Considerations: Some Preliminary Comments

Securitization has a number of positive characteristics. Indeed, the positive characteristics, at least in concept, are so compelling that they contributed to a conventional wisdom that developed prior to the financial crisis that a Great Moderation had occurred and that “this time

¹³ See, e.g., Allen and Carletti (2010) for additional background and discussion.

it's different" (Reinhart and Rogoff (2009)). The financial crisis has forced a revision of the conventional wisdom.

Prior to undertaking a detailed analysis, in order to establish a conceptual foundation for further discussion, I will briefly review some recent and not-so-recent macroeconomic characterizations of finance and financial markets. A neo-classical economic view of finance is that it is a zero-sum game, where all that matters is what happens in the real economy. That is, the presumption is that profitable real investment opportunities will always be funded by properly priced finance. Modigliani and Miller (1958) most clearly articulated this view in the context of the corporation. A more nuanced view, which can be labeled as the Friedman monetarist view, is that finance matters, but only in the sense of trying to make sure it doesn't screw things up in the real economy. For example, in response to the issue of the existence of complex financial products, some feel that anything complicated must indicate a game of "hide the sausage" and "find the greater fool", invariably leading to resource misallocations.

The consequences of the financial market crisis certainly validate the monetarist view to some extent, but it misses a very important fact: There is a credit channel in the economy (Bernanke and Gertler (1989)). In normal times, certainly in bad times, and even in good times, firms and consumers are financially constrained. This means that productive and utility-increasing activities, which might have occurred, did not have the opportunity to occur because there was no money available to finance them. They are truly very important dogs that don't have the opportunity to bark. Financial market frictions have first-order effects in the real economy, and thus cannot be assumed away.

A credit channel implies that financial innovations which mitigate financial market frictions are an economic "good". This is the great promise of securitization, which we consider in the next section.

IV. Securitization: The Good

The following is a laundry list of the economic "goods" offered by securitization. Many of these "goods" have been identified and discussed extensively in previous work, so the discussion will be brief and to the point. But some of the issues have not been emphasized previously, and for these I spend more time elaborating.

- *Liquidity Provision:* As noted earlier, a secondary loan market alone is capable of supplying additional liquidity to the financial system. Individual banks can better manage their balance sheets by having the option to sell loans into the secondary market, and liquidity imbalances affecting the whole of the financial sector can be more easily managed. Securitization can provide further liquidity benefits that result in a lower cost of loan capital for borrowers as well as an ability for lenders to sell and then repurchase transformed assets in the form of more liquid securities.
- *Completing an Incomplete Market:* This is the classic demand-side incomplete market argument for the creation of structured financial products. Structured finance is about pooling cash flows and then establishing rules to redistribute cash flows to create securities that have risk-return characteristics that cannot be easily replicated by the existing set of securities. For example, credit-based structured securities often have not just one AAA-rated tranche, but several. AAA-rated tranches varied by maturity as well as by level of subordination, where some securities were at the minimum AAA-rated subordination boundary while others were “super-senior” in terms of being above the minimum subordination boundary. It is an open question, however, as to just how much risk customization is necessary to maximize demand-based gains. That is, one can clearly realize gains to dividing the chicken into the breast, legs, thigh and wings, but are there gains to chopping up the wing or the thigh into smaller pieces and selling the pieces separately?
- *Satisfying Unmet Demand:* Prior to the financial crisis, the demand for AAA-rated securities seemed to be insatiable. Part of this demand appears to have been associated with distortions created by Basle II. But the demand also appears to have a fundamental component. Insurance companies and pension funds have legitimate prudential reasons for placing high credit quality assets on their balance sheets to aid in funding long-term liabilities. Moreover, in a global financial marketplace, non-local capital is looking for a competitive return but at reasonable risk. Evaluating risk is increasingly difficult with distance; hence, there are strong investor incentives to seek out high credit rated securities for their “good housekeeping seals of approval.” Many investors have

historically placed even a higher value on highly credit-rated securities backed by “high-grade” collateral such as real estate.

- *Reductions in Risk Concentrations:* The financial crisis has taught many of us that, even though securitization allowed for the creation of “unique” securities with finely tuned risk-return characteristics, it did not necessarily imply a reduction in the concentration of risk in systemically important financial institutions. But risk transfer and redistribution nonetheless provides significant promise with securitization, particularly in the context of concerns over certain institutions being too big to fail.
- *Production Efficiencies:* This is simply an application of Adam Smith economics to the banking sector. The idea is that one might expect to realize efficiency gains by assigning functional tasks to specialists rather than doing everything in-house. Closely related to this is the notion of “relationship” versus “transactional” lending. Traditional lending is more relational, relying to a greater extent on soft information, while securitized lending is more transactional, relying to a greater extent on hard information. One of the real potential benefits of securitization is the formal provision of information, which is necessary to coordinate among a number of independent agents that provide critical inputs to loan production. The requirement of formal information provision increases incentives to standardize loan products and contracting, at least within the boundaries of a particular securitization operation, with the potential for efficiency gains. Although some of these potential gains to information provision and standardization were realized prior to the crisis, many were not, particularly as related to tracking performance in the post-loan origination period.
- *Alleviating Market Failure:* It is well known that information asymmetries can block the development of loan markets (e.g., Stiglitz and Weiss (1981)). A previous example was a private market for student loans. There are other similar examples of loan markets for which investment has the potential to generate positive spillovers for society at large, such as small business and low income housing. Securitization, potentially augmented with complementary funding mechanisms, offers a method to address the problem. For

example, the creation of a senior-subordinated security from a risky asset pool allows for the information risk to be concentrated in the subordinated security, where the senior security can sell for a high price due to its information insensitivity. This in turn allows investors with the expertise and risk appetite to participate in the subordinated bond market. In fact, one necessary condition for the sustained development structured securities markets may be a dedicated group of buy-and-hold investors that participate in the subordinated securities market.

- *Increased Competition and Borrower Choice:* Traditional lending is known to be imperfectly competitive, with a limited set of loan products available with which to finance consumption or investment. Securitization does two things. It increases competition by introducing a new source capital. Perhaps more importantly, securitization provides borrowers a product or set of products that have different characteristics than the existing set of products. This allows borrowers, through a combination of comparing differences in price and product design, to self-select into the loan type that it prefers. As long as suppliers are aware of this self-selection, borrower choice enhances efficiency. Indeed, we would expect a sophisticated financial market to design incentive-compatible loan products to induce the appropriate self-selection.

When considered all together, this list of benefits appears to be formidable. This would help explain securitization's role in forming the conventional "Great Moderation" wisdom prior to the crisis. But, as we now know, the cost side of the ledger presents some formidable tradeoffs of its own. Those tradeoffs are considered next.

V. Securitization: The Bad

Loan production has apparently remained vertically integrated for centuries for good reason, as the financial market crisis has showed that many specificities and complementarities exist with integrated production that can get "lost in translation" (as Gary Gorton puts it) when the

production process is broken up. Thus the key operational issue with respect to securitization is whether a disintegrated loan production process can be organized to function effectively.

The popular press has had a field day with these operational issues. Interestingly, there has been less focus in policy and academic circles, where instead the focus has to this point been primarily on macro systemic-related aspects of securitization. I believe this focus will change once the broader regulatory framework has been set up and policymakers begin to focus on consumer protection and detailed bank lending regulation.

As with the laundry list of “goods”, the list of “bads” has also been vetted to a large extent. But, as noted, the vetting on this topic has occurred more in the popular press than in the academic/policy press. Consequently, when appropriate, I will offer my own perspective and critique of the conventional formulation of the “bads” of securitization and loan production.

- *The Broker-Borrower Relationship:* Residential mortgage (and certain other consumer) loan contracts are complicated, with significant borrower costs and commitments. Many consumers do not have the experience nor perhaps the ability to properly anticipate the magnitude of financial obligation associated with owning a home and servicing a mortgage. Brokers and other primary points of contact with the borrower have certain legal and perhaps ethical obligations to: 1) Not cause the borrower to incur unnecessary/unstated costs at the time of loan origination, and 2) Assist in screening out potential borrowers that should not take on debt, regardless of formally stated underwriting guidelines. But broker compensation creates a potential conflict, as brokers are generally paid based on volume. And to the extent that securitization is a volume-driven business, it is particularly susceptible to the volume-conflict problem. That said, while many sub-prime borrowers were improperly treated or misled by brokers, many other sub-prime borrowers were not unsophisticated nor marginal credit risks. Rather, they used their houses as ATM machines vis-à-vis the sub-prime loan market. Many other first-time homeowners have actually benefitted greatly from the ability to access credit through the sub-prime market and own a home. Consequently, the real “bad” is bad broker behavior, which may be correctable.

- *The Loan Underwriting Process:* How does an issuer get a loan underwriter to exercise appropriate care in qualifying a borrower when the underwriter is paid a piece rate and knows it has no further financial stake in the transaction? This is a particularly difficult problem, but it is not a problem that was ignored in the design of most securitized loan production operations. Security issuers and investors do have legal recourse to the loan underwriter if that underwriter materially and systematically violates stated guidelines. Enforcement is costly, however. The difficulty in enforcement is two-fold: 1) Underwriting guidelines are based on formal, or hard, information provision, while soft information can be important in assessing creditworthiness; and 2) Enforcement is imperfect, where the underwriter knows this and may be willing to game the system.
- *The Rating Agency Game:* Much has been written about this issue. Clearly, in hindsight, the rating agencies got things wrong, in many dimensions, in their assessment and grading of credit risk on structured securities. For example, credit rating agencies were too optimistic about the benefits of asset pool diversification, which led to too much of the asset pool being assigned a AAA-rating. The rating agencies were shopped and susceptible to capture, as they don't appear to have exerted enough independence and skepticism in their dealings with issuers. And they were conflicted—rating structured securities was a big money business for them.

On the other hand, we are not aware of anyone within the financial regulatory system that assigned formal responsibility to the credit rating agencies, designating them as the master regulator of the structured securities universe. If you ask a rating agency what it does, it will tell you it exercises free speech and makes a little money in the process—where market participants can decide for themselves whether or not they believe the opinion or find it of value. Clearly the role of the rating agency was more important than this, but regulators did not bother to clarify that role. Thus the whole certification piece of the security production process was muddled, and ultimately quite problematic. Going forward, one thing seems certain: investors still value credit rating assignments as good housekeeping seals of approval, and they would like to have a system that serves their

interests in obtaining informative and unbiased opinions of credit quality from independent and credible sources.

- *Can the Beast Be Tamed*: Richard Posner (2009) suggests the beast is Wall Street, not just securitization. Wall Street is the live creature behind securitization, in the sense that it is Wall Street that organizes the production process that aggregates the pooled capital that is then repackaged and redistributed to investors as securities. Posner suggests that we should not be surprised that the beast (a lion in his book) chases down and kills zebras (which presumably represents profit opportunity). That is, don't blame the beast for doing what comes natural. Rather, if there is an interest in saving zebras, it is essential to separate the beast from the zebras.

Vast amounts of money were made by Wall Street from executing securitizations in the 1990s and 2000s—firms ate what they killed, and they killed and ate a lot. Given that Wall Street and the securitization process seem to be joined at the hip, both historically and going forward, a central policy issue is whether the beast can be controlled, and if so, how to exercise that control. One key element is compensation and governance, in which the major firms are now all publicly traded with non-deferred cash or stock compensation structures. The tradeoff within these firms has more recently favored scale and access to financial capital over reputational capital (Morrison and Wilhelm (2007)), with not-so-surprising results.

- *Where Have All the Toxic Securities Gone?:* As noted earlier, one of the sticky issues with structured securitization is the creation of the high-risk, or toxic securities that result when risk is reallocated within a capital structure of a structured asset pool. These securities sometimes stay on the balance sheet of the issuer, which is not necessarily a bad thing as it avoids having to sell them at a discount. It can also signal quality as well as create an alignment of interests. But it also results in concentrated risk vis-à-vis embedded leverage which, if combined with leverage on the liability side of the balance sheet, can result in tremendously risky (oftentimes shadow) financial organizations. A strong case can therefore be made for selling the toxic stuff. But who will buy it? Again, as noted earlier, after 2003 a significant amount of it was repackaged into CDOs.

This appears to be especially true in the sub-prime ABS market. But who ended up owning the toxic pieces of the CDO, since risk does not simply disappear with another round of securitization. At this point nobody knows for sure, but there is evidence that high net worth investors, largely through hedge and private equity funds, purchased some of this stuff. Less wealthy and less sophisticated individuals also appeared to invest through high-yield mutual funds.

- *Foreclosure and Rigidities in Special Servicing:* Foreclosure can be inefficient when deadweight costs are significant or when negative externalities occur as a result of foreclosure. With traditional lending, if a borrower finds him or herself in financial distress, a straightforward bilateral negotiation can presumably occur in an attempt to work things out. Renegotiation is not so simple in the securitized market. Security investors delegate the task of renegotiation to the special servicer, which is hired due to its significant expertise in renegotiating loans and dealing with financial distress. In almost all cases, the special servicer has absolutely no relationship with the borrower. Moreover, as is the case with financial distress in the corporate world, multiple securityholders creates coordination problems in terms of arriving at negotiated outcomes. On top of that, tax and accounting rules require that securitized assets pools are “static” in the sense that there is little or no management decision-making discretion. Because designing complete contracts is a notoriously difficult thing to do, a lack of discretion implies a tendency towards favoring foreclosure over renegotiation.

In summary, the cardinal operational characteristic of securitization is a disintegrated loan-security production process. Sufficient information provision and incentive management along the production chain is critical for success, and the financial crisis has revealed significant weaknesses throughout. And the cumulative costs to weakness along the chain are not simply additive—they are multiplicative—and it is ultimately up to the security conduit lender-securities underwriter to coordinate among the various factors of production.

But, unlike popular press characterizations, loan production design was not insensitive to information provision or incentive management. For example, Demiroglu and James (2009) note that security structures were modified to address “distance from loss” concerns, where investors

nonetheless misestimated their exposure from loss. The lesson is not just one of sins of omission, but also sins of commission, where it will be necessary for all involved to do better in the future.

VI. Securitization: The Ugly

When production management “challenges” are combined with systemic risks that seem to be associated with securitization, a case can be made to cage or even kill the beast. This section considers factors associated with securitization that directly or indirectly contribute to the systemic risks of the financial system.

- *The Dark Side of Complete Markets:* Securitization, and more broadly derivatives, are to financial markets what the internet is to information technology—a vast network that connects everything and everyone to everything and everyone else. Part of the network effects occur within the plumbing of the financial system, where counter-parties and funding chains are necessary to facilitate transactions (Duffie (2010), Stulz (2010)). More generally, network effects happen through the partitioning and distribution of risk to many diverse actors in the economy, and can result in positive and negative externalities. The Arrow-Debreu characterization of market completeness focuses on the positive externalities, where state contingent claims allow for better sharing of risk. The dark side of networking is that when leverage, asset securitization and complementary products such as CDOs are combined, they line up economic actors like a string of closely spaced dominos. When one domino falls, other dominos fall in succession. The surprising thing to most of us was the spacing effect, as many felt that many types of investments, as well as systemically important financial institutions, were isolated from the contaminating effects certain segments of the market. For example, who prior to 2007 (or even the middle of 2008) could envision that the sub-prime mortgage backed securities market would be a domino that could knock the money and commercial paper markets to the ground—not to mention the entire economy.
- *Lost in Translation:* This is the transparency issue. Gary Gorton (2009) has written eloquently on this topic, emphasizing that a negative shock can cause investors suddenly

question what is inside the “black box” of a financial intermediary. That is, information-insensitive securities suddenly become information sensitive after unanticipated bad news.¹⁴ Asset-backed securities have this problem, since, after issuance, the monitoring of underlying asset quality is difficult. Consequently, when a significant negative shock occurs, opaqueness makes it very difficult to revalue the securities. Revaluation is especially difficult with the higher-risk securities, which also tend to be smaller in size, as a lack of scale takes away incentives to incur the costs associated with revaluation. These problems are further exacerbated with complicated assets such as sub-prime mortgages and CDOs, with true economic values getting completely lost in translation.

- *Correlation Risk:* Correlation structure is a central issue to structured securitization. From a credit risk perspective, pooled asset loan performance will depend on how price changes on the underlying collateral assets are correlated. Correlation matters with structured securities because the percentage of an asset pool that is designated senior/AAA-rated is negatively related to the correlation structure of the asset pool. That is, less correlation implies more AAA-rated securities and hence greater proceeds at the time of security issuance. Correlation, which is a measure of how unanticipated price shocks propagate across the asset pool, is itself uncertain. Unanticipated shocks are either idiosyncratic or common. Issuers, rating agencies and investors all put significant weight on the occurrence of idiosyncratic shocks, leading to a greater proportion of senior/AAA-rated securities. However, in a financial crisis, correlations go to one due to the commonality of the systemic shock. The result is that senior/AAA-rated securities did not have enough protection in the subordination level, causing revaluation and distress (information sensitivity is introduced), which can feed back to exacerbate a panic.
- *Good Liquidity-Bad Liquidity:* As with market completeness, there are tradeoffs to increasing liquidity that goes with securitization and secondary market trading. Liquidity is often associated with an increase in flexibility and ability to manage risk. But there is a dark side to liquidity, which can be seen as follows. A long time ago, military brass noted

¹⁴ Current research is considering reasons why these kinds of securities are created in the first place. For example, Glode, Green and Lowery (2010) argue that competition among financial intermediaries for financial expertise that lowers the cost of acquiring information can lead to vulnerability in the trade of securities which require that expertise for secondary market price evaluation.

that once a bridge was crossed to fight the enemy, and the bridge was subsequently burned or blown up, soldiers fought harder. Bridge-burning at first seems paradoxical, since a valuable, potentially life-saving option is eliminated (namely, retreat). But the possibility of retreat creates a moral hazard. The same principal applies to liquidity. Liquidity decreases commitment, and commitment can have value (Myers and Rajan (1998)). For example, if I can sell my mortgage into a security, do I have the same level of commitment? If I can sell my security into a CDO, do I have the same level of commitment? If I can hedge my firm's losses due to financial distress, do I have the same level of commitment? The liquidity-commitment problem is first-order with tremendous systemic risk implications.

- *Embedded Leverage and the Toxic Asset Problem:* Excess leverage is at the center of every financial crisis. Securitization, and more generally derivatives, allow for the creation of socially useful insurance instruments. However, many of these instruments contain significant amounts of embedded leverage. Add some debt (particularly short-term debt that is maturity mismatched) to finance the asset with embedded leverage, do it a large scale, and you have a recipe for a financial crisis.

To illustrate the embedded leverage problem, we will use weighted-average cost of capital formulations of Modigliani and Miller. Suppose there are mortgages in an asset pool that are originated at a fair rate of 7 percent rate. A senior asset-backed security (debt) is created that yields 5 percent and a junior asset-backed security (equity) is created that yields 15 percent. Using a weighted average cost of capital formulation, the embedded leverage created through a structured securitization relative to the underlying mortgages is 4:1, or 80 percent (that is, $.07 = (.8)(.05) + (.2)(.15)$). Now suppose the owner of the junior security (the equity piece) finances 50 percent of value with debt that costs 8 percent. This increases the total effective leverage from 80 percent to 90 percent, since one-half of the 20 percent equity piece is debt financed. Thus the leverage ratio increases to 9:1, and the required annual return to the levered junior security increases to 22 percent ($.15 = (.5)(.08) + (.5)(.22)$). Finally, suppose the owner of the junior security executes a CDO, backed by the junior security, with the senior piece being 50 percent of the total sold at a 5 percent yield. The issuer retains the junior security, as it is difficult to sell.

Because part of the junior security is sold off, the junior securityholder must reduce the original debt position to 50 percent debt on the retained CDO, with a cost of debt that equals 10 percent. This suggests that the leverage ratio is now 19:1. Furthermore, these numbers imply a required annual return of 40 percent on the levered retained junior CDO security.¹⁵ If realized, a 40 percent required return on an equity investment is attractive. But it is also highly speculative.

- *Complementarities and Moral Hazard:* This is the liquidity commitment problem noted above, applied specifically to the CDS market. René Stulz (2010) makes the important distinction between CDS and traditional insurance, which is that the insuree has a retained stake that causes the exercise of care. This retained stake can be eliminated with CDS. For example, if a lender can hedge its credit exposure on a loan with a CDS, does it have an incentive to screen and underwrite the loan with a sufficient level of care. Similarly, if management of a highly levered firm can hedge its credit risk with a CDS, will it have the same incentives to fight hard to save the firm in the case of financial distress. I believe regulation can address this moral hazard problem, but it is likely to be imperfect. I also note that speculation in markets for CDS as well as other derivatives is required as part of the price discovery process. But the CDS market has been less than fully transparent, and there have been allegations of market manipulation before, during and after the worst times of the financial crisis.
- *The Land Myth:* Douglas Diamond and Raghuram Rajan (2009) have made the point that investors love bonds backed by high-grade collateral, especially collateral that has commitment value. The love of real estate as collateral in a financing transaction is not new; for example, for centuries wars have been financed based on the expectation of acquired land providing gains large enough to repay debt. In modern times, real estate, due to its durability and relative value insensitivity to operational expertise, has been in high demand to collateralize debt. In the extreme, demand morphs into a Japanese-style land myth. When this happens, demand for real estate as collateral feeds back to cause a

¹⁵ The required return to the unlevered junior CDO security is 25 percent ($.15 = (.5)(.05) + (.5)(.25)$), which after leverage becomes 40 percent ($.25 = (.5)(.10) + (.5)(.40)$).

boom in land values, with higher land values leading to more leverage (e.g., Kiyotaki and Moore (1997)).

- *Neglected Risks:* Gennaioli, Shleifer and Vishny (2010) argue that certain risks, such as systemic collapse brought about by funding chains and shadow banking in general, can be (and were) neglected by investors. This behavioral “neglected risk” problem combines with excess demand for low-risk securities to create profit opportunities for financial innovators that result in the oversupply of higher-rated securities that contain the neglected risks. This in turn leads to financial fragility problems that can lead to market collapse when neglected risks become realized outcomes. What is particularly compelling about this perspective is the authors’ focus on behaviorally-based demand side distortions causing vulnerability in financial markets.
- *The Small Bank Problem:* Each and every securitized asset pool is analogous to a mini-bank. We know that the U.S. has had more financial panics than any other developed country in the last 200 years, and we know that the U.S. has perhaps the most decentralized banking system in the world. Financial panics and decentralized banking thus seem to go together. Securitized asset pools are not so much about geographical isolation or decentralization, but instead more about a specialized loan product type. Focus may nevertheless increase susceptibility to negative spillover and panic. Even more likely is that small size decreases incentives of outsiders to incur the disproportionately high costs of monitoring and information acquisition when negative shocks occur.

VII. General Policy Implications

Securitization over the last 20 years, and particularly over the last ten, has occurred at sufficient scale to make it relevant in many countries. Because securitized asset markets are susceptible to market failure, and because a banking panic can spill over to securitized asset markets, which can then feed back to exacerbate a crisis, securitized asset markets require regulation.

Although there are serious tradeoffs associated with securitization, I, as well as most analysts and policymakers, believe that many benefits can be realized if the markets are properly regulated.

Achieving an appropriate regulatory “balance” is essential, however. Specifically, I believe that regulation should be structured so that securitized asset markets have the flexibility to adopt to changing circumstances, while not imposing undue risk on the financial system as a whole.

I will not pretend to offer definitive solutions to the regulation problem; rather, in this section we will offer some observations and general policy guidelines that are practical and that can guide implementation. Many of these guidelines and proposals have been vetted in detail by policymakers and are currently under discussion. Several of the issues that I emphasize have not received as much attention, however.

Let me begin the discussion with what is the biggest challenge facing the U.S. and England, which is how to regulate a highly complex financial system. Shadow banks are everywhere, operating at the fringes or completely outside the formal financial regulatory system. The problems with regulating large-scale hedge and private equity funds are well known. In addition to these funds, there are any number of smaller firms that have characteristics of banks and that impose systemic risks due to their linkages with more important institutions. In addition, in the U.S., the formal banking system is itself complex due to the existence of thousands of medium and small banks that operate at the local or regional levels under a patchwork of regulatory regimes.

To provide a sense of the regulatory challenges ahead, consider two examples that illustrate the fundamental issues. First, during most of the 1800s and into the early 1900s, there was no central bank in the U.S. Beginning in 1837, after the President Jackson eliminated the Second Bank of the U.S., a series of serious banking panics happened at 15 to 20 year intervals until the early 1900s. The banking panic of 1837 was primarily a money problem, in the sense that local private banks issued their own (oftentimes worthless) currency in lieu of State-backed currency. Regulations were subsequently imposed to increase the soundness of money issued by private banking institutions.

The next major banking panic, that of 1857, was not a money problem *per se*, but rather a shadow banking and a uninsured deposit problem. Although the U.S. government got into the business of printing money after 1860, subsequent banking panics contained some elements of the 1837 and 1857 banking panics, along with new elements, where the issue of gold versus fiat

money dominated the banking policy discussion. It was not until the Federal Reserve was created that progress was made on the question of gold as an anchor to the financial system, and it was not until the Great Depression that the issue of bank run incentive problems were comprehensively addressed. And, with respect to the panic of 2007-08, we know that the “run” on the financial system occurred largely outside the formal (deposit-insured) bank regulatory system (Gorton (2009)).

The point is that it took the U.S. nearly 100 years to properly address fundamental systemic banking issues that existed at that time. Each “fix” focused on problems from the previous crisis, but largely failed to anticipate problems causing the next financial crisis. After the Great Depression the world went through a “quiet period” (to use Gary Gorton’s phrase) of over 40 years, during which it was commonly thought that the banking “problem” had been solved. We now know that is not the case. The financial system today faces challenges that are not dissimilar to those of the 1800s, which in both cases correspond to period of rapid (domestic and global) economic development. In short, we may be in the early innings of a financial market regulation problem that may take nine innings to play out.

A second example specifically illustrates fundamental regulatory challenges. In early April 2010, an on-line investigative reporting organization (called Pro-Publica) ran a story about a Chicago-based hedge fund called Magnetar. Beginning in 2005 this hedge fund began purchasing the lower-rated (toxic) CDOs backed by sub-prime asset-backed securities. Some thought this investment policy to be ill-advised given the inflated state of the housing market. But most market participants did not know two things: 1) Magnetar was allegedly encouraging issuers to produce CDO’s that contained more credit risk rather than less credit risk, and 2) Magnetar allegedly more than offset their long position in the toxic CDO securities with positions in related CDS that paid off when credit losses were incurred on the underlying sub-prime asset-backed securities.

According to insiders, by 2007 Magnetar had approximately a 50 percent market share in toxic sub-prime CDO securities. That said, Magnetar was reportedly not even close to being one of the larger hedge funds around. So, why was their alleged investment strategy a potential problem for the U.S. economy?

The various kinds of sub-prime mortgage product available to borrowers (e.g., option and hybrid ARMS) and the cost of the debt associated with those products depended on an ability to place them into an asset-backed security. If there was no market for the higher-risk sub-prime asset-backed securities, it would be difficult to make a market for the mortgage products backing those securities. Taking the higher-risk sub-prime asset backed securities, and placing them into a CDO for which there was a market for the high-risk security, very possibly helped sustain the retail sub-prime mortgage market from 2006 to 2008. Availability of sub-prime finance may in turn have helped sustain increasing house prices, thus prolonging the housing bubble and exacerbating resource misallocations. Furthermore, because Magnetar's alleged actions caused credit risk to be underpriced, the cost of insurance for Magnetar through the CDS market was also underpriced. This investment strategy thus allowed Magnetar to make tremendous profits when the markets blew up; indeed, Magnetar may have perpetuated large-scale resource misallocations to inflate its own bottom line, where significant negative spillovers accrued to uninformed financial market participants and society at large.¹⁶

The policy issue is, how does one address this kind of problem when it is certain that the next scheme that comes along will be sufficiently different so as to escape the attention of the regulatory community? This is not a trivial issue, and history teaches us that it takes time to get one's arms around complex issues in which there are serious societal tradeoffs.

With this discussion as a warm-up, below is our list of policy guidelines, more or less in the order of importance, as they relate to managing systemic risks of securitized asset markets.

- *Leverage Management:* Leverage and liquidity are flip sides of the same coin, as one typically implies the other in the months leading up to a financial crisis. I believe that the fundamental underlying cause of the recent financial crisis was due more to excess liquidity than excess leverage, leverage being the consequence of vast liquidity imbalances in the U.S. and other countries in the developed world. Although this causality argument suggests developing policy to address liquidity imbalances, a focus on treating the symptom—leverage—can go at least part way in treating the root cause of the

¹⁶ When I tell the Magnetar story to my private sector friends, they inevitably hit their head and blurt out “why didn't I think of that.” When I tell the same story to my friends in academic and policy circles, they inevitably look horrified and focus the conversation on preventative measures.

problem. To use an analogy, there are often deeper causes of alcoholism, but a first step in addressing the problem is to keep a drink out of the hands of an alcoholic.

Leverage is, in theory, measurable with a high degree of accuracy, at least as applied to the liability side of the balance sheet. As discussed earlier, however, addressing the interaction of asset risk (which often contains embedded leverage) and financial leverage is a more difficult issue. The use of margin loans and other short-term debt through the rehypothecation of securities presents additional leverage measurement challenges as well as introduces multiple creditor, debt funding chain coordination issues when investors experience negative asset value shocks.

I am somewhat skeptical about a regulatory focus on retention of securities on the balance sheet of the issuer. I understand retention is intended to be a mechanism to address conflict-of-interest problems associated with a disintegrated securitization production process (having “skin in the game”), particularly for the larger more systemic financial institutions. But risk retention cuts against one of the primary advantages of securitization, which is a reduction of bank concentration through the redistribution of credit risk. I believe that the conflict-of-interest issue can be better addressed through other mechanisms which are discussed in detail below.

- *Transparency and Information Production:* The recent financial crisis clearly demonstrated how much most of us did not know about the investment policies of systemically important financial institutions. Indeed, a lack of transparency was a central factor in the meltdown, not only in securitized asset markets but all across the financial system. Given funding chain effects and the existence of a large shadow banking structure, it is imperative that regulators and outside investors are able to access more information about investment risk at low cost. It is also imperative that there is better information on “who is connected to whom” in the financial system. This will require a much greater appreciation by macroeconomists and policymakers of the “plumbing” of finance (see, e.g., the Symposia on Financial Plumbing published in the *Journal of Economic Perspectives*, Winter 2010). Increased quantity and quality of information may also decrease incentives for market participants to hoard information privately, which Glode et al. (2010) show can cause financial fragility.

That said, it is important to keep in mind that perfect transparency is impossible to achieve. There are in fact serious tradeoffs to transparency. A certain degree of market imperfection (imperfect information) must be tolerated in order to achieve other social benefits (liquidity, risk distribution). Otherwise, strange things happen. For example, in the extreme of perfect transparency, nobody in the market will have an incentive to gather information and trade will collapse (Grossman and Stiglitz (1980)). A good analogy is the patent system. Without an ability to achieve a temporary monopoly on economic rents from innovation, there will be no incentive to innovate in the first place. But implementing an appropriate design is not a simple task. A current focus is on a *clearinghouse* approach, in which customized derivatives and asset-backed securities must be traded through a centralized “arm’s length” exchange rather than directly with self-interested dealers and investors. This system will increase transparency, but at what cost? The cost of trade will increase due to a more bureaucratic trading infrastructure. There will be fewer incentives for issuers to innovate and participate in securities markets (for additional background, see, e.g., Morrison and Wilhelm (2007, chapter 3)).

Centralized information with respect to trade, including the identity of buyers and sellers, raises the issue of politically motivated information leaks or other related disclosures of “proprietary” information (see, e.g., a recent discussion by Josh Lerner (2009) in the context of sovereign fund investment).

There is also a concern that creation of government-sponsored clearinghouses may result in a new financial intermediary that is too big to fail. The issue seems to revolve around what exactly the clearinghouse, will guarantee to counter-parties when there is systemic risk related to making margin calls and the like. I have an additional related concern, which is that government-sponsored enterprises tend to morph over time into bigger, more complex organizations that effectively capture their regulators. For example, Fannie Mae was originally created in the 1930s as something of a one-sided clearinghouse that created liquidity through the purchase of mortgage loans. Then, because of Federal government balance sheet concerns, Fannie Mae, and then Freddie Mac, were allowed to expand their business model to selling mortgages. But they became more than a clearinghouse when they got into the securitization business and were allowed to retain mortgage loans and their securities on their own balance sheet. The expanded authority of

these enterprises seemed like a good idea at the time, but they morphed into highly systemically important institutions that were very hard to regulate and control.

- *Increase the size of asset pools:* One of the biggest factors in the recent panic was that securitization markets completely broke down when, after a series of negative shocks, the higher-rated securities became “information sensitive”. That is, investors realized they did not know what was really inside the asset-backed securities and CDOs. They furthermore had little or no incentive to try to find out due to the costs of information production relative to the size of the investment. Trade and issuance subsequently came to a complete stop.

One can think of a pool of securitized assets as a mini-bank. Banks, like securitized asset pools, are opaque. Price discovery depends on incentives of investors to gather information about these opaque “firms”. Size is a critical element in this process, where there are security-level scale economies in information production.

- *Monitor and provide incentives to establish a dedicated b-piece investment market:* As discussed earlier, one of the central challenges in establishing viable markets for structured securities is selling the high-risk tranches, or the *b-pieces*, at a reasonable price. Doing so in a sustainable manner requires *b-piece* investors to possess not only an appetite for risk, but also an ability to assess the relevant risks. This in turn requires a sophisticated understanding of financial markets (derivative pricing, etc.), as well as an in-depth understanding of the fundamentals of the underlying asset market. For example, *b-piece* buyers in the commercial mortgage-backed securities (CMBS) market had to understand structuring complexities as well as fundamentals of commercial property markets.

Because they were in a first loss position, *b-piece* investors essentially held a levered equity position in underlying property market, and assessed risk accordingly. Scrutiny of asset pool risk by a dedicated *b-piece* buyer market can both complement and substitute for credit ratings by certified credit rating agencies, as well as mitigate residual agency and information concerns associated with the securitization production process.

As the Magnetar story illustrates, one of the central problems in the sub-prime asset-backed securities market was that there were no dedicated long-term (net long) *b-piece* buyers in that market. Consequently, the lack of a dedicated *b-piece* investor market can be interpreted as a sign of weakness in the relevant securities market. I believe that policymakers should focus more on the *b-piece* market issue, where progress in this area can reduce the need for issuers to cover their bonds by retaining an investment stake.

- *More emphasis on investor responsibility:* Most of the focus in policy reform has been on the supply side of financial markets, and when the demand side has been considered it has been in the spirit of protecting borrowers and investors from distortions and misrepresentations made by lenders, securities issuers and firms. But it takes two to tango to create a financial crisis, and it is clear that borrowers and investors played their part in blowing things up. A lack of policy emphasis on the demand side of the equation is surprising to me, particularly as it applies to the institutional investment community (by which I primarily mean pension fund managers, but one can also throw mutual funds, endowments and sovereign wealth funds into the mix).

Institutional investors are agents that act on behalf of others (who are often less sophisticated individuals or entities that delegate investment responsibility to investment “professionals”) to investigate and make prudent investments made on behalf of. Yet, after losing tremendous sums of money in the crisis, many institutional investors have claimed ignorance, arguing that they have been taken advantage of by nefarious issuers and other financial intermediaries. Interestingly, the current head of the U.S. Securities and Exchange Commission, George Canellos, has launched an investigation, “where he is pushing his staff to scrutinize products normally sold to institutional investors after the financial crisis showed that even sophisticated buyers need additional protection (Bloomberg.com, May 13, 2010).

This approach to reform seems unbalanced and potentially quite harmful. In a world with freedom of investment choice, individual responsibility and fiduciary responsibility, investors and their agents must have incentives to exercise due care. One area that could use significant attention is outdated regulation underlying certain pension fund and related investment activity, known as *ERISA*. This regulation was created in the U.S. in

the middle 1970s to encourage prudent investment activities by agents acting on behalf of future pensioners. The regulation in essence states to institutional investors that, if you are to lose lots of money, then you should do so with a great deal of company. Not surprisingly, these guidelines have caused a herding mentality which can distort securities markets—particularly less liquid securities markets. It is also a prescription for investors not to do their homework in a meaningful way, as long as everyone else is behaving in a similar fashion.

These distortions were less benign when institutional investment was primarily focused on stocks, Treasury securities and high-grade bonds. But over time allocations to real estate have increased for many institutional investors, as have allocations to hedge funds and private equity funds. Through these funds, investment into structured securities has increased many times over. These non-traditional low-liquidity investment funds also tend to employ leverage. A herding mentality further encourages investors to neglect certain risks of investment that may prove to be important, and which can increase financial fragility. The bottom line: It may be time to reexamine regulations that govern institutional investor incentives, as this is one of the great underappreciated factors underlying the financial crisis of 2007-08.

- *Increase back-end structural flexibility:* Tax law has required that special purpose vehicles which house the assets for securitization be static, *automon* “firms” that exercise no managerial discretion in the post-issuance period. This rigidity can be costly *ex post* when unanticipated negative shocks occur. Specifically, flexibility can have high value in addressing the consequences of deep asset price shocks that leave an entire sector in financial distress. I believe that building more flexibility into the special purpose vehicle up-front, rather than having to change the rules of the game after the fact, merits serious discussion. I do caution, however, that too much built-in flexibility can increase uncertainty as well as lead to moral hazard problems.
- *Increase monitoring and assessment along the entire securities production chain:* Agency issues associated with a disintegrated loan production process were discussed in detail previously. Better monitoring and information production of post-issuance securities

prices and performance would benefit securitization markets as well as improve the quality of the entire production process. Credit rating agencies provided assessments to some extent for a period of time, but by 2004 or so detailed assessment stopped as the investment “party” in securitization markets started in earnest. One recent proposal that gets at this issue is a requirement that issuers “sign off” on the quality of the asset pool being issued. This approach seems a bit heavy-handed—I would instead prefer a more market-based approach that focuses on creating incentives for investors to monitor and assess issuer quality and compliance.

A key potential player in organizing the production process is the credit rating agency. Going forward, credit rating agencies, if their role is well designed and communicated clearly to the market, have the potential to play an important and positive role in assisting in organizing securitization markets. They served this function well in the 1990s without much regulatory assistance as the structured securities began an intense period of development in the U.S.

- *Consideration of organization form and incentives of issuers and investors:* Prior to the late 1990s, most large investment banks were organized as partnerships. But access to capital and operational scale-scope considerations, among other factors, led to many of these firms going public as corporations (see Morrison and Wilhelm (2007) for more on this topic). Being a publicly traded firm creates liquidity for its employees, and changes incentives. The dark side of liquidity is that it decreases long-term commitment. An important, and very tricky, regulatory issue is how to address this liquidity-incentives issue in the interest of improving the functionality of securitization markets. I will not offer any specific proposals in this regard, other than saying that it is an issue that merits continued attention and consideration of creative approaches that do not undermine private market incentives to innovate and allocate resources efficiently.
- *Monitoring the monitor:* As a result of the financial crisis, financial market regulation will become more centralized in the U.S. and in certain other countries. This is fine, but the very organizations that will be charged with addressing regulatory shortcomings are those that failed to act effectively in the days, months and years leading up to the

meltdown. And, regardless of a new regulatory framework put into place, it is true that “capital, like water, tends to flow around obstacles. Try to dam its movement at one point, and slowly but remorselessly it will find its way around” [*The Economist*, “The Unintended Consequences of Past Financial Reforms”, January 30, 2010]. This in fact is the great and deep problem of regulating a dynamic as well as complex financial system: capital finds ways to flow around barriers, but it also gets redirected in other ways to meet the emerging needs of economic actors. It is very difficult for regulators to keep up, and as regulation gets stale it also becomes ineffective and distortionary.

One “creative” thought in this regard would be to establish a forward market on the likelihood of the next financial market crisis. Doing so would of course require well defined and easily measurable benchmarks as to what constituted a financial market crisis (there could be different definitions that reflect varying degrees of severity). Creating such a market would also require addressing asymmetric information and moral hazard problems, which I will ignore for now. But the basic notion is to create a market mechanism that, in effect, monitors the monitor. The advantage of my proposal relative to correlated market metrics such as LIBOR is that it is direct and easily understandable to consumers, business people and politicians. Such a mechanism would of course be susceptible to Paul Samuelson’s observation that the stock market has called 13 out of the last five recessions, but it at least provides a check on what we know will be imperfect rules and enforcement going forward.

Lastly I would like to pose the following question. Is a complex financial system required to facilitate long-run growth in a complex real economy? This is a fundamental issue, and in my opinion goes to the heart of the regulatory policy issues being considered in countries like the U.S. I am not aware of any specific research on this topic, although there have been a number of papers which indicate that more sophisticated financial markets (as measured by stock market liquidity, etc.) are related to, and may possibly cause, increased levels of domestic economic growth (see, e.g., Levine and Zervos (1998)). I will conjecture that there is a positive causal relation going from complex finance to increased growth in a complex real economy, at least up

to a point. Determining the inflection point, should it exist, would be most interesting and relevant to this discussion.

VIII. Conclusion

This paper lays out the pros and cons of securitization, concluding that it can work. Giving up on securitization at this point is to me analogous to giving up on the U.S. experiment of creating a system of small, geographically dispersed banks in the 1800s. Although that system had its problems and indeed helped cause a number of financial crises, it addressed the needs of decentralized and rapidly expanding economy in a geographically vast country to finance investment in the large as well as in the small. Securitization is simultaneously similar to and different from traditional small banking, as a lack of scale and opaqueness are relevant to both. Securitization is, however, a transaction-based business as well as product focused and geographically diversified, where instead traditional localized banking is relationship-based and geographically focused with a variety of products to serve the needs of the local customer base.

But, like banking in the U.S. in the later 1800s and early 1900s, securitization is now transitioning from a period of youthful erratic exuberance to one of awkward early adulthood. Arguably, it took approximately 100 years (culminating with the creation of deposit insurance in the 1930s) to learn how to regulate and control the formal banking system in the U.S. The growing pains with securitization and the shadow banking system were clearly put on display with the recent financial meltdown. We are now at a critical stage that will define whether and how well securitization will work. Indeed, it will be interesting to see if the securitization “beast” can be tamed in the near term, or whether it will take much longer, or whether we end up caging the beast due to its uncontrollable nature. This paper has attempted to help guide interested parties with respect to some of these issues.

As a final note, it is also important to stress tradeoffs and a longer run perspective. Creating a regulatory system whose objective is to completely eliminate banking panics would be a wonderful thing, but doing so would come at great cost. For example, elimination of banking panics could possibly be accomplished by structuring an extremely simple financial system in

which community and regional banks, hedge funds, private equity funds, financially oriented insurance companies and other shadow banks are eliminated. The costs associated with this approach would be immense along many dimensions, including the inability to adequately fund any number of start-up businesses and productive consumer activities. Unfortunately, panics and bubbles appear to be an fact of economic life. The policy challenge is to reduce the frequency and especially the severity of such episodes, while not choking off incentives and productive activities in a vast and complicated global economy.

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