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Getting to the Heart of the Crisis: A Deeper Look into Mortgage Securitization and Credit Default Swaps

Satya Thallam†

The process of understanding the causes of and solution to the current financial crisis is consumed in large part to identifying villains – the actors who made mistakes or took advantage of opportunities which put the economy at risk. The recently inaugurated Financial Crisis Inquiry Commission created by Congress (modeled after the Pecora Commission in the 30s and the 9/11 Commission earlier this decade) has been given over 20 targets to investigate. A recent Congressional Research Service report identifies a similar number of culpable entities, including human frailty and greed.

But insufficient attention has been paid to the financial instruments and arrangements that are no doubt at the heart of the crisis, whether responsible or not. This issue of Lombard Street takes a closer look at two poorly understood but widely implicated of those instruments: securitization and credit default swaps (CDSs).

In a recent hearing at the Senate Banking Committee, Ranking Member Richard Shelby (R-AL) repeatedly asked how, after having seemed to work pretty well for so long, securitization could be revived. Arnold Kling offers a skeptical view of the future of securitization. Once at the heart of mortgage financing, the market for mortgage securities has in recent months precipitated and leaves Kling wondering if it should ever be revived. A companion piece, by Hanweck, Sanders, and Van Order takes, if not an opposing, a slightly more sanguine view of securitization. They pin certain problems in the housing finance sector to the dual, hybrid nature of many of the institutions therein, and offer a future which allows originate-to-hold and originate-to-distribute to co-exist so long as they are given an even regulatory playing field. Both explain the crucial role that the GSEs played in the mortgage market as it previously existed.

In a third piece, Charles Davi takes a closer look at credit default swaps, and their fundamental characteristics which make them a beneficial part of the financial sector. He points out, that in order to more

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†Satya Thallam is associate director of economic education, responsible for connecting Mercatus scholars and their research to leveraged audiences within Congress, federal agencies, and state and local governments, ensuring that policy ideas get into the hands of those people who need it most, in the most timely fashion. He is also responsible for writing and editing op-eds, the Mercatus On Policy series, and other vehicles for dissemination based on Mercatus research.
completely hedge and diversify one’s credit risk, relying only on underlying bonds would be insufficient. He also discusses the oft-repeated but mistaken notion of CDSs as insurance. While they do in part act much like an insurance arrangement, they also possess a “dynamic life between execution and termination, and therefore, have more in common with forward contracts than insurance.” He also addresses the externality argument surrounding regulation of derivatives, and submits that CDSs, much more than imposing a negative externality which denotes market failure, may actually provide a positive externality from which market participants benefit from.

While ongoing discussion of regulatory structure is merited and much needed, Congress and the Administration continue to debate reform along lines of a static financial structure with fixed and well-defined instruments. In many cases, in my own interactions with policymakers, even existing and well-established financial instruments are poorly understood. How then can policy be made which protects innovation while protecting from undue and unforeseen risks? The authors in this issue of Lombard Street give us a more nuanced view of certain instruments and offer an alternative future contrary to the dominant view that mortgage finance will look much the same as it has, and credit default swaps only offer high-stakes betting on the failure of companies.
Should Mortgages be Securitized?

Arnold Kling†

Like Humpty-Dumpty, mortgage securitization has taken a big fall. There is a widespread presumption that government policy, if not all the king's horses and all the king's men, should be aimed at putting securitization together again. The purpose of this essay is to question that presumption.

The first section of this paper will describe how securitization worked at Freddie Mac in the late 1980s, when I worked there. This will allow me to introduce and explain the concepts of interest rate risk and credit risk in mortgage finance.

The second section of this paper will describe developments in the mortgage industry from the mid-1980s through the 1990s, when Freddie Mac and Fannie Mae took on more interest rate risk. The third section looks at what evolved over the past ten years, when the process for allocating and managing credit risk changed, with “private-label” securitization and the growth of subprime mortgages.

The fourth section of this paper describes various options for reviving mortgage securitization. The final section steps back and looks at interest rate risk and credit risk from a public policy standpoint. Government policy influences the allocation of credit risk and interest rate risk in capital markets. What are the social costs and benefits of various allocations? I suggest that policymakers might consider reverting to the housing finance system that preceded the emergence of securitization, in which depository institutions were responsible for managing both credit risk and interest rate risk for mortgages.

Freddie Mac around 1989

I joined Freddie Mac as an economist in December 1986. About eighteen months later, I was promoted to Director of Pricing/Cost Analysis, under the Vice-President for Financial Research. My job was to oversee the models used to manage interest rate risk and credit risk.

† Arnold Kling is an economist and member of the Financial Markets Working Group of the Mercatus Center at George Mason University. In the 1980's and 1990's he was an economist with the Federal Reserve Board and then with Freddie Mac. He blogs at econlog.econlib.org
At the time, my primary focus was credit risk. Freddie Mac bundled loans into securities, and then it sold the securities. If a mortgage loan defaulted, Freddie Mac would pay the entire unpaid balance on that loan to the security holder and then try to recover as much as it could from foreclosure proceedings on the property. Thus, Freddie Mac insulated security holders from the credit risk. This was known as the guarantee business, because Freddie Mac would guarantee that investors in its mortgage securities would not have to worry about individual mortgage defaults.

A change in market interest rates could affect the value of the cash flows due to the investor in a mortgage. Because Freddie Mac packed nearly all of the mortgages it guaranteed into pass-through securities, Freddie Mac in the late 1980s had very little interest-rate risk. The interest-rate risk was borne by the investors who bought Freddie-Mac securities and relied on the cash flows that were passed through. Note that at that time there was a difference between Freddie Mac and Fannie Mae. Fannie Mae had traditionally financed most of its mortgage purchases with its own debt, rather than with pass-through securities. Thus, Fannie Mae had taken on interest-rate risk.

Interest-rate risk arises because the typical mortgage in the United States is a thirty-year fixed-rate mortgage with a prepayment option. This means that the firm receiving the cash flows of the mortgage (call this the mortgage holder) faces a difficult problem in matching funding with the cash flows from the mortgage.

Suppose that the interest rate on the mortgage is 8%, and suppose that the mortgage holder finances its position by issuing a five-year bond at 7%. If interest rates remain unchanged, then after five years the holder can issue another five-year bond at 7%. If this environment persists for thirty years, then the holder clearly makes a profit.

However, suppose that after two years, market interest rates drop by two percentage points. The borrower takes advantage of this to obtain a new mortgage at 6%, using the proceeds from this refinance to pay off the original mortgage. The holder is still stuck with having to pay interest on the five-year bond for three more years at 7%. However, the holder cannot find investments that yield more than 6 percent, so the holder takes a loss. This is known as prepayment risk, or the cost of the prepayment option.

On the other hand, suppose that after two years market interest rates rise by two percentage points and that this rise is permanent. Now, the mortgage borrower will try to retain the loan as long as possible, while the mortgage holder's financing will run out after five years. At the end of the fifth year, the holder is going to have to obtain new funding, which will cost 9%, so that the holder is going to be suffering a loss. This might be called duration risk, because the cash flows from the mortgage have a longer duration (the last payment will not be received until thirty years from the date of origination) than the holder's liability (a five-year bond in our example).
When I joined Freddie Mac, its major competitors had recently been stung by duration risk. In the late 1960s and early 1970s, mortgage interest rates were around 6%. By the early 1980s, market interest rates had more than doubled. Fannie Mae, which at that time relied on medium-term debt to finance its mortgage holdings, was losing $1 million a day in 1982. More importantly the savings and loan industry, which financed its mortgage holdings with short-term deposits, was bankrupt.

Thus, by the early 1980s, the approach of funding mortgages with short-term deposits was discredited. Securitization, which allowed the interest-rate risk to be transferred to institutions such as pension funds and insurance companies, seemed to be a superior financing method.

The big challenge with securitization was managing credit risk. This required pricing policies, capital policies, and risk management policies.

For pricing, we wanted to price mortgages according to risk. We specified a probability distribution for house prices, and we assumed that losses from mortgage defaults would take place when individual house prices fell below the outstanding mortgage balance. Because of this, the guarantee fee charged on a loan that was for 80% of the purchase price would be higher than the fee charged on a loan that was for 60% of the purchase price.

Our capital policy was tied to something that we called “the Moody's scenario,” since it was suggested to us by that credit rating agency, based on what happened in the Great Depression. Under this scenario, the average house price would fall by 10% per year for four years, and then remain flat thereafter. Although this was the average price path under the Moody's scenario, we simulated a distribution of house prices, in which some fell by more and some fell by less. We then measured the total losses under this scenario, and we assumed that we would need enough capital to cover those losses. The cost of this capital was then priced into the guarantee fee. This capital charge did even more to penalize the relatively high-risk loans, such as loans backed by rental properties or loans with a high loan-to-value ratio.

Pricing for risk is fine, assuming that the loan origination process is standardized. However, because loan origination was not under the control of Freddie Mac, we faced principal-agent problems. The incentive of the originators was to aim for volume, regardless of quality. To appreciate the challenge that we faced, consider that we might encounter a shady mortgage originator, whose intent is to create fraudulent mortgages and then abscond with the origination fees—or even the entire proceeds of the loan. Freddie Mac might revoke the eligibility of the shady operator, only to find that the operator moves to another location and does business under a different name.

To manage this principal-agent problem, Freddie Mac had a number of devices (and Fannie Mae had very similar measures):
--a qualification system for sellers. To sell loans to Freddie Mac, you had to prove that your staff had experience and you had to show sufficient capital that you could buy back loans that had been improperly originated.

--a seller-servicer guide. This spelled out exactly the procedures and rules that we wanted originators to follow when approving or rejecting loan applications.

--contractual obligations. Sellers were providing contractual representations and warranties to us that they were following our guide.

--quality control. We inspected the loan files of a sample of loans from each originator. Loans that were found to violate the “reps and warrants” were put back to the seller to be repurchased.

All of these risk management processes were costly, and all were imperfect. The principal-agent problems in securitization were difficult, and we were constantly tinkering with our systems to try to improve them.

**Freddie Mac and Fannie Mae Achieve Domination**

In the mid-1980s, inflation and interest rates began trending down. This made it profitable to finance mortgages with medium-term debt. Indeed, the downward movements in interest rates served to highlight prepayment risk. Mortgage holders had difficulty protecting themselves against sharp declines in interest rates, which caused borrowers to refinance while the holders were still paying interest on medium-term debt.

Fannie Mae found a solution to the prepayment problem by issuing callable debt. For example, it might issue a ten-year bond that it could extinguish at par after five years, if interest rates had fallen. This effectively transferred prepayment risk from Fannie Mae to its debt investors, in return for which Fannie paid a slightly higher interest rate.

The innovation of callable debt ultimately produced a dramatic change in the mortgage market. It undermined the Freddie Mac model of issuing pass-through securities. Investors were more comfortable with the relative simplicity and transparency of callable debt. In the 1990s, Freddie Mac joined Fannie Mae as a “portfolio lender,” meaning that it held its own mortgage securities and funded them with callable debt.

Funding mortgages with callable debt was so efficient that by 2003 Freddie Mac and Fannie Mae together held half of the mortgage debt outstanding in the United States. This dominant position was undermined by other innovations, discussed below.

**Securitization Goes Private-Label**
The benefits of securitization come from the fact that investors do not have to go to the trouble and expense of examining the underlying mortgages. Investors know the types of mortgages and the interest rates on the mortgages in the pool, which is the information that they need to manage interest-rate risk. However, investors assume that they are entirely insulated from credit risk, because of the guarantee provided by Freddie Mac or Fannie Mae.

The guarantees from Freddie Mac and Fannie Mae were credible because of the capital and historical record of those firms. Most of all, however, the guarantees were credible because of the perception that it would be politically unacceptable to allow those firms to fail.

There are mortgages that Freddie and Fannie could not guarantee, because of legislated limits on the size of loan eligible for those agencies. Moreover, ten years ago there were loans that the agencies would not guarantee, because low downpayments or weak borrower credit history made the loans high risk for default.

About ten years ago, a number of innovations emerged that substituted for an agency guarantee, allowing “private-label” securities to compete with those of the agencies. Borrower credit scores provided a simple, quantitative measure of the borrower's credit. Structured securities allowed credit risk to be reallocated, with subordinated holders taking most of the risk and senior holders only taking what was left over. The various tranches were evaluated by credit rating agencies, so that investors could treat AAA private-label securities as equivalent to agency securities (a practice which was formally ratified by bank regulators in a policy that took effect on January 1, 2002). For extra comfort, the holder of a security could purchase a credit default swap, which would pay off in the event that the security's principal repayment was jeopardized.

With all of these layers or protection, holders did not have to examine the underlying mortgages. In fact, it is not clear where that responsibility lay. With agency securitization, it was clearly the responsibility of Freddie Mac and Fannie Mae for managing, measuring, and bearing credit risk. However, with private-label securitization, those functions were diffused. The Wall Street firms that packaged securities had no experience with the risk management functions needed to ensure quality standards in mortgage origination. The credit rating agencies had most of the responsibility for credit risk measurement, but they bore none of the risk. In retrospect, the incentive to be overly generous in rating securities was far too high.

Toward the latter part of the housing boom, the risk management process also broke down at Freddie Mac and Fannie Mae. Private-label securitization and the growth of subprime mortgages were leading to a sharp fall in the market share at the two agencies. In retrospect, the agencies should simply have held on to their capital standards and risk-management controls. However, at the time, they suffered from doubts about whether their traditional approach was still valid. They began to loosen standards for mortgage quality, to maintain insufficient capital relative to credit risk, and to purchase subprime mortgage securities based on
agency ratings rather than on an assessment of the risks of the underlying loans. As a result, when the crisis hit, the agencies were not in a position to survive the losses that they incurred.

**Fix Securitization?**

On April 30, 2009, Gillian Tett lectured at the London School of Economics.¹ Tett, the author of perhaps the best book published so far on the origins of the financial crisis,² was asked a question about the impact of the failure of Lehman Brothers. In her response, she said that having the securities market break down was the equivalent of waking up one morning and finding that the Internet and cell phones had broken down.

The consensus in the financial community is that securitization simply must be fixed. The question is how this can be done.

Securitization worked because the holders of securities assumed that they were not bearing any credit risk. Securitization broke down when mortgage defaults reached a level where holders of securities were no longer confident that they were insulated from credit risk. For mortgage securitization to work again, the credit risk will have to be absorbed in a credible way by someone other than the holder of the securities.

Mortgage credit risk includes both systemic risk and idiosyncratic risk. Systemic risk is the risk that conditions in the overall housing market will take a sharp turn for the worse. Idiosyncratic risk is the risk that mortgage originators will deliver faulty or fraudulent loans into the securitization process.

The private-label securitizations operations did not seem to have strong mechanisms for dealing with idiosyncratic risk. Recently, the U.S. Treasury published recommendations for financial reform that included requiring mortgage originators to retain a 5% interest in the mortgage loans that they deliver for securitization. This strikes me as a crude approach. Five percent is too high for an honest but capital-strapped mortgage broker. At the same time, it is too low to deter serious fraud: retaining a 5% interest is no penalty at all if your intent all along is to abscond with 100% of the funds.

A basic problem in private-label securitization is that the functions for managing idiosyncratic risk (procedures for qualifying sellers, establishing and enforcing guidelines, and so forth) are no one's responsibility. Some party must take on those functions in order to address idiosyncratic risk.

Another problem with all forms of mortgage securitization is that of systemic risk. At this point, there is no private-sector firm that can credibly insulate security holders from systemic risk. If Freddie Mac, Fannie

¹ A recording of the lecture is available at http://www.lse.ac.uk/collections/LSEPublicLecturesAndEvents/events/2009/20090311t1935z001.htm

Mae, and AIG all are unable to proceed without government backing, then there is no way that securitization can come back without the government acting as a guarantor of last resort.

One suggestion that I have heard is that government should provide support along the lines of “the GNMA model.” This strikes me as nonsense. GNMA packages loans that are guaranteed by FHA and VA. GNMA is not taking any credit risk. Instead, losses are absorbed by the agencies from which it obtains the loans.

The only way that the “GNMA model” could be used for the entire mortgage market would be if the FHA were to guarantee every mortgage. However, the FHA is not even capable of properly pricing the credit risk within its own niche. The FHA currently is suffering significant losses, creating large liabilities for taxpayers.

Another proposal is what I refer to as “Wall Street’s Wet Dream.” The idea is that a government agency would behave like a late-1980s Freddie Mac. This agency would take all of the credit risk in the securitization process, but it would not hold any securities in portfolio. This would be ideal from Wall Street’s point of view, because it would maximize the circulation of mortgage securities, rather than keep them stuck inside Freddie Mac or Fannie Mae in their own portfolios. The result would be an agency that bears no interest rate risk (which Freddie and Fannie were able to manage successfully), but which bears all of the credit risk (which brought them down).

The “Wall Street Wet Dream” model would ensure that mortgage securities can be traded safely and profitably. The government agency would be responsible for managing the idiosyncratic risk of dealing with mortgage originators. It also would have to price for the systemic risk that arises from fluctuations in regional and national housing markets. Ultimately, this systematic risk would be borne by the taxpayers. Thus, the profits of the securities business would be fully privatized, and the credit risk would be fully socialized. Given the way Washington and Wall Street relate to one another in our society, it is a good bet that this is the model that will gain the most political support.

**Returning to the Savings and Loan Model**

Policymakers should consider returning to the mortgage finance system that we had forty years ago. Mortgages were originated and held by firms that financed their mortgage holdings with deposits. These were the savings and loans.

The savings and loans did not suffer from the principal-agent problems that plague securitization. The loan originator is controlled by the institution that is going to hold the mortgage. The management of idiosyncratic risk is internalized.

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3 For an example of the type of proposal I am describing, see Harley S. Bassman, “GSE’s: The Denouement,” available at http://www.zerohedge.com/sites/default/files/RateLab%20GSE%20Denouement.pdf
To manage systemic risk, regulators could subject depository institutions to capital regulations and stress tests. Mortgage holders that benefit from deposit insurance would have to hold enough capital to withstand a severe drop in house prices.

The biggest flaw with the savings and loan model was that the savings and loans could not manage interest rate risk. When inflation and interest rates leaped higher in the 1970s, the savings and loans were stuck holding mortgages with interest rates that were well below the new prevailing market rates.

There are various ways to make the S&L model work better than it did in the past. One is to conduct monetary policy in a way that stabilizes the inflation rate. In fact, since the early 1980s the Fed has been able to do that.

Another approach would be to encourage variable-rate mortgages. These do not have to be the sort of high-risk, “teaser” loans that became notorious in recent years. Instead, they could work more like Canadian rollover mortgages, in which the interest rate is renegotiated every five years. The loans would be on a thirty-year amortization schedule, and they would start out at a market interest rate, rather than an artificially low rate. If interest rates were to rise sharply over any given five-year period, we would expect that the borrower’s income would have risen as well, so that the burden of the loan would not be significantly larger.

Defenders of securitization will argue that it is more efficient to fund mortgages in the capital market. I would make two counter-arguments. The first counter-argument I would make is that the alleged efficiency of securitization has not been demonstrated in the market. Mortgage securities are the artificial creation of government, starting with GNMA and Freddie Mac. The second-counter-argument is that adding efficiency to mortgage securitization serves to divert capital from other uses, and it is not necessarily the case that this capital diversion is best for society. More recently, bank capital regulations severely distorted the cost of holding mortgages relative to holding securities, strongly favoring the latter. In a completely free market, it is doubtful that securitization would emerge, particularly in light of recent experience.

At its best, securitization appeared to lower mortgage rates about about one quarter of one percentage point relative to loans that could not be placed into securities. Suppose that government-backed securitization could be put in place to achieve a comparable reduction in mortgage interest rates. Is that an outcome for which we should aim?

Compared with the risks that the government must assume in order to make securitization work, it seems to me that lowering mortgage interest rates by one quarter of one percent is not a commensurate benefit. This is particularly so given the alternative uses of capital. If mortgage rates are a bit higher than they could be under the most efficient system, then some capital will go toward other uses—interest rates charged to businesses or to consumers for other loans will be slightly lower. It is not clear that mortgage loans are
better for society than other uses of capital. If it turns out that the “originate and hold” model is not as efficient as securitization for delivering low mortgage interest rates, that would not be a tragedy.

In order to revive securitization, taxpayers would have to absorb large risk. The social gains would be small, or perhaps even nonexistent. The best thing to do with the shattered Humpty-Dumpty of mortgage securitization would be to toss the broken pieces into the garbage.
Securitization vs. Traditional Banks: An Agnostic View of the Future of Fannie Mae, Freddie Mac, and Banks

Gerald Hanweck†
Anthony B. Sanders††
Robert Van Order†††

The current financial crisis was precipitated by a bubble in house prices and its subsequent burst, which led to a wave of foreclosures, the seizure by the Federal government of the main vehicle for securitization (the Government Sponsored Enterprises [GSEs] Fannie Mae and Freddie Mac), the obliteration of the “private label” securitization market, the failure of 92 banks so far this year, and bailout costs for the remainder of the banking system. No one has come out smelling like a rose. The question we address is what should happen to the historically most important players in the mortgage market: Fannie Mae, Freddie Mac, and the banks.

Broadly speaking there are two models for funding mortgages (and other loans): the portfolio lender model, which entails financial institutions (e.g., banks) originating and holding loans in their portfolio and funding them with debt (e.g., deposits), and the securitization model, which entails buying loans and putting them into pools and selling (perhaps structured1) shares in the pools to capital market investors. Many of the current financial arrangements are combinations of the two. The easiest way of looking at the two models is

1 Gerald A. Hanweck is professor of finance and chair of the finance area in the School of Management at George Mason University.

† Anthony B. Sanders is Professor of Finance in the School of Management at George Mason University where he is the Distinguished Professor of Real Estate Finance. He has previously taught at University of Chicago (Graduate School of Business), University of Texas at Austin (McCombs School of Business) and The Ohio State University (Fisher College of Business). In addition, he served as Director and Head of Asset-backed and Mortgage-backed Securities Research at Deutsche Bank in New York City.

†† Robert Van Order is Professor of Economics, George Washington University, Washington, DC, and former Chief International Economist, Freddie Mac, McLean, VA.

1 “Structured” means taking the cash flows from the pool of mortgages and selling them in non–pro rata ways, for instance, selling the interest payments to one group of investors and the principal payments to another or prioritizing the impact of default losses by having one group take the first loss. Some of these structures, particularly the latter, are discussed below.
to think of them as applying to institutions called “banks” and “securitizers” and to view the rules and benefits that apply to them as their “charters.”

There is a trade-off between the advantages and disadvantages of securitization: securitization provides a low cost and elastic source of funds from the capital market, but it has “agency costs” because of information asymmetry between investors (or whoever takes on the credit risk) and loan originators. Both structures have transactions costs; for instance banks have costs of running branches and the things necessary to attract depositors, and securitization has costs of setting up and marketing deals as well as costs of monitoring agents’ behavior. A competitive balance among the charters depends on the balance of the above as well as implicit and explicit subsidies, particularly in the form of guarantees, but also taxes, received by them.

Guarantees have been a central aspect of both charters. This began with the Great Depression and federal deposit insurance. Fannie Mae and Freddie Mac (hereafter FF) can be understood within the deposit insurance framework: Their GSE status gives them an “implicit” guarantee that is similar in function to deposit insurance, and they use this guarantee to compete with banks. This competition has been referred to as “dueling charters.”

Differences between banks and GSEs can be overrated. For instance, the GSE structure has been criticized as being unworkable because of its dual role as a private company but with a public purpose. However, that is not especially unusual, especially relative to banks, which via the Community Reinvestment Act (CRA) are in much the same position. Public purpose regulation is not that unusual in banking.

During the current financial crisis with the ubiquitous exercise of the Too-Big-To-Fail policy, it has become apparent that virtually all major financial institutions (banks included) and systems of institutions are GSEs. Public policy choices need to realize this and manage it. We suggest that instead of picking a model, we diversify and allow the two charters to compete by making the playing fields between them as level as possible. We do not see the elimination of guarantees as likely or especially desirable. It is probable that the model chosen will be less important than the regulatory structure that accompanies it. Our best guess is that the bank model will focus on Adjustable Rate Mortgages funded with deposits and the securitization model on fixed rate mortgages funded with long term securities. But there are lots of ways to skin a cat, and both charters have ways of doing more or less the same thing.

A Framework


Our point of departure is the “Modigliani-Miller Irrelevance Theorem” (henceforth “MM”). Briefly, the theorem is that under a set of assumptions, which mainly involve competitive markets, low transaction costs, and widely agreed on information, the liability structure of the firm is irrelevant in the sense that changing the way the firm finances its assets will not affect its “all-in” cost of funds. This is because different liability structures are simply different ways of rearranging the same cash flows from the firm’s assets, and competition will assure that all structures will be priced so that the sum of the parts will equal the whole, no matter how the parts are chosen.

Taken literally, the theorem suggests that the different charters should not affect mortgage rates. A softer version is that advantages of different structures are likely to be small, and because of very elastic long run supply curves, small advantages of one source of funding (e.g., from a subsidy or lower transaction costs) can lead to big effects on market share but with perhaps small effects on interest rates and resource allocation.

**Institutions**

The structure of the U.S. mortgage market has changed dramatically in the last quarter century because of the rise of securitization, which was largely brought on by the three secondary market Agencies: Fannie Mae, Freddie Mac, and Ginnie Mae (a Government Owned Enterprise). In addition, the Federal Home Loan Bank (FHLB) system provides liquidity to the banking institutions by discounting their mortgage-related assets. Their growth has been accompanied by a decline in the market share of the traditional lenders, banks, and thrift institutions (e.g., savings and loans). That growth was reversed by the growth of the “non prime” (subprime and “Alt-A”) market after 2003, and renewed with the collapse of that market.

In 2008, FF were put into conservatorship. The government has become the major shareholder in both companies. The conservatorship has made the guarantee much closer to explicit, particularly because the Treasury has agreed to inject up to $400 billion in capital as needed.

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5 This assumes limited liability by the issuer, so that the structure is forced to depend on just the asset cash flows. But if, for instance, there is an outside guarantee on debt funding, then debt funding might be preferable (see below).


8 Alt-A loans are loans that have characteristics of prime loans (e.g., good credit history) but have less than full documentation of income and wealth.
Banks, the main alternative to securitization, also have a low-cost source of funds in the form of insured deposits, but this source of funding has not been as elastic as the one coming from capital markets in general, which can be tapped quickly by the secondary market. As a result, banks sometimes have trouble raising money quickly, especially relative to the Agencies.

Banks, like all corporations, are essentially structured deals with subordination: the common stock holders are the most subordinated, followed by preferred stock, subordinated debt, etc. The MM Theorem of course applies to this structure. A key difference, which applies to any ongoing business, is the option of management-to-change portfolio composition, something that contractually is not usually allowed in structured securitization deals. Details differ, but structured securitization deals and banks have a lot in common, and it is not clear which is less transparent.

Recent Securitization

The beginning of modern securitization in the 1970s and early 1980s relied primarily on the standard pass-through security, which bundled mortgages together and sold shares in them, usually with Agency guarantees of credit risk. While Agency MBSs have little or no credit risk, they have two types of interest rate risk: the usual risk of any long-term security that its value will fall when rates rise, and a second risk that is similar to that of callable bonds, because borrowers have the option to refinance (i.e., call the mortgage) which they tend to do when rates fall. Guaranteeing credit risk allowed investors to focus on managing interest rate risk.

Beginning in 1983, the first collateralized mortgage obligations (CMOs) established tranches that received principal payments in sequence. In this way a complicated pool of 30-year callable securities was broken into a sequence of bonds, which could be sold to different types of investors. A popular form of structuring segments prepayment risk by taking parts of the pools and designating one piece that takes the first part of prepayments with the other piece taking the risk only above some level. This is a form of subordination, in this case of prepayment risk.

Both Fannie and Freddie also fund mortgages with debt. Debt allows them to issue very homogenous and easy to understand securities, which can trade very efficiently, almost like Treasury debt, but it requires them to manage the interest rate risk. The share of debt financing is now around one-third.

The Non-Agency (Private Label) Market

This market operates mostly in areas not eligible for the agencies. A big part of this market has been loans with balances too large for Agency purchase. More recently, the subprime market, which consists largely of

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9 For example, Freddie Mac’s debt can be found on their website at http://www.freddiemac.com/debt/
loans to borrowers with poor credit histories, has grown very rapidly. A related market, for “Alt-A” loans, which are loans that are prime except for low documentation of income and wealth, has also grown rapidly. The two combined have grown from around 5% in the 1990s to 10% in the early 2000s and then to roughly 33% after 2003. Commercial mortgages are also funded with securities (Commercial Mortgage-Backed Securities or CMBSs).

Non-Agency securities are different from Agency MBSs because they do not have the benefit of Agency guarantees on credit risk. As a result, credit risk is typically managed by subordination, as with the CMOs, but in this case to rearrange credit risk. Typically there is a series of subordinated tranches that take the default losses up to some amount and senior tranches, which take the rest. Functionally these are mini corporations, like special purpose banks. An alternate credit enhancement tool has been insurance on the pool, e.g., credit default swaps.

Unbundling, the Securitization Process, and Agency Problems

The traditional portfolio lender performs all aspects of the mortgage bundle: it originates the mortgages, it services them,\(^{10}\) it takes the risk of default (perhaps along with a private or government insurer), and it raises money in the deposit market to fund it. The secondary market evolved by unbundling this package.

Unbundling takes advantage of division of labor and promotes competition among the suppliers of the various bundles, but it has a cost. In particular, there is a “principal/agent” problem: the principals (e.g., ultimate investors) depend on agents (e.g., the institutions originating and servicing the loans) to perform as promised. For those who end up taking the risk, the major principal-agent problem has come from the reliance on originators and servicers to originate good loans and service them properly.

This is all in contrast with the traditional, bundled bank, which had all the elements of the bundle under its control and was less worried that the part of the firm that originates mortgages would take advantage of the part of the firm that evaluates, monitors credit risk, and enforces the loan contracts.\(^1\) Hence, banks have an advantage at controlling agency costs.

Modigliani and Miller

So where does Miller-Modigliani fit into this? In the pre-secondary market world in the U.S. where banks (savings and loans) did the lending, transaction costs and asymmetries were more or less the same for everyone, as were regulations. In that world MM was violated because holding less capital lowered “all-in”

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\(^{10}\) Servicing means collecting the payments and sending them to wherever they are supposed to go and managing delinquency and foreclosure.

\(^{11}\) That is not to say that there is no risk. Compensation schemes could induce conflicts of interest inside the firm. The point is that conflicts inside the firm are easier to resolve.
costs to the banks because it allowed better exploitation of the deposit insurance guarantee. A price paid for this was that funding was forced through the deposit market, which has been shown not to be the most efficient vehicle for funding fixed rate mortgages (recall Reg. Q ceilings on deposit interest rates).

The advent of GSEs didn’t add or subtract much in terms of the existence of guarantees, but it changed the types of guarantees and the possible ways of operating and exploiting the guarantees, by allowing institutions to get access to the bond market through MBSs. These markets have lower transaction costs, a more elastic supply of funds, and a better way of managing interest rate risk. But the GSEs were forced, because they were secondary markets, to take on some asymmetric information problems that banks did not have to take on. So MM was still violated, but it was violated in different ways.

The subprime market was largely unburdened by regulation and guarantees. It violated MM because of asymmetric information on steroids.

**Policy Issues: Structures and Guarantees**

The two central policy issues are:

1. Resource allocation in normal times.
2. Systemic risk when times are bad.

The first refers to incentives for pricing and risk taking as they affect investment in housing versus other investment and allocation of housing among households. Guarantees invite moral hazard if, as is inevitable, they are imperfectly managed. The second issue refers to the center of much of the recent concern because of spillovers from housing finance markets to other markets, which sent the financial system overall into collapse and contributed to a major recession.

Guarantees have been a way of controlling systemic risk, but at the expense of better resource allocation. For instance, savings and loans in the 1980s had similar incentives to take risk and misallocate resources and provoke bailouts (of the government insurance fund that supported the S&Ls). Their collapse was the consequence of taking interest rate risk followed by excessive investment in commercial real estate after the passage of the Garn-St Germain Act (1982) and the collapse of the oil price bubble in 1986, but because of deposit insurance it did not produce bank runs to speak of or have broad effects on the economy.

The story until recently was that the main source of moral hazard was government guarantees, but we have discovered that the least guaranteed sector, private label securitization, indulged in a very large amount of moral hazard. The private market, for reasons related to policy decisions (e.g., delegating too much regulatory authority to rating agencies), did not monitor risk very well.
Moral hazard is complicated. Financial institutions do not always exploit it fully, to the extent that they have reputations or franchises to preserve. Investment banks don’t always put really bad loans into pools because they want to establish a reputation for good service and survive to collect high fees again. But institutions will ramp up risk-taking when they are in trouble or when the benefits are bigger than the expected loss in reputation or franchise value.

There are lots of trade-offs. The most obvious is that guarantees tend to produce poor resource allocation but less panic and a more stable source of funds.

**Going Forward**

Right now, Fannie Mae, Freddie Mac, and Ginnie Mae dominate the market, and there is little prospect for private capital moving into FF, and little prospect for banks moving heavily into mortgages in the near future. For now they are the only game in town. But what about the future?

The trade-off between agency costs and fundraising costs (and supply elasticity) would appear to be the most important issue for securitization vs. banks, but how much is not obvious. For instance, FF were clearly subject to agency costs and spent resources on managing it, but their General and Administrative costs, which include these costs, were low, much lower (under .10% of asset balance) than those of banks, and their loan default performance has been better than industry performance. On the other hand, large banks have found non-deposit ways of funding that approximate the efficiency of the Agency access to capital markets.

**Recommendations**

Our proposed solution is to be agnostic and set regulations that convey the same subsidy (hopefully zero) to each charter and let them duel. This will require addressing weaknesses of the banks and bank regulation along lines parallel to those of the GSEs. The dueling charter model is imperfect, but alternatives, like relying on banks alone or pretending we have a stable, unguaranteed private sector, are worse bets. Here are the GSE, bank, and market proposals that we suggest need to be followed lest risk simply be transferred to one or the other along with their guarantee:

**Capital**

New capital rules will have to be stronger, but not just by increasing minimum capital levels. FF had two capital rules applied to them: one was a series of stress tests and the other a minimum if they passed the stress tests. Clearly the minimum was too low, but simply raising it is not enough. Both companies managed their risks so as to keep stress test capital below the minimum because the minimum is less volatile and easier to manage. Raising the minimum alone will probably not change risk because the incentive will be to increase stress test risk to match the higher minimum. A suggestion is to make the two tests additive rather
than substitutes (with some allowance for time to adjust to more volatile capital requirements). Capital rules must be risk based, and stress tests are likely to be the best single measure.

Additionally, banks and thrifts have been subject to a risk-based capital standard since FDICIA passed in 1991, as well as Prompt Corrective Action standards if capital falls below certain specified amounts. Also, since 1991, banks and thrifts have been subject to risk-based deposit insurance premiums regulated by the FDIC. As the current banking and thrift crisis demonstrates, the regulators did not apply these with vigor and let the risk-based standards lapse and, for large banks, have refused to apply the standards of Prompt Corrective Action. Rather, the Basel II capital accords that were going into effect in 2006 lowered the capital requirements for the largest 20 banks just at the time their capital should have been increasing and a year before their stock prices began to dip.

Further, less costly (e.g., for tax reasons) forms of capital, such as subordinated debt that is credibly subordinated by automatically converting it into preferred or common stock if common stock price falls below some preset level, should be considered. This form of debt could have been sold relatively easily a few years ago and could have avoided to a considerable degree the capital meltdown later.

Accounting capital rules are likely to be too slow to catch some risks, but in some cases marking to market will overstate losses to long term investors when the market evaporates and trading is based on the “lemonness” of assets rather than long-run value.\(^\text{12}\) An alternative is to base capital regulation on a mark-to-market basis of net cash flows from all operations such that it meets a certain risk-based rule in terms of debt coverage and operational needs.\(^\text{13}\)

**Running a Portfolio**

What is on or off balance sheet is an accounting rather than economic distinction, which is not obviously related to risk.\(^\text{14}\) For instance, credit risk, which has been the source of recent problems, is accepted by FF in largely the same way whether the loans are “sold” (with a put back to FF) or debt-funded.\(^\text{15}\) The portfolio issue is mostly interest rate risk, which is serious and was a major source of problems for Fannie Mae in the early 1980s as well as the genesis of the problem for the S&Ls. However, the size of the portfolio is not a good measure of the risk for two reasons: a very large part of the risk can be hedged by selling long-term

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\(^\text{14}\) An advantage of stress tests is that they simply look at cash flows whether on or off balance sheet.

\(^\text{15}\) For instance, subprime securities have been held in portfolio, but they could have been (and to some extent were) as easily re-securitized in some sort of CMO format with the same amount of credit risk.
callable debt or using other forms of debt and forward and option contracts, and second, on the other side, a large amount of risk can be hidden in a small portfolio by holding nasty CMO tranches.

An important element of risk is liquidity risk. In the current crisis, the uncertainty about the guarantee produced a liquidity problem; FF borrowing spreads went up sharply in August 2008. This is a problem that cannot be solved by interest rate swaps; it can be solved by real matched funding, that is, funding long term mortgages with long term callable bonds.

Bank and GSE portfolios are not much different; they both can take on lots of interest rate risk. However, this is an area where stress tests are relatively easy to use as a risk control, e.g., by requiring enough capital to withstand a big shock to interest rates.

**Carrots, Sticks, and Market Power**

A part of the balancing act for any structure is market concentration. From the standpoint of resource allocation, there is a second-best case to be made for market power as an offset to excessively low mortgage rates directing too much money to housing and as an incentive to take on less risk (to preserve the franchise); this, however, is probably not the most effective way of equating private and social costs. Market power and concentration do increase political power and limit or eliminate useful results of competition, such as innovation in alternative mortgage products and risk management. We don’t know what the right size is for financial institutions or how to set up rules to get there.

Finally, the guarantees should be explicit, and FF should be charged a risk-based user fee, which should substitute for their mission regulations (same for banks and CRA). The division of labor should be to use the certainty of the guarantee to control systemic risk and to continue to provide an elastic supply of funds, and use pricing and capital to control resource misallocation and allow the dueling charters to compete.
Rethinking OTC Credit Derivatives

Charles Davi†

The effects that OTC credit derivatives have on the broader financial markets are poorly understood. These effects can perhaps best be described as what economists call externalities or, as they are referred to in the context of financial markets, spillover effects. While the term externality is usually associated with a negative effect on a third party, such as environmental pollution, both externalities and spillover effects can be used more generally to describe effects that are not the express subject of a transaction or group of transactions, without any subsequent value judgment. So, for example, a spillover effect of a robust derivative market could be price information generated in that derivative market “spilling over” into the corresponding asset market, resulting in more accurate pricing in the latter.

Externalities of any kind tend to be controversial, since the existence of externalities could be used as a basis for regulatory intervention. For example, price volatility in spot commodities markets has been pegged to supposedly excessive speculation in futures markets, which has been the lynch pin of the recent push for position limits.¹ Similarly, credit default swaps (CDS) have been blamed for a wide range of effects observed outside the CDS market, from crashing individual equity prices to systemic failures in the broader financial markets. These arguments, which are usually unsupported by any cogent theory or evidence, have been used to justify a ban on naked CDS positions (un-hedged short positions)² and even banning CDS altogether.³ And while the messenger may be merely posturing or aggrandizing, these arguments have a frighteningly large audience.

† Charles Davi, Associate, McDermott Will & Emery, Structured Finance Practice Group; J.D., New York University School of Law; B.A., Hunter College, Computer Science.


³ http://www.bloomberg.com/apps/news?pid=20601087&sid=aKm1E6vW7Brc
In a modest effort to contribute to a more sober dialogue, what follows is a discussion and analysis of the legitimately new products and relationships that CDS have created along with a largely theoretical discussion of how these new products and relationships could be expected to spillover into and alter behavior in the broader credit markets, using concepts rooted in basic economics and common sense. Specifically, we consider whether CDS could divert capital that would otherwise be allocated to the bond market, and thereby, in certain cases, mitigate damage to overall economic welfare.

**What Is New About Credit Derivatives**

**No Need To Own the Underlying**

In a world without credit derivatives, it would be necessary to first locate and purchase a bond (or loan, but for simplicity's sake we will refer only to bonds) issued by a particular issuer to take a position on that issuer's credit. Even taking a short position requires locating a bond to first borrow and then sell short into the market. This implies that, in the absence of credit derivatives, the aggregate dollar value at risk at any time that is tied to a particular issuer's default cannot be greater than the total face value of the issuer's bonds then outstanding.

Credit derivatives remove that ceiling by allowing parties to identify a particular issuer or issuance of bonds without either of them owning any of the underlying bonds. The vast majority of credit derivatives are CDS, and so are composed of two transactional legs: the short leg, which pays a fixed quarterly premium and possibly an upfront amount; and a long leg, which makes a payment upon the occurrence of certain predefined "default" events. Those that have incorrectly characterized CDS as insurance policies have focused only on these two payment legs. This characterization also ignores the CDS market's structure, which has dealers that supply liquidity and end users that take both long and short positions on credit risk. This is in contrast to the financial guaranty insurance market, which has end users that take only short positions (the policy holders) and insurers that take only long positions on credit risk.

Because CDS are swaps, there is much more to the transaction than the premium and default payment. As a matter of general market practice, collateral flows back and forth between the parties based on daily mark-to-market valuations of each party's respective position, with the out-of-the-money party posting collateral to the other. The value of each party's position is a function of how CDS spreads have moved since the contract was executed. As a result, CDS have a dynamic life between execution and termination,

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and therefore, have more in common with other swaps and forward contracts than insurance policies.\(^5\) Interestingly, this also implies that the value of a CDS position is determined by both the underlying bond (upon the occurrence of a default) and CDS spreads, which creates the potential for a disconnect between the two near default known as *jump to default risk*.

Some have argued that because CDS do not require ownership of the underlying, there is no limit to the amount of risk that can be created through their use and that as such one spillover effect generated by the CDS market is greater systemic risk.\(^6\) This argument assumes the existence of a derivative vending machine that generates products upon payment and ignores the reality of contracts, which require human decision makers to mutually agree to assume risk. Embracing the latter view, we note that the two parties to a derivative contract necessarily assume diametrically opposing risks.\(^7\) As such, while CDS eliminate the requirement of locating and purchasing a bond, they still require one party to identify another willing to assume the other side of the trade. While it could be that there are more fools than bonds, the argument that CDS facilitate the creation of unlimited credit risk ignores the simple fact that there are two parties to every derivative contract, with each assuming opposing risks. So while CDS remove the ceiling imposed by the supply of bonds, the CDS market is still subject to that market's willingness to assume risk.

**Scale and Composition Are Arbitrary**

CDS are not bound to any multiple of the face value of a bond nor are the parties required to reference only one issuer. So long as the mutual interests of the parties are served, they can contract on whatever scale and reference any issuers they like. This feature facilitates the creation of a wide variety of CDS, such as basket CDS, n-th to default CDS, and the widely traded iTraxx credit indices. These products allow market participants to take highly structured positions, both long and short, on a basket of credits through a single trade. The creation of comparable products in the bond market would incur substantially greater transaction costs than that of their synthetic counterparts.

**Reduced Funding**

As a general matter, CDS are unfunded. That is, the long leg, the *protection seller*, does not post the face value of the contract, the *notional amount*, into an account for the benefit of the short leg, the *protection

\(^5\) The popular CDS as insurance argument is based on bespoke CDS contracts entered into with highly rated insurers that did not require collateral until the insurers were downgraded. As mentioned above, these contracts are not representative of market practice.

\(^6\) George Soros, One Way to Stop Bear Raids (available at http://online.wsj.com/article/SB123785310594719693.html).

\(^7\) N.B., this is a troubling fact for those who espouse the view that market participants have uniform expectations.
buyer. While both parties must set aside some capital to cover potential collateral and payment obligations, the reduced funding requirement allows the protection seller to invest some portion of the notional amount elsewhere, earning a return. If that portion of the notional amount is posted or held in Treasuries, then the cash flows received by the protection seller will be roughly equivalent to the cash flows of the underlying bond. This is because the protection seller will receive both the risk free rate on the Treasuries and the premium from the short leg, which should be approximately the spread over the risk free rate that the underlying bond pays. But if the protection seller invests the portion of the notional amount available for investment in non-risk free instruments, he will be able to earn a return above the risk free rate on that portion in addition to earning the swap fee, which implies that the total return should be higher than that of the underlying bond. Thus, CDS allow for essentially unfunded exposure to credit risk, which can be used to facilitate a return that is higher than that of the underlying bond, albeit with a different risk profile.

**Diverting Capital**

CDS offer market participants an alternative to purchasing bonds. Assuming that the price of each comes to an equilibrium that excludes any opportunity for obvious arbitrage, we would expect at least some market participants to be indifferent between the two. Moreover, certain market participants might, and probably do, prefer the greater flexibility and liquidity of CDS to the control rights, security interests, and other benefits that traditional credit investments offer. This suggests capital that would otherwise be allocated to the bond market is being allocated to the CDS market. But unlike bonds, which are used to fund economic activity (e.g., purchasing equipment, hiring employees, etc.), CDS are for the most part unfunded, and in any case the funds allocated do not go to the issuer but to one of the counterparties. While the same is true of bond transactions in the secondary market, a portion of the capital that market participants are willing to allocate to credit risk is actually transferred to issuers in primary market transactions. Because this capital is then used by the issuer to purchase and use resources, it should be the case that transactions in the primary market have an impact on overall economic welfare. In contrast, CDS payments are made from one counterparty to the other where each counterparty is, in all likelihood, engaged in very similar activities. Payments of this sort should not affect overall economic welfare in the absence of a payment pushing a counterparty into insolvency. As such, CDS payments are similar to transactions in the secondary market in the sense that society should not care how payments and assets are distributed among a group of similar market participants.

**Conclusion**

By taking a long position through CDS a protection seller, who by definition desires credit exposure to the underlying bond, can achieve this exposure without increasing the amount of capital allocated to the issuer's economic activities. If it turns out that at least some market participants believe that a given
issuer’s economic activities are overvalued by the bond market and that consequently the bond market has underpriced that issuer’s default risk, these market participants should be willing to take short positions on that issuer through CDS. Their willingness to enter into short positions creates liquidity for long positions, thereby offering an alternative to the issuer's bonds and potentially diverting capital away from the issuer's ostensibly overvalued economic activities and into a transaction that should have no effect on overall economic welfare. That said, if it turns out that the issuer’s activities are not overvalued, the same argument applies and so CDS could divert capital away from appropriately priced activities as well. However, as mentioned above, CDS are generally unfunded and so a protection seller that has taken a long position still has some portion of the notional amount available for investment. As a result, CDS absorb the demand for exposure to risk while requiring the use of only a fraction of the capital that would otherwise be required to satisfy that demand. As suggested above, this cuts two ways: if the issuer’s bonds are overvalued, then CDS satisfy the demand for exposure to that issuer’s credit risk without increasing the capital allocated to that issuer; but if the issuer’s bonds are priced appropriately, CDS absorb some fraction of the capital that would otherwise be allocated to that issuer. In the former case, the remaining capital is free to go to better use while the market’s demand for exposure to risk is satisfied in a manner that should have no effect on overall economic welfare, which is preferable to over allocating capital to the overvalued issuer. In the latter case, we have missed an opportunity to increase overall economic welfare by failing to allocate the capital that ended up being absorbed by the CDS market. In both of these cases, CDS have not decreased overall economic welfare, but either prevented it from decreasing needlessly or caused a failure to increase it.