# The Economics of Housing Finance Reform: Privatizing, Regulating and Backstopping Mortgage Markets*

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ABSTRACT

This paper analyzes the two leading types of proposals for reform of the housing finance system: (i) broad-based, explicit, priced government guarantees of mortgage-backed securities (MBS) and (ii) privatization. Both proposals have drawbacks. Properly-priced guarantees would have little effect on mortgage interest rates relative to unguaranteed mortgage credit during normal times, and would expose taxpayers to moral-hazard risk with little benefit. Privatization reduces, but does not eliminate, the government's exposure to mortgage credit risk. It also leaves the economy and financial system exposed to destabilizing boom and bust cycles in mortgage credit. Based on this analysis, we argue that the main goal of housing finance reform should be financial stability, not the reduction of mortgage interest rates. To this end, we propose that the private market should be the main supplier of mortgage credit, but that it should be carefully regulated. This will require new approaches to regulating mortgage securitization. Moreover, we argue that while government guarantees of MBS have little value in normal times, they are valuable in periods of significant stress to the financial system, such as the recent financial crisis. Thus, we propose the creation of a government-owned corporation that would play the role of "guarantor-of-last-resort" for MBS during periods of crisis.

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## 1. Introduction and Summary

There is widespread agreement across the political spectrum that Fannie Mae and Freddie Mac should be wound down. With the two Government Sponsored Enterprises (GSEs) now guaranteeing or owning about half of all residential mortgages in the United States, this will require nothing less than a complete redesign of the U.S. housing finance system. Unfortunately, there is little agreement about what the new system of housing finance should be.

There are two leading types of housing finance reform proposals. The first type of proposal – offered by numerous industry groups, think tanks, academics and Federal Reserve economists – seeks to replicate key attributes of the current market for GSE-guaranteed mortgage-backed securities (MBS) with explicit, fairly priced government guarantees of MBS. In the typical proposal, private entities are the primary guarantors of MBS, the government provides reinsurance in the event that the private guarantors are impaired, and MBS investors bear no credit risk. The second type of proposal envisions privatizing mortgage markets by eliminating targeted government guarantees of mortgage credit.

This paper starts with an economic analysis of these proposals. We argue that both have significant drawbacks. The government-guarantee proposals reach too far in the scope of their guarantees, while providing little benefit to households under normal financial market conditions. In contrast, privatization proposals do not reach far enough. They ignore flaws in securitization and the fundamental instability of mortgage credit supplied by the private market.

However, our analysis also points to strengths in each of the proposals, which we draw on in crafting our own reform proposal. Privatization advocates are correct in arguing that, for the most part, private markets can provide attractively priced mortgage credit without government guarantees. Therefore, we propose that the private market should be the main supplier of mortgage credit. At the same time, housing credit supplied by private markets is prone to destabilizing boom and bust cycles, which can have serious consequences for financial stability and the real economy. Thus, it is critical to combine privatization with careful regulation of mortgage markets, which we argue will require a new approach to regulating securitization. And, while we are skeptical of broad-based government guarantees, we agree with government-guarantee advocates who argue that MBS guarantees are valuable in periods of

significant stress to the financial system, such as the recent financial crisis. Therefore, we propose the creation of a government-owned corporation that would play the role of "guarantor-of-last-resort" during periods of crisis.

To understand the full logic of our proposal it helps to start with an analysis of the difficulties with broad-based mortgage guarantees. We see three basic problems. First, a properly priced government guarantee fee should reflect not just the expected credit losses on guaranteed securities, but also a risk premium to compensate the government for bearing more losses during an economic downturn, losses that risk-averse taxpayers ultimately bear. And while a government guarantee could enhance the liquidity of MBS, empirical evidence on the liquidity premium suggests that the benefits are likely to be small most of the time – in the range of 10 to 20 basis points (i.e. 0.10% to 0.20%). Thus, we conclude that in most instances a fairly priced government guarantee will have little, if any, effect on mortgage interest rates.

Second, the goal of lowering average mortgage interest rates through government guarantees is itself somewhat questionable. The tax code already favors housing investment through the mortgage interest deduction. Furthermore, credit markets already finance real estate investments on more favorable terms than other investments such as education because real estate is a tangible asset with significant collateral value. Thus, lowering mortgage rates exacerbates existing biases towards over-investment in housing.

Third, attaching government guarantees to securities issued by private for-profit entities invites the same sort of moral hazards that led to the failure of the two GSEs in the first place. Even though the government would charge for the guarantee, private entities will always have incentives to take more risk than the government would like and to lobby for lower capital requirements and reinsurance fees. These moral hazard costs likely outweigh the small benefits of guarantees.

The alternative of a loosely-regulated private mortgage market is also problematic. Mortgage credit is subject to boom and bust cycles, which can lead to corresponding booms and busts in housing values. A sharp decline in housing values can have significant negative effects on the real economy given that housing assets are a large share of wealth for many households. Moreover, given the large exposure of financial firms to real estate, a large negative shock to

housing values can impair bank capital and the willingness of banks to lend. In the extreme, it can lead to financial crisis, which we have recently witnessed. Such real-estate-induced financial crises are not uncommon, and they have devastating and long-lasting effects on economic growth, as documented by Reinhardt and Rogoff (2008, 2009). This history suggests that it is important to carefully regulate private mortgage markets to prevent the sorts of mortgage credit booms that can be so destructive when they collapse.

Some observers have assigned all of the blame for the subprime mortgage crisis to Fannie and Freddie, implying that without the two GSEs there would have been no mortgage credit boom and thus no need for private market regulation. To be sure, Fannie and Freddie deserve a considerable share of the blame for the decline in underwriting standards and the unhealthy expansion of mortgage credit. However, while Fannie and Freddie were exposed to a very large share of Alt-A loans, they had a relative small share of subprime mortgages. At the peak of the mortgage credit boom in 2006, Fannie and Freddie accounted for approximately 30% of new Alt-A and subprime mortgage lending.[1] While this is a large exposure, many other market participants had to be involved to fuel the growth of low-quality credit. Thus, there is a case to be made for more stringent regulation of private mortgage markets.

Our analysis of the two leading proposals suggests a set of goals for housing finance reform. The key takeaways of our analysis are that (i) properly-priced guarantees are likely to offer little benefit to borrowers under normal market conditions; and (ii) the private supply of mortgage credit is subject to boom and bust episodes that threaten financial stability and the real economy. Thus, in our view, housing finance policy should *not* be aimed at lowering mortgage costs but at promoting financial stability. *It follows that the main goals of housing finance policy should be to reduce excess volatility in the supply of housing credit and protect the financial system from adverse shocks to the housing sector*. Specifically, policy should be aimed at (i) reducing the risk of mortgage credit booms; (ii) protecting against a drought in mortgage credit; and (iii) ensuring that the financial system can withstand a steep downturn in the housing sector.

[1] Calculations based on *The 2010 Mortgage Market Statistical Annual (*Inside Mortgage Finance Publications); Fannie Mae 10-Q Credit Supplement, 2010 Third Quarter; FHFA Report to Congress 2009; FHFA Conservator's Report on the Enterprises' Financial Performance.

With these policy aims in mind, we propose a set of housing finance reforms that draw from elements of the two leading reform proposals. Given our skepticism about the benefits of mortgage guarantees in normal financial conditions, *we support the eventual elimination of Fannie Mae and Freddie Mac and a significant privatization of mortgage markets*. However, to prevent the kind of mortgage credit boom that characterized the period from 2001-2006, *we also advocate significant and stringent regulation of private mortgage markets*. These regulations would combine prohibitions on certain risky mortgages, enhanced capital requirements for financial firms, as well as a new regulatory regime for securitization markets that goes well beyond the skin-in-the-game regulations put forth in the Dodd-Frank Act. Our proposed regulations include restrictions on the capital structure of securitization trusts as well as restrictions on the financing of MBS purchases. This is the most challenging part of our proposal given the lack of a well-accepted paradigm for the regulation of securitization markets. But it is an essential element of our proposal given the large role that securitization flaws played in the subprime crisis and the broader financial crisis. And, regardless of whether housing finance reform results in a greater role for government guarantees of prime mortgages than we would advocate, there will still be a private securitization market for non-prime mortgages and a need to regulate that part of the market.

The second part of our proposal is to establish a government-owned corporation to guarantee MBS. The primary role of this corporation is *to ensure the supply of high quality, well-underwritten mortgages during a period of significant market stress* such as the financial crisis of 2007-2009. To ensure that the corporation would be able to provide guarantees in a timely fashion during a systemic crisis, we propose that it operate in normal times but with a hard-wired constraint on its market share of no more than 10 percent. This market share could only be lifted with the approval of the Financial Stability Oversight Council in response to a systemic crisis.

We are proposing that this mortgage guarantor be a self-funded government-owned corporation, not a government agency and not a private corporation. As a government-owned corporation with an independent board, it would be less easily influenced by political considerations. More importantly, as a government-owned corporation it would not seek to

increase profits by loosening underwriting standards in the way that a private corporation would, making it more likely to be in a strong financial position entering a downturn.

In summary, we argue for a carefully regulated, largely private system of mortgage finance in normal times, coupled with a government guarantor to backstop the provision of mortgage credit in severe housing downturns.

The remainder of the paper is organized as follows. In Section 2 we analyze government guarantee proposals and in Section 3 we analyze privatization proposals. Section 4 builds on the above analysis to put forth a set of goals for housing finance reform. Section 5 lays out our proposal and Section 6 concludes.

## 2. Analysis of Explicit Government Guarantee Proposals

Many leading proposals for housing finance reform involve some form of explicit government guarantee of MBS, usually in conjunction with private market guarantees. There are two ostensible goals of these proposals. The first is to preserve key features of GSE-guaranteed MBS, which provide liquidity and credit protection to their holders. The second goal is to protect the government from losses by charging an explicit fee in exchange for the guarantee.

Proposals along these lines have been advocated by a variety of parties including: industry groups such as the Mortgage Bankers Association (MBA), the National Association of Home Builders (NAHB), and the National Association of Realtors (NAR); the Center for American Progress (CAP), a progressive think tank; Federal Reserve economists including those at the Federal Reserve Bank of New York and the Federal Reserve Board of Governors; and academic economists.[2]

We have three main criticisms of these proposals. First, if the government charges the right price for bearing the credit risk associated with its guarantee, the effect on mortgage rates is likely to be small relative to a world without such guarantees. Second, even if government

[2] MBA (2009), NAHB (2010), NAR (2010), CAP (2011), Dechario, et. al. (2010), Hancock and Passmore (2010), Acharya, et. al. (2011).

guarantees could lower mortgage financing costs to some extent, the tax code and certain market frictions already make housing investment easier to finance than other forms of socially valuable investment such as education. It may not be desirable to further distort investment in favor of housing. Third, government guarantee proposals that involve private financial firms are likely to suffer from governance problems similar to those that plagued Fannie and Freddie, exposing the taxpayer to significant uncompensated losses in housing downturns. Given the small benefits of government guarantees during normal market conditions, these costs are probably not worth bearing.

### A. Properly-Priced Government Guarantees Will Have Little Effect on the Cost of Mortgage Credit

Advocates of government guarantees argue that such guarantees lower mortgage costs both because the government can more efficiently absorb credit risk than the market and because MBS are more liquid when holders do not have to evaluate credit risk. Guarantee advocates also argue that guarantees can be used to promote the issuance of long-term fixed rate pre-payable mortgages. For many, long-term fixed rate mortgages are desirable from a consumer-protection point of view. Below we raise several concerns about the validity of these arguments.

<u>Lowering MBS yields does not necessarily translate into lower mortgage costs.</u>

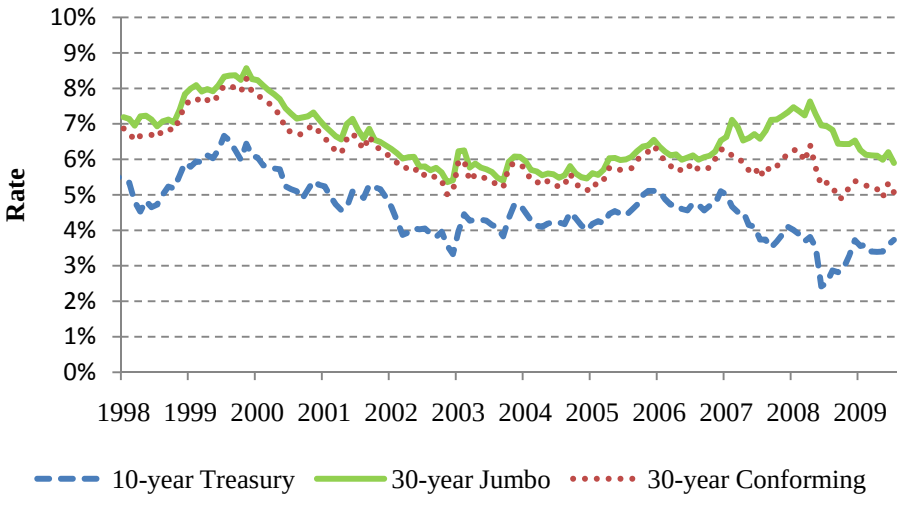
It is generally believed that the two GSEs charged low guarantee fees (approximately 22 basis points) relative to risks they were bearing on their guarantee book. They were able to charge low fees and make money on their guarantee book because lax regulators did not require them to hold much capital (approximately 45 basis points) against the risk of losses. And, despite this small capital cushion, the implicit government guarantee meant that investors viewed GSE MBS as essentially riskless.

Nevertheless, numerous studies have raised doubts about how much homeowners benefited from the implicit guarantee on Fannie and Freddie MBS. These studies, including CBO (2001), Torregrosa (2001), Ambrose, LaCour-Little, and Sanders (2002), MacKenzie (2002), Passmore, Sherlund and Burgess (2005), and Sherlund (2008), typically examine the differences in rates between jumbo mortgages, which are securitized without a GSE guarantee,

and conforming mortgages, which are securitized with a GSE guarantee.[3] After controlling for borrower characteristics, these studies estimate the benefit of the GSE guarantee on mortgage rates to be anywhere from 7 to 30 basis points, a surprisingly small effect.

To put these estimates in context, Figure 1 below shows the 30-year conforming mortgage rate, the 30-year jumbo mortgage rate, and the 10-year Treasury yield. Over most of the period, until the financial crisis hits in mid-2007, the conforming and jumbo mortgage rates are quite similar, and both closely track the Treasury yield. Indeed, 90% of the variation in both rates over this period is driven by the variation in the Treasury yield. The difference between conforming and jumbo rates, which could be attributed to the GSE guarantee, is small in comparison. It is only at the onset of the financial crisis in 2007 that jumbo rates rise relative to conforming rates. Thus, as we argue below, the main value of guarantees is that they support the extension of mortgage credit in periods of financial market distress.

**Figure 1: Mortgage Rates and Treasury Yields**

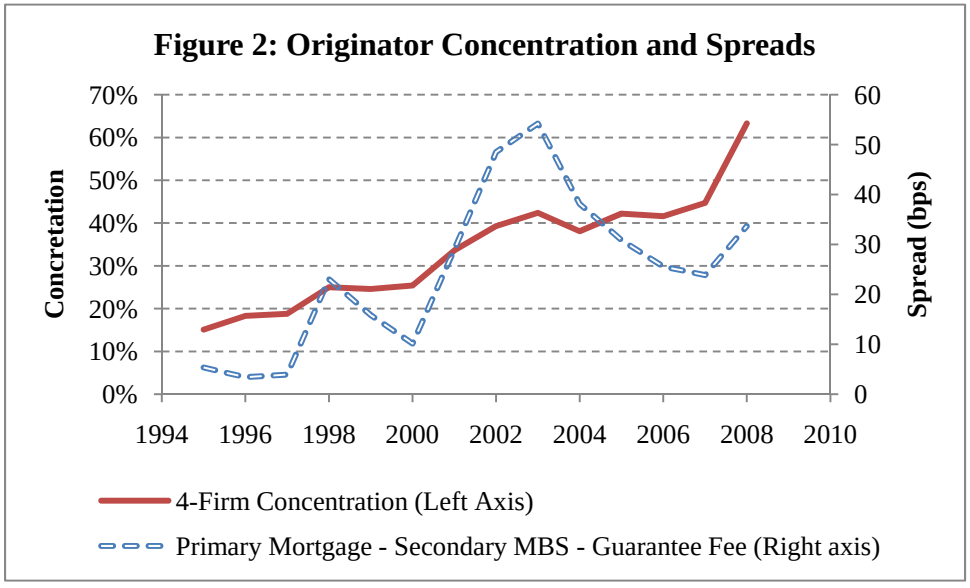



As noted by Hermalin and Jaffee (1996), one possible explanation of the small difference between jumbo and conforming mortgage rates is that the beneficiaries of the MBS subsidy are

[3] It is possible that this spread underestimates the true value of the government guarantee. In particular, with the GSEs guaranteeing a large share of mortgage credit in the U.S., jumbo mortgage lenders may have higher risk-bearing capacity and may be willing to lend at lower rates than they otherwise would if the GSEs were not absorbing so much credit risk. Nevertheless, whatever the effect lax regulation and the free government guarantee had on mortgage rates, it stands to reason that the effect will be even smaller when regulation is tightened and the guarantee is priced.

not homeowners, but the GSEs and their shareholders. Another possibility is that the benefits of the subsidy are captured by the banks that originate and then securitize the loan pools into GSE MBS. This would be the case if loan origination itself is imperfectly competitive. Indeed, as shown in Figure 2 below, there is some suggestive evidence of this. Over the last 15 years the concentration of the mortgage origination industry, according to *Inside Mortgage Finance*, has increased significantly. The top 4 mortgage originators accounted for less than 15% of originations in 1995, but more than 60% in 2008. At the same time, the spread between the primary mortgage rates available to borrowers (less the guarantee fee) and the yield on Fannie Mae current-coupon MBS has increased from about 5 bps to over 30 bps.[4] While this is not definitive evidence, it does suggest that the market power of players throughout the mortgage origination chain could be an important consideration when evaluating the benefits of government guarantees. Thus, even if government guarantees lower MBS yields they may not result in lower mortgage costs to borrowers.

**Figure 2: Originator Concentration and Spreads**




[4] Primary mortgage rates are from Freddie Mac's weekly primary mortgage survey. The current coupon yield on Fannie MBS is from Barclays.

Properly-priced government guarantees may not lower MBS yields.

To better understand whether *properly-priced* government guarantees lower MBS yields, we start by contrasting pass-through non-guaranteed MBS with ones that are fully guaranteed by the government. Holders of non-guaranteed MBS bear credit risk as well as interest-rate and pre-payment risk on long-term fixed-rate pre-payable mortgages. They also bear liquidity risk, which we discuss later in the section. Since holders of guaranteed MBS bear the same interest-rate and pre-payment risk, our focus is on analyzing differences in the way credit risk is borne across the two types of securities.

Credit risk has two components: (i) expected losses on the securities arising from troubled loans; and (ii) co-variation of those losses with macroeconomic conditions in which investors suffer from other losses. The yields on unguaranteed MBS must therefore compensate their holders for expected losses and provide a risk premium given the co-variation with other investor losses. In exchange for not bearing credit risk, guaranteed MBS holders pay a guarantee fee to the government analogous to the guarantee fees they pay the two GSEs.

The guaranteed securities will require a lower yield provided the guarantee fee (*GFee)* is less than the yield required to compensate investors for bearing credit risk. Since the compensation for credit risk is the sum of expected losses on defaults in the loan pool (*EL*) and the risk premium on such losses (*RP*), guaranteed securities will have lower yields than unguaranteed ones if

*(1)* $GFee < EL + RP$.

Ideally, lower yields on guaranteed MBS would be passed along to borrowers in the form of lower mortgage rates although, as discussed above, empirical evidence suggests this may not be the case.

Thus, determining the proper *GFee* the government should charge is critical to the analysis of whether a government guarantee of MBS is desirable. The implicit assumption of government-guarantee advocates is that *GFee* should be set equal to the actuarially fair rate that

just covers expected losses on the loan pool (*GFee = EL*), in which case guaranteed MBS require lower yields than non-guaranteed MBS as indicated by (1) above.[5] The government prices the fee as if it is risk neutral, protecting itself from losses on average, but not charging holders of guaranteed MBS the risk premium, *RP*, for bearing losses at a time when there are losses on other assets. Of course, this risk is ultimately borne by taxpayers. The critical question then is whether the government should include a risk-premium in the *GFee* to compensate the government and taxpayers for the systematic risks they are bearing. If it is optimal to charge the full risk premium (*GFee = EL + RP*), then there is no advantage of guaranteed MBS.

Arrow and Lind (1970) showed that the government, acting in the interest of taxpayers, should not charge a risk premium on government projects as long as the project's costs are independent of taxpayers' income. Because risks are pooled across a large number of taxpayers, the risk associated with the project has only a negligible effect on the welfare of individual taxpayers. As in the Capital Asset Pricing Model, purely idiosyncratic risk should not receive a risk-premium.

However, this independence assumption does not apply to the mortgage market. The realized costs of guarantees are high when mortgage defaults rise, i.e., the costs are high when house prices, and hence taxpayer wealth and income have fallen. Ultimately, government mortgage guarantees mean that taxpayers would bear greater tax liabilities in states of the world in which their wealth has fallen. As in the CAPM and related models, they should be compensated for bearing this risk. This point applies to a wide range of programs in which the government takes financial risk as discussed by Lucas and Phaup (2010). *The key point is that risks of mortgage default are always borne by society as a whole. The issue is whether the costs associated with bearing those risks are faced by homeowners through the guarantee fee or by taxpayers through contingent tax liabilities.*

Thus, one can argue that the government should embed a risk premium in the *GFee*, although it is an open question whether the risk premium should be the same as would be charged by the private market. One could argue that the government should charge a lower risk premium than the market given that imperfections in capital markets make it more difficult for

[5] Since 1990, the Federal Credit Reform Act (FCRA) has required the costs of on-budget guarantee programs to be accounted for on an expected loss basis (i.e., without a risk premium).

investors to smooth consumption than for the government to smooth its expenditures. A large adverse shock to the housing sector leading to an increase in defaults means that holders of non-guaranteed MBS pass-through securities would take large losses, requiring them to cut consumption or borrow against future income to maintain consumption. By contrast, when the government takes losses on its guarantees of MBS, it can defer tax increases or expenditure cuts to reduce the contemporaneous burden on taxpayers. However, even if taxpayers do not respond in this way, one has to ask why the government should use its risk-bearing and tax smoothing capacity to support mortgage finance over other forms of finance, such as small business or consumer credit. Moreover, some of the tax-smoothing benefits would be reduced to the extent that taxpayers anticipate greater future tax burdens and therefore choose to cut consumption (Barro, 1974).

This discussion assumes that the government is the sole guarantor of MBS. The leading proposals for government guarantees envision private firms – which we will refer to as "mortgage guarantee entities" or MGEs – guaranteeing mortgages and taking first losses on mortgage guarantees, while the government acts as a re-insurer against catastrophic losses. In this hybrid system, the MGEs would charge a risk premium for their guarantees as their shareholders would need to be compensated not just for expected losses but for the co-variation of those losses with the returns on the rest of their portfolios. As discussed above, the government should also charge a risk premium for bearing catastrophic risk. In this case, there would be no difference between the fees the government would charge if it was the sole guarantor and the overall fees charged in the hybrid system. If instead the government does not charge a risk premium for bearing catastrophic risk, overall guarantee fees on MBS would be somewhat lower but not appreciably different, provided the private firms are well capitalized so that they are bearing the large majority of the risk.

An implication of this analysis is that in the new housing finance system we should expect to see mortgage rates rise on average regardless of whether the government guarantees mortgages or not. The financial crisis has resulted in a greater understanding of the risks inherent in mortgage lending, and private entities, including MGEs, will want more compensation for bearing these risks, including a risk premium for bearing systematic risk.

The government, acting on behalf of taxpayers, should also charge a risk premium for bearing systematic risk.

If private entities or the government charge risk premiums, how much would the yields on MBS backed by prime mortgages rise relative to a situation in which no risk premium is charged and investors (or the government) just earn the risk-free rate? This is a difficult question to answer, but below we try to put an upper bound on the number.

The *GFee* should be set by private firms so that the rate of return on the capital they set aside to guarantee MBS compensates them for the systematic risk that they bear. Since any future guarantors would presumably only guarantee prime mortgages, we focus on the risk premium for such guarantees. To be conservative, we take capital as the amount that would have been necessary to cover all GSE credit losses resulting from prime mortgages during the financial crisis. FHFA's conservative estimate of total GSE credit losses is $337 billion, based on an adverse scenario where house prices decline 25% from September 2010 and 45% peak-to-trough. The more moderate baseline estimate is $232 billion. An estimated 30% - 40% of these losses come from prime loans, which comprise 70% –75% of the guarantee book of $5.4 trillion.[6] Assuming the high loss estimate of $337 billion, this implies that the GSEs would have had to hold 2.5-3.5% capital against prime mortgages to survive a crisis of similar magnitude.

To calculate the risk premium that investors would need to earn on this capital we use the CAPM. According to the CAPM, the risk premium is equal to beta – the co-variation of the asset's return with the overall market return – times the market risk premium, which is usually taken to be about 5%. We estimate the beta of the guarantee business by estimating Freddie's betas in the 1990s before it had a large portfolio of loans and MBS on its balance sheet. During this period, unlike Fannie, most of Freddie's business was in its guarantee book. Our beta estimate is 1.2. For Freddie's entire history, the estimate is 1.5. We obtain similar estimates for Fannie (1.25 from 1970 – 2009). Note that the estimate likely overstates the beta of a specific guarantee because it measures the beta of the guarantee business, which tends to expand or contract with the economy. Furthermore, the estimate also incorporates the beta-amplifying effects of financial leverage. Undoing this effect would lower the beta significantly given the

[6] Fannie Mae, 2010Q3 10-Q and 2009 10-K

two GSEs' high leverage. To be conservative, we only cut the beta in half and we also show calculations where the beta is 1.2. Thus, if the market risk premium is 5%, and the beta is 0.6 (1.2), guarantors require a 3% (6%) risk premium on their capital for guaranteeing prime mortgage credit. If capital is 3% (i.e. almost 7x historical capital requirements of 45 bps), then the risk premium component of the *GFee* should be 3% x 3% = 9 bps. A 6% risk premium, which would be astronomically high for a fixed income product, would require 18 bps in the *GFee* to compensate for systematic risk. Thus, a conservative estimate of the risk premium on prime mortgages is in the range of 10 to 20 bps.

While we have argued that the government should charge a risk premium as a mortgage guarantor, the above calculations imply that if the government insures prime mortgages, but does not charge a risk premium (i.e. only requires a return equal to the risk-free rate), the *GFee* could be 10 to 20 bps lower. If the government just reinsures MBS without charging a risk premium and private MGEs take first loss, then the total *GFee* reduction will be less than the 10 – 20 bps since private firms will demand a risk premium. Our conclusion is that even if the government does not charge a risk premium for its guarantee, the benefit to borrowers in terms of lower mortgage rates would be quite modest. And of course even these modestly lower rates would come at the expense of taxpayers who bear this risk for which they would not have been compensated.

<u>Government guarantees may not lower MBS yields by increasing their liquidity</u>.

Government guarantees could also lower mortgage rates by increasing the liquidity of MBS. There are two main reasons why government guarantees could increase liquidity and thereby lower the yields required by MBS investors. First, by eliminating credit risk, guarantees reduce asymmetric information problems, which could facilitate trade. Second, to the extent that guarantees are used only for a relatively narrow range of mortgages, they could encourage standardization and thus create a deeper market for securities backed by those mortgages.

Concerns about liquidity loom large in discussions of housing finance reform because GSE MBS are among the most liquid fixed income securities in the world, with daily trading volumes averaging $300 billion since 2005. In comparison, over the same period, trading in U.S.

Treasury securities averaged $520 billion per day, while trading in corporate bonds averaged $16 billion per day.[7] Most trading of GSE MBS occurs in the "to be announced" (TBA) market, a forward market organized by the Securities Industry and Financial Markets Association (SIFMA). The key innovation underlying the TBA market is that a TBA forward contract specifies only a few characteristics of the securities that can be delivered to satisfy the contract. This allows heterogeneous GSE MBS to be traded as though they were homogenous securities.

Of course, adverse selection could destroy the liquidity of such a market if traders have private information about security payoffs and deliver the worst securities that satisfy a contract. The scope for adverse selection in the TBA market is limited in three ways. First, the guarantee provided by the two GSEs eliminates adverse selection due to credit risk, although adverse selection due to prepayment risk is still present (Downing, et. al. 2009). Second, the uniform underwriting standards of the two GSEs enforce a degree of homogeneity on the mortgages in each collateral pool. Third, SIFMA maintains additional rules restricting the GSE MBS that are eligible for delivery in the TBA market. TBA-eligible MBS must satisfy certain requirements on geographic diversification and individual loan balances.

While guarantees likely increase liquidity, the size of the effect on yields is probably small, at least most of the time. For example, the yields on newly issued long-term Treasury bonds – which have a deep and active market – are typically about 6 basis points (bps) lower than the yields on less liquid long-term bonds that were issued somewhat earlier, although during periods of market stress this spread can increase dramatically, such as in the fall of 1998, when the spread rose to about 25 bps (Krishnamurthy, 2002). Likewise, Longstaff (2004) estimates that Treasury notes trade at yields 10-15 bps below government-guaranteed bonds issued by the Resolution Funding Corporation, the government-owned corporation set up to finance assets seized during the S&L crisis; he ascribes the spread to the difference in the liquidity of the two instruments. However, there have also been studies on liquidity that have found substantially larger effects. For instance, Krishnamurthy and Vissing-Jorgenson (2010) analyze the yields on Treasury bonds and AAA corporate bonds and conclude that high liquidity reduces Treasury

[7] SIFMA compilation of data from the Federal Reserve Bank of New York's Primary Dealer Statistical Release: http://www.sifma.org/uploadedFiles/Research/Statistics/StatisticsFiles/CM-US-Bond-Market-Trading-Volume-SIFMA.xls

yields by about 50 bps. Nevertheless, they find no comparable effect for GSE MBS, and suggest that prepayment risk may reduce the liquidity value of MBS.

Perhaps the most relevant study for our analysis is Vickery and Wright (2010). They estimate the effects of liquidity for GSE MBS by comparing MBS that are eligible for delivery in the TBA market, where the large majority of GSE MBS are traded, with MBS that are TBA-ineligible. The difference in yields between TBA-eligible and ineligible MBS should largely reflect the value of liquidity for MBS (though TBA-ineligible MBS contain high-balance loans and thus may also have greater prepayment risk than TBA-eligible MBS). They find TBA-ineligible MBS carry yields approximately 10-15 bps higher than TBA-eligible MBS in normal times, though the spread was as high as 50 bps during the height of the financial crisis.

Overall, there is substantial uncertainty over the size of liquidity premiums in asset markets. However, the balance of evidence suggests that, in the context of MBS, 10-20 bps may be a reasonable estimate in normal times. Moreover, the fact that estimates of liquidity premiums vary substantially across different government securities suggests that all government guarantees do not create equal amounts of liquidity.

In the absence of government guarantees, private markets may be able to generate some liquidity in private-label MBS through financial engineering. In normal times, the cumulative default rate on conforming mortgages is less than 1 percent so that the senior tranches of unguaranteed securitizations should be relatively low-risk and information-insensitive.[8] This means that they could be traded without fear of adverse selection and could be quite liquid. Thus, tranching may be able to provide some of the liquidity benefits of government guarantees in normal times. This is the case, for instance, with credit card securitizations where the AAA tranches are quite liquid when markets are functioning properly (Lancaster, et. al. 2008).

Government guarantees may not be needed to promote use of long-term fixed rate mortgages.

Beyond their liquidity benefits, many believe that government guarantees help expand the availability and affordability of 30-year fixed-rate amortizing pre-payable mortgages. These

[8] S&P US Residential Mortgage Index, 5/24/2010.

observers have argued that such mortgages are desirable because they protect consumers against interest-rate risk and rollover risk. Concerns that eliminating Fannie and Freddie would reduce the supply of these types of mortgages have at least three sources.

First, long-term fixed rate mortgages, while a fixture of the U.S. mortgage market, are not commonly observed in other countries. Part of the reason is that the interest-rate protection such mortgages provide borrowers, exposes lenders (typically, financial institutions with floating rate obligations) to considerable interest-rate risk. Securitization of mortgages by Fannie and Freddie has enabled investors who are better able to bear interest-rate and pre-payment risk to hold these mortgages. These investors may also not be well-suited or willing to evaluate credit risk. In countries where securitization is less developed, mortgages are more likely to be held by financial institutions that are not well positioned to bear interest-rate risk because of their floating-rate obligations.

Second, long-term fixed-rate mortgages have been subsidized through the implicit guarantee of Fannie and Freddie. The subsidy has benefited suppliers of mortgage credit, which capture some of the subsidy due to imperfect competition, as well as borrowers. Thus, the implicit guarantee of Fannie and Freddie has raised both the supply of and demand for long-term fixed rate mortgages. If the subsidy is removed, the long-term fixed-rate mortgage will have lower supply and demand.

Third, it has been argued that, without government involvement, the 30-year fixed-rate pre-payable amortizing mortgage would never have gotten off the ground in the first place. Indeed, it was a Depression-era government program sponsored by the Homeowners Loan Corporation that introduced the long-term fixed rate amortizing mortgage to replace the short-term (about five year maturity), non-amortizing mortgage (Courtemanche and Snowden, 2010). The inability of homeowners to roll over their mortgages because of declining home values was the main reason that the government became involved in mortgage finance. The Homeowners' Loan Corporation refinanced many of these underwater borrowers with long-term amortizing mortgages.

These concerns are probably overstated. For one, derivatives markets have developed to the point where financial institutions with floating-rate obligations hedge interest-rate and pre-

payment risk at relatively low cost. Indeed, at the end of 2009, commercial banks, thrifts and credit unions owned 21.7% of outstanding GSE MBS. These institutions also bear interest-rate and pre-payment risk in their role as mortgage servicers.[9] Fannie and Freddie themselves own 15.5% of the outstanding MBS they guarantee.[10] These institutions already have to hedge their interest rate and pre-payment exposures under the current regime, and thus are already passing on these exposures to other players in the financial system. It is reasonable to think that they would do the same if they were to hold long-term fixed rate mortgages as portfolio loans or through holdings of securitized long-term fixed-rate mortgages.

Moreover, while it may be true that there are investors who are averse to bearing or evaluating credit risk, if there is a sufficiently large clientele of such investors, securitizations of low-risk mortgages can be tranched to create mortgage products with very little credit risk but with the same interest-rate and pre-payment exposures as GSE MBS. While securitizers may have misestimated the risk of mortgage products, they are nothing if not clever at designing structured products to meet the risk preferences of investors.

Finally, while it is true that the government introduced and helped popularize the long-term fixed-rate mortgage through subsidies, the two GSEs have been purchasing adjustable-rate mortgages since 1981. Thus, the GSE subsidy has not uniquely preferenced fixed rate mortgages over adjustable rate mortgages for the last 30 years. Yet, long-term fixed-rate mortgages remain popular, suggesting that borrowers now appreciate the value of the long-term fixed rate mortgage and that, demand for it would likely be robust even in the absence of subsidies. If not, it is possible to preference these loans through other types of government policy.

### B. Subsidizing Mortgage Credit Is Potentially Ineffective and Inefficient

The government could attempt to subsidize mortgage credit by mis-pricing its guarantee fee, perhaps by not charging a risk premium. However, lowering mortgage credit costs may not

[9] Mortgage servicers bear interest-rate risk because they only capture the stream of servicing fees from a mortgage until that mortgage prepays. As of December 2009, the top four mortgage servicers were the four largest banks, and they owned 56.5% market share of mortgage servicing rights (*The 2010 Mortgage Market Statistical Annual, Volume I: The Primary Market,* Inside Mortgage Finance Publications)
[10] *The 2010 Mortgage Market Statistical Annual, Volume II: The Secondary Market.*

be an effective way to achieve broader policy goals for several reasons. First, if government guarantees lower the mortgage interest rates faced by borrowers, some of the benefits get impounded into home prices, benefitting existing homeowners, not home purchasers. A long literature in economics, including Poterba (1984) and Poterba, Weill, and Shiller (1991), suggests that financing costs are an important determinant of home prices. If the purpose of lowering mortgage rates is to increase affordability, particularly for first-time homebuyers, a mis-priced government guarantee may not be particularly effective in achieving this goal.

Second, lowering mortgage financing costs distorts consumption and investment behavior of households. Because real estate is a very tangible asset, it is relatively easy to finance. This can lead to overinvestment in housing relative to other, potentially more valuable investments such as education. Lowering mortgage financing costs through government programs such as the mortgage interest deduction and government guarantees further exacerbates this distortion.

Finally, one could argue that there are positive externalities of homeownership (Rossi-Hansberg et. al., 2010), which households do not internalize. In this case, lowering mortgage costs may help to achieve the right level of homeownership. However, lowering mortgage costs does not just affect the decision of whether to own or rent, but also how much housing to purchase. As noted above, it is hard to believe there is much value in promoting more housing consumption relative to other investments that are more difficult to finance. More targeted interventions may be better suited to the goal of increasing homeownership.

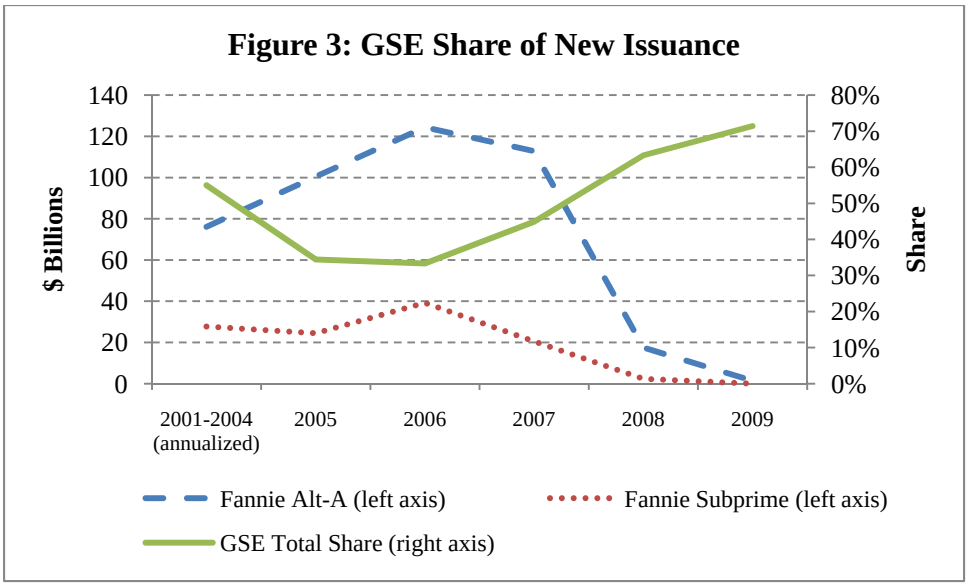
### C. Government Guarantees May Expose Taxpayers to Uncompensated Risk-

Some of the government guarantee proposals are likely to re-create governance problems that plagued Fannie and Freddie. For example, both MBA and CAP have proposed creating mortgage guarantee entities (MGEs) that would provide guarantees on securitized mortgages. The MGEs would be for-profit entities subject to regulations designed to ensure they have enough capital to meet their guarantee commitments. In addition, a government agency would be established to "wrap" the MBS, i.e., reinsure the securities themselves in the event the MGEs do not have enough capital to meet their guarantee commitments. The government agency would charge the MGEs a fee in exchange for reinsuring the MBS. Thus, the MGEs would hold a first-

loss position on any mortgage defaults, and the government would be paid to reinsure the MBS in case a MGE cannot meet its obligation. In essence, these proposals re-create entities like Fannie and Freddie without (i) sizable retained portfolios; (ii) government mandates to promote housing affordability; and (iii) implicit, free government re-insurance of MBS.

In these proposals, the MGEs would be for-profit entities like Fannie and Freddie, and thus continue the tensions that exist when the activities of for-profit firms are guaranteed by the government. These tensions have historically come in two forms. First, for-profit firms are likely to chase market share, engaging in a competitive race-to-the bottom in underwriting standards during boom periods. That is, when private market participants loosen their underwriting standards, for-profit MGEs are likely to do the same. Fannie and Freddie are prime examples. Figure 3 below shows how Fannie Mae expanded into Alt-A and subprime lending in 2006 and 2007 to recapture market share it had lost to the private-label securitization market in the mid-2000s. According to the FHFA Conservator's Report on the Enterprises' Financial Performance, 40% - 50% of Fannie and Freddie's credit losses stemmed from their guarantees of Alt-A mortgages[11]. Regulators may find it difficult to prevent private MGEs from similarly extending their activities into risky lending. Moreover, the private MGEs will be critical to the extension of new mortgage credit, making it difficult to let them fail in a severe housing downturn. This may weaken market discipline on the MGEs, making them more likely to guarantee high-risk mortgages.

[11] Conservator's Report on the Enterprises' Financial Performance, Third Quarter 2010, Federal Housing Finance Agency.




Second, for-profit MGEs will want low government reinsurances fees on MBS and will want their regulator to impose low capital requirements for their mortgage guarantees. Low reinsurance fees and capital requirements increase the chance that losses on MBS will be borne by taxpayers in a severe housing downturn. There is, of course, ample precedent for regulators setting capital requirements and insurance fees too low in response to lobbying efforts by the for-profit financial firms they regulate. Fannie and Freddie are the most obvious examples, but so too are banks and thrifts. Even after the recent financial crisis, banks have lobbied regulators against significant increases in capital requirements as part of the Basel III process, with some success. For instance, Bank of America urged the Basel Committee to "balance greater capital and liquidity requirements needed to make the system stronger and safer, on the one hand, against the risk of inappropriately restricting the flow of credit that is critical to economic growth, on the other."[12] Similarly, it is noteworthy that most banks paid no deposit insurance fees between 1996 and 2007 because of provisions in the Deposit Insurance Funds Act of 1996 advocated for by the American Bankers Association.[13]

Because of such concerns, some advocates for government guarantees of MBS, have proposed alternative governance structures for MGEs that attempt to reduce or eliminate the

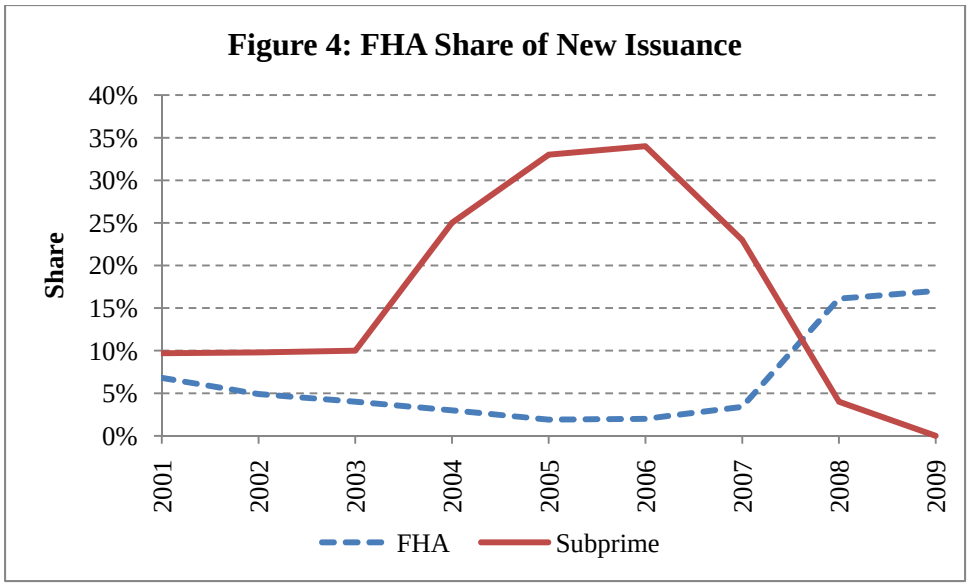
[12] Bank of America comments on the consultative document, "Strengthening the Resilience of the Banking Sector," Basel Committee on Banking Supervision, http://www.bis.org/publ/bcbs165/boac.pdf.
[13] American Bankers Association position on FDIC premiums: http://www.aba.com/Industry+Issues/FDIC_RBP.htm

profit motive. Economists at the New York Fed (Dechario et. al., 2010) have proposed establishing a single MGE that would be owned co-operatively by the financial institutions that issue MBS. This governance structure harkens back to ownership structure of Fannie Mae established by the Charter Act of 1954 in which thrifts who sold their mortgages to Fannie Mae were required to hold the equity of Fannie Mae. It is also similar to the original ownership structure of Freddie Mac and the current ownership structure of the Federal Home Loan Banks.

While the shareholders in this form of MGE may not chase profits quite as aggressively as Fannie and Freddie did, they would likely still push for low capital requirements. Indeed, the main opposition to the Charter Act of 1954 came from thrifts precisely because they did not want to use their own capital to capitalize Fannie Mae (Bartke, 1971). Moreover, a lender-owned co-operative may not be healthy for the financial system in a time of crisis. Relying on financial institutions to re-capitalize the co-operative MGE when it experiences large losses also de-capitalizes the banking sector at a time when it is most likely to need capital.

The proposals of the homebuilders' and realtors' associations (NAHB and the NAR) attempt to avoid these conflicts by making the MGE a government fund that is capitalized with guarantee fees on MBS. Unlike the other proposals, here the government takes all losses on mortgage defaults; there is no private company in a first loss position. This structure is closer to the FHA/VA model of guarantees, although it is unclear whether their proposals would have the fund be part of a government agency or an independent government corporation.

This structure could work better from a governance perspective. Fannie and Freddie tried to regain market share by guaranteeing riskier loans in 2005 and 2006 in response to the market share gains of subprime lenders earlier in the decade. By contrast, FHA also lost considerable market share to subprime lenders, but did not chase market share by lowering its mortgage insurance premiums even as subprime lenders were willing to extend credit at much lower rates. As Figure 4 below shows, as subprime mortgages increased from 10% to nearly 35% of the market FHA's share of new origination dwindled to 1.9%, from 6.8%. Arguably, FHA did not respond to the competitive pressure from subprime lenders because it was not trying to maximize profit. As a result, the modest size of FHA's guarantee book has meant that its losses were also modest, particularly given the high LTVs on the mortgages it guarantees.




While FHA did not chase market share in the subprime boom, it also did not turn away market share in the subprime bust. Instead, it kept mortgage insurance premiums at pre-crisis levels and quickly regained and then exceeded the market share it had lost during the subprime boom. In 2010, FHA mortgages accounted for 29.4% of new mortgages and 14.4% of refinanced mortgages. In no small measure, FHA is now performing the role for which it was originally designed in the 1930s – as a guarantor of mortgage credit during a period in which private sector lenders were unwilling to take mortgage credit risk. [14]

Thus, one could argue that a benefit of having a government agency as the mortgage guarantor is that the agency can more easily be directed to play a countercyclical role. Of course, playing such a countercyclical role is no small task: a government agency can make mistakes in determining when intervention is necessary and it can be influenced by politicians to intervene when it is not necessary or in a way that ends up being costly to the government. We will have more to say about these issues when we discuss our policy proposal.

While we have raised moral hazard concerns with respect to government reinsurance of MBS guaranteed by private for-profit entities, this would not be the only type of government

[14] The initial increase in market share during the crisis was less a conscious policy decision than a reflection of the insensitivity of FHA to market forces. Later, during the Obama administration, there was concern about the risks to the FHA of a considerable expansion in its market share, and a conscious decision to try to protect FHA from future losses while maintaining a large market share. "F.H.A. Problems Raising Concern Of Policy Makers," *The New York Times*, 10/9/2009.

guarantee in the financial system. In particular, one may ask whether we also object to deposit insurance, which may create even greater moral hazard problems given the relatively opaque and illiquid nature of a bank's balance sheet.

The core of our response is that while there may be significant moral hazard costs associated with deposit insurance, the *benefits* of providing deposit guarantees are likely to be significantly larger than the benefits of providing MBS guarantees. There are at least two reasons why we make this claim.

First, a key function of deposit insurance is to prevent bank runs, which force banks to reduce lending, curtail other banking activities, and sell assets to meet deposit redemptions. This creates real inefficiencies. By contrast, a securitization trust is a static collection of assets. If those assets decline in value because of higher-than-expected defaults, investors suffer losses, but there are no direct efficiency implications.

Second, house purchases have more tangible collateral value (a house) and thus are relatively easy to finance. Banks make risky loans that are subject to asymmetric information and agency problems, often with hard-to-value or limited collateral. Such frictions mean that it is more likely that the private market underinvests in such loans. Thus, there is greater benefit in subsidizing such bank loans through underpriced deposit insurance (and the liquidity premium that deposit insurance creates) than in subsidizing mortgages.

More broadly, one may wonder whether a more efficient way for the government to meet liquidity needs is to have a financial system with (i) insured deposits for "narrow banks" that fund only mortgages[15], and (ii) long-term unguaranteed debt funding of less transparent credit assets like corporate loans and construction loans. The main benefit of such a system is that the government will incur less risk because it may be easier to monitor bank risk-taking in relatively transparent mortgages than in less transparent credit assets. The main cost would be that the liquidity benefits of guarantees would no longer be channeled towards overcoming underinvestment in asset classes where financial frictions are most severe. While this

[15] See Gorton and Metrick (2010) for a proposal in which "narrow funding banks" can only hold asset-backed securities. Given that a large share of ABS are MBS, this would amount to a narrow bank with a large exposure to real estate.

counterfactual is interesting, such a sweeping reorganization of the financial system is impractical from a policy perspective.

To summarize, we make four key points about government guarantee proposals.

- There is little benefit to government guarantees during normal times if guarantee fees are set properly; these fees should incorporate a risk premium that closely approximates the market risk premium on guarantees with systematic risk.
- The liquidity benefits of guarantees in normal times are probably not large. In the absence of government guarantees, private-label MBS would likely be tranched to create near-riskless securities that could be quite liquid.
- Guarantees are not necessary to ensure the supply of long-term fixed rate mortgages. Borrowers have strong preferences for such mortgages, and the private financial institutions have evolved sophisticated hedging strategies to supply them.
- Proposals that mix private guarantee with public guarantees risk the same sort of governance conflicts that ultimately led to the downfall of Fannie and Freddie.

None of this is to say that government guarantees are never valuable. Indeed, we argue that government guarantees are valuable during periods of significant market stress. But that does not mean that government guaranteed mortgages should comprise a large share of the market during normal times. Instead, we argue in Section 5 that government guarantees should be offered when they are needed most, namely during periods of financial crisis. The implication of this is that private markets should be providing the lion's share of mortgage finance in normal times. The next section considers some of the challenges of increased use of private markets in mortgage finance.

## 3. Analysis of Privatization Proposals

Privatization proposals in some form have been part of the public debate about the GSEs almost since Fannie Mae's creation in 1938. Over the last twenty years, the government has repeatedly considered privatization, beginning with the President's Commission on Privatization

in 1987. The report noted that Fannie and Freddie provided little value to the mortgage market while exposing the government to considerable risk. However, Congress did not act on the Commission's recommendation to privatize the two entities.

A series of reports by the Government Accounting Office in the early 1990s documented that Fannie and Freddie continued to expose the government to large risks, that they held insufficient capital against these risks, and that they were inadequately supervised by HUD. In response, the Federal Housing Enterprises Financial Safety and Soundness Act of 1992 established the Office of Federal Housing Enterprise Oversight (OFHEO) as an independent regulator within HUD, and gave it the power to set capital standards and ensure the safety and soundness of Fannie and Freddie. It also mandated that HUD, Treasury, CBO, and GAO study whether Fannie and Freddie should be privatized. HUD opposed privatization, writing in conclusion that "There remains a substantial public-purpose rationale for the current GSE system. Given the recently-improved housing goals and safety and soundness oversight by OFHEO, the Department recommends that it be continued." The other reports noted that the shareholders of Fannie and Freddie were the main beneficiaries of the implicit government guarantee, and they reinforced the idea that the two companies exposed the government to considerable risk. Nevertheless, none of the reports came out in support of privatization, and no legislative action was taken.

Over the years, however, numerous policy analysts and economists, including Vern McKinley, Peter Wallison, and Charles Calomiris, have argued forcefully for privatization. Their criticisms echoed many of the same concerns in the government reports, but further argued that the two GSEs served no useful public purpose.[16] More recently, Dwight Jaffee, an early critic of the GSEs, Edward Pinto, a former Freddie Mac executive, and Alex Pollock, a long-time President of the Federal Home Loan Bank of Chicago, itself a GSE, have argued for full privatization of Fannie Mae and Freddie Mac.[17] Given the immense cost to taxpayers from supporting Fannie and Freddie through the recent crisis, the case for privatization would appear to be a strong one.

[16] See McKinley (1997), Wallison and Ely (2000), Calomiris (2001), and Wallison, Stanton and Ely (2004).
[17] See Jaffee (2009), Pinto (2010), and Pollock (2010).

However, the advocates for privatization, while generally on-target in their criticism of the GSEs, have not provided much detail on the kind of housing finance system that would emerge in place of the current one, nor how it would be regulated. This is a significant shortcoming of the proposal given that a good deal of the responsibility for the subprime crisis resides with private market participants. Instead, much of the focus of privatization advocates has been on how to transition from a system in which the government guarantees 54% of all outstanding mortgages and vast majority of all newly issued mortgages. Essentially, they support a continued wind-down of the GSEs' retained portfolio, as prescribed in the Housing and Economic Recovery Act of 2008, guaranteeing legacy obligations of the GSEs, but then gradually scaling back guarantees on newly issued MBS. While transition issues are important, without a clear idea of the end-point of the transition, it is difficult to evaluate the costs and benefits of privatization.

This section discusses the implications of privatization. As noted above, privatization is unlikely to have a material effect on mortgage interest rates during normal financial market conditions, although it could have a large effect when financial markets become significantly stressed. Privatization also has a number of implications that require an enhanced regulatory regime. For one, "privatization" does not eliminate the government's exposure to housing finance given the large scope of implicit and explicit government insurance of the financial system. Moreover, privatization will increase the credit risk borne by financial institutions, and possibly increase the transmission of shocks from the housing sector to other sectors. Finally, privatization will increase use of private securitization, which the recent crisis has shown to have serious flaws both in the quality of underwriting and in the incentives for renegotiation.

### A. The Effect of Privatization on the Costs of Mortgages Provided by Banks

As noted in Section 2 private securitization is unlikely to lead to appreciably more expensive mortgages than a regime with properly-priced government guarantees of MBS. However, one possible implication of winding down Fannie and Freddie is that a much larger share of residential mortgage credit would be held directly by banks on their balance sheets, an increase from its current level of 28%. Indeed, some of the growth in GSE MBS over the years,

and the corresponding decline in share of mortgage credit risk held by banks, can be attributed to the fact that under Basel I the financial system as a whole had to hold about 75 bps less capital against mortgage losses if the mortgages were securitized by the GSEs.[18]

Thus, a benefit of moving mortgage credit back to the banks in the form of portfolio loans is that financial system will have a greater buffer against mortgage risk. This buffer will be even bigger as the more stringent Basel III capital regime gets phased in over the next decade. This may encourage more prudent lending, although the long history of imprudent bank lending should give pause to those who think that higher capital is an effective deterrent to making bad loans.

In theory, the increase in bank capital could lead to higher mortgage rates because bank capital is a more expensive source of finance than debt. However, the size of this effect is probably overstated by market participants.[19] Academic studies argue that bank capital is only modestly more expensive than debt when one takes into account that equity becomes less risky as a bank's capital is increased. For example, Kashyap, Stein, and Hanson (2010) place an upper bound of 45 basis points on the increase in funding costs from a 10 percentage point increase in bank capital.[20] Thus, if banks have to hold one or two percentage points more capital than the non-bank financial system, the effect on mortgage rates would likely be very modest.

[18] Specifically, portfolio loans get a 50% risk weight, which means that they have to hold 200 bps of Tier 1 capital (given a 400 bps capital requirement). By contrast, GSE MBS gets a 20% risk weight, which corresponds to 80 bps of capital. In combination with the 45 bps that the GSEs hold, the total financial system capital held against loans in GSE MBS is only 125 bps.

[19] See, for example, the comment letters of market participants in response to the report of the Basel Committee on Banking Supervision, "Strengthening the Resilience of the Banking System." Comments can be found at http://www.bis.org/publ/bcbs165/cacomments.htm.

[20] Bank debt is less expensive than equity for two reasons in the Kashyap, Stein and Hanson (2010) framework. First, interest payments are tax deductible while dividends are not. Second, to the extent that banks can raise deposit financing or access other liquid short-term funding sources they benefit from the liquidity premium that depositors and short-term lenders are willing to pay, enabling banks to borrow more cheaply. However, the tax benefit is a transfer to the banking sector and is not really a social benefit of debt financing (Admati et. al., 2010). Moroever, if one thinks that banks are excessively reliant on short-term funding and do not incorporate its systemic risk when making their funding decisions (as suggested by the suggested Basel III liquidity requirements), then the liquidity premium understates the true cost of debt.

### B. The Effect of Privatization on the Government's Exposure to Mortgage Risk

While winding down the GSEs eliminates one form of government guarantee, it increases the use of other explicit and implicit government guarantees. As of the 2010Q3, 40.5% of the commercial banking sector was financed by government-insured deposits.[21] Although banks pay deposit insurance premiums to the FDIC, they have arguably been underpriced (Pennacchi, 2009). Thus, GSE privatization could put the FDIC's deposit insurance fund at greater risk. This would be particularly true if community and regional banks expand their portfolio of residential real estate loans, both because their portfolios would be less geographically diversified and because deposits are a larger source of funding for them than for large banks. Whereas banks with less than $10 billion in assets funded 64% of their assets with insured deposits, the top four banks funded only 26.4% of their assets with insured deposits. One has only to look at the losses that community and regional banks have incurred on their commercial and residential real estate loans in the recent crisis to get a sense of the risk that real estate poses to the FDIC. The savings and loan crisis of the 1980s, which was also related to excessive real estate lending, resulted in even larger losses to deposit insurers as a share of GDP (1.7%) than the current crisis (0.5%).[22]

The government's exposure to losses in the banking sector is not restricted to deposit insurance. The four largest financial institutions – JP Morgan Chase, Wells Fargo, Bank of America, and Citigroup with combined assets of $5.4 trillion -- originate 58.2% of all new residential mortgages in 2009.[23] While they now securitize a large share of these loans through Fannie and Freddie (38.8% in 2009)[24], privatization may lead them to hold a larger share of their loans on their balance sheets. Although the Dodd-Frank Act took some steps in facilitating the resolution of large, systemic financial institutions, it is difficult to know whether the legislation will actually succeed in ending "too-big-to-fail." If not, then there is an implicit guarantee on the loans made by the largest financial institutions even if only 26.4% of their liabilities are insured

[21] Authors' calculations from Table III-B in *FDIC Quarterly*, Third Quarter, 2010, p. 18.
[22] "The Cost of the Savings and Loan Crisis: Truth and Consequences," *FDIC Banking Review* (2000). Report on the Troubled Asset Relief Program – November 2010, Congressional Budget Office. The Budgetary Impact of Fannie Mae and Freddie Mac (9/16/2010), Congressional Budget Office.
[23] Authors' calculations from *The 2010 Mortgage Market Statistical Annual, Volume I,* Inside Mortgage Finance Publications: Bethesda), p. 41.
[24] Authors' calculations from *The 2010 Mortgage Market Statistical Annual, Volumes I and II,* Inside Mortgage Finance Publications: Bethesda, pp. 41 and 161

deposits. Thus, it is misleading to suggest that elimination of the GSEs would eliminate government guarantees from the housing finance system.

### C. The Effect of Privatization on the Banking Sector's Exposure to Mortgage Risk

Eliminating government guarantees on MBS increases the banking sector's exposure to mortgage credit risk both from portfolio loans and their holdings of MBS. This increases the likelihood that shocks to the housing sector will get transmitted to other sectors by impairing banks' capital and reducing their willingness to lend. There is a large literature documenting spillovers of this type (Peek and Rosengren, 1997; Gan, 2007; Khwaja and Mian, 2008)). If there is any silver lining in the failure of Fannie and Freddie, it is that it limited the exposure of the banks to residential real estate losses. Had banks suffered the $229 billion of losses that Fannie Mae and Freddie Mac have suffered to date, they would have been in worse shape than they are today, further impairing their willingness to lend to other sectors of the economy. With losses to date of $229 billion, Tier 1 capital in the banking sector would be 7.0% rather than 8.7%. Moreover, given that large banks rely heavily on uninsured short-term funding, it is possible that greater exposure to residential mortgages would have exacerbated the withdrawal of funding from large banks in the fall of 2008. This is not to say that it is necessarily undesirable for banks to bear more credit risk in residential real estate, perhaps to reduce moral hazard in underwriting, but it does suggest that absorbing such risk is not without cost.

### D. The Effect of Privatization on Securitization Markets

Eliminating Fannie and Freddie would drive more activity into private-label MBS. It is important to analyze the effects of such a shift given that subprime mortgage lending funded largely by private-label securitizations, and securitization in general, played such a prominent role in the recent financial crisis. Indeed, the crisis exposed several flaws in the securitization process. Some of these flaws emerged because of lack of regulation, others because regulations encouraged regulatory arbitrage. These flaws in securitization have not been addressed by

privatization advocates. We discuss them in detail to provide context for our proposal for the regulation of securitization.

Moral hazard in origination, underwriting and credit ratings.

Numerous observers have suggested that because underwriters of MBS held very little, if any, of the securities they underwrote, they had little incentive to assess the quality of the mortgages that went into the mortgage pools. Keys et. al. (2010) presents evidence to this effect, showing that mortgages that were easier to securitize because they had FICO scores above 620 performed worse than mortgages with FICO scores just below 620. Securitizers profited instead from the underwriting fees they received and proceeds from the sale of the securitization tranches in excess of the cost of the mortgages in the pool. Originators, in turn, profited from the fees they earned by supplying mortgages to securitizers. These poor incentives resulted in the extension of mortgages to un-creditworthy borrowers. For instance, Mian and Sufi (2009) show that securitization is associated with increased availability of mortgage credit in subprime ZIP codes from 2002 to 2005, and elevated mortgage defaults in 2007.

There were also incentive problems with credit ratings agencies, which were paid by underwriters to provide ratings of the various tranches. The conflicts inherent in the ratings process have been widely noted, resulting in AAA ratings for senior securitization tranches that were far from immune to a nationwide decline in house prices. For instance, Griffin and Tang (2010) show that the rating agencies frequently adjusted the output from their statistical models to increase the size of the AAA tranches in some securitizations. In addition, Ashcraft, Goldsmith-Pinkham, and Vickery (2010) show that ratings incorporate readily available information on the riskiness of the loans in subprime and Alt-A MBS. These AAA tranches were, in turn, highly valued for their ostensible safety and the ability to include them in "safe" investment portfolios while earning spreads over Treasuries or Agency MBS. Fannie and Freddie were among the investors that found these securities particularly appealing given their own low borrowing costs.

The Dodd-Frank Act attempts to deal with these problems in three ways. First, it requires "skin in the game"; securitizers and originators must collectively hold 5% of the risk of

mortgages that are not "qualified residential mortgages". Precisely, how this requirement will be implemented is unknown. Second, to reduce the conflicts of interest between securitizers and credit ratings agencies, Dodd-Frank requires the SEC to study the feasibility of a system where credit ratings agencies are randomly assigned to rate structured products. Third, Dodd-Frank reduces the use of credit ratings by government entities in an attempt to reduce the perception that the government endorses credit ratings. Fourth, Dodd-Frank abolishes the exemption of the credit rating agencies from Regulation Full Disclosure, eliminating their government-granted special status as information providers. The critical question here is whether these new regulations will be enough to solve the problems in origination, securitization, and credit ratings.

We think the answer is no. First, the 5% risk retention requirement may be too small to incentivize good underwriting practices. As suggested by Shleifer and Vishny (2010), the incentives created by risk retention must be compared to the fee income that is generated from mortgage origination. If the fee income is large, only a large retention requirement will encourage good underwriting. Second, risk retention only addresses problems in underwriting that arise due to moral hazard on the part of mortgage originators. There may be other causes for deterioration in underwriting standards, including competition among securitizers and investors sentiment, which are better addressed with more direct regulation. Third, regulation of the credit rating agencies may improve the transparency of rating methodologies but is unlikely to fundamentally change the way that issuers and securitizers interact with the agencies. Investors are likely to continue relying on the rating agencies for credit analysis as long as that is more cost effective than generating their own analysis. Securitizers still have incentives to push for larger AAA tranches in order to maximize the profits from structuring MBS. Indeed, as suggested by Becker and Milbourne (2010), the steps taken by Dodd-Frank to increase competition among the rating agencies may actually lead to a race to the bottom and a decline in the quality of ratings.

Complexity in loan modifications and excess foreclosures

The foreclosure crisis has also revealed the difficulty of modifying mortgages in private label securitizations. Piskorski, Seru, and Vig (2010) show that foreclosure rates on delinquent borrowers are higher when mortgages are securitized than when they are held as whole loans in a bank's portfolio. In addition, Agarwal et. al. (2011) show that portfolio loans are 26% to 36%

more likely to be renegotiated than securitized loans, and that these renegotiations have lower post-modification default rates.[25]

There are a variety of reasons that it is difficult to modify loans in securitizations. Pooling and servicing agreements (PSAs), which govern the management of mortgage loan pools in securitization trusts, often prohibit servicers from modifying loans or constrain the number of modifications they can make (Gelpern and Levitin, 2009). While servicers are compensated for the costs of foreclosure, they are not compensated for the costs of modification. Although successful modification enables servicers to continue to earn servicing fees, foreclosure may still have higher present value to the servicer (Piskorski, Seru and Vig, 2010).

In normal times, when foreclosure rates are low, foreclosing on delinquent borrowers may maximize the expected payoffs to MBS investors. Thus, the PSA that encourages foreclosure may be optimal from an ex ante perspective. However, in the current environment, when foreclosure rates are high, foreclosure may no longer maximize the value of payments to investors. But changing a PSA to encourage mortgage modifications is extremely difficult as it requires the consent of a large number of investors in the securities. Moreover, investors in the senior tranches do not bear the costs of foreclosure and have little incentive to agree to a change in the PSA. They could be encouraged to go along with such a modification to the PSA by changing the terms of their securities, but the Trust Indenture Act of 1939 would require unanimous consent, making such a change nearly impossible (Gelpern and Levitin, 2009).

The key point here is that while the privately negotiated contracts that govern securitization *may* be optimal during normal times, it is far from clear that they are optimal during a crisis. One cannot expect private parties to internalize the foreclosure externalities that such contracts create. Therefore, it may be necessary to regulate securitization agreements in such a way as to discourage excessive foreclosure.

[25] Adelino, Girardi and Willen (2010) dispute this view. They present evidence that there is no difference between the modification rates on securitized and portfolio loans.

Fragility of securitization more broadly

The financial crisis also revealed that securitization can be a fragile form of financing. One of the supposed benefits of securitization is that it allows tranching of claims into senior and junior securities. This allows relatively uninformed investors (or those with mandates to invest only in "safe" securities) to provide financing by enabling them to buy the senior tranches, leaving the more junior tranches to better informed investors (Gorton and Pennacchi 1990, Duffie and DeMarzo 1999, DeMarzo 2005). As a result, more credit is supplied. Adelino (2010) shows that the pricing of MBS supports this hypothesis. The prices at which the junior tranches of MBS were sold at issue contain information about the quality of the underlying loans beyond the information in the ratings of those tranches; the prices of the AAA tranches contain no such information.

While such tranching works well during normal times, it is prone to break-downs during periods of crisis. Dang, Gorton, and Holmstrom (2009) suggest that secondary market trading of senior tranches will be disrupted when there is large uncertainty about the value of the collateral because the uninformed investors who hold them fear of adverse selection. Hanson and Sunderam (2010) argue that instability is an intrinsic feature of securitization: securitizers will structure the trusts with too large a senior tranche so as to attract uninformed investors who require low returns on their investments precisely because they do not invest in information acquisition. Thus, securitizers fail to take into account the financing difficulties that are created when there is uncertainty about collateral values and there are too few informed investors in the market. This happened during the recent crisis, but also during prior episodes such as the 1994 breakdown in the market for collateralized mortgage obligations. This could provide a rationale for the regulation of the capital structure of securitizations.

Use of asset-backed securities (ABS) as collateral in short-term funding and financing vehicles.

Asset-backed securities are used as collateral in repo funding by financial firms and as collateral in off-balance sheet entities such as structured investment vehicles (SIVs). These entities are themselves funded with commercial paper. Concerns about the quality of ABS collateral, particularly private-label MBS, led repo lenders to financial firms and commercial paper holders in SIVs to withdraw funding. Covitz, Liang, and Suarez (2009) show that the

withdrawal of SIV funding was initially indiscriminate, unrelated to the quality of the assets being financed. This modern-day run on financial firms led to the sequence of interventions by the Federal Reserve and U.S. Treasury to stabilize the financial system, including the Term Auction Facility, the Commercial Paper Funding Facility, and guarantees of money market mutual funds. Given that mortgages make up a large fraction of the financial sector's long-term assets, the way they are funded is of critical importance for financial stability; their regulation cannot be ignored.

In summary, any proposal advocating privatization must address concerns that privatization will create a larger role for private-label securitization, which proved deeply flawed in the recent crisis. As we discuss in Section 5, we believe that careful regulation of private-label securitization must be a key component of any privatization plan.

### E. Are Covered Bonds the Solution?

Former Treasury Secretary Henry Paulson and privatization advocates have tried to promote covered bonds as an alternative to Agency MBS. Indeed, since July 2008, a number of bills have been introduced in Congress to promote and regulate covered bond usage, although none have passed.[26]

Covered bonds are an important form of securitization in Europe, where they have been used since the 1700s.[27] They are issued by financial institutions, backed by a pool of assets (the "cover pool") and protected from the insolvency of the issuer. They are similar in this regard to MBS, however, they differ in at least two important respects. Unlike MBS, the asset pool that backs covered bonds is dynamic in the sense that loans in default or that have been pre-paid have to be replaced with other loans. But, more importantly, covered bondholders have recourse to the issuer. Thus, if the covered bond defaults, covered bondholders have an unsecured claim on the assets of the issuer to the extent that the face value of the bond exceeds the value of the cover

[26] Most recently the US Covered Bond Act of 2010, sponsored by Representatives Garrett, Kanjorski, and Bachus was not voted on by the House of Representatives.
[27] Best Practices for Residential Covered Bonds, US Treasury Department (2008).

pool. Because the issuing bank ultimately bears the credit risk of the mortgages, the covered bond stays on the bank's balance sheet as a liability.

Covered bond advocates have made much of the benefits of recourse to the issuer, arguing that it reduces moral hazard and adverse selection problems relative to MBS (Quinn 2008, Packer, Stever and Upper 2007). Because the issuer bears the cost of mortgage defaults, they have more incentives to engage in due diligence on mortgage quality and less incentive to sneak low quality mortgages into the cover pool. In this view, one gets the liquidity benefits of MBS, without the adverse selection and moral hazard problems that have been associated with MBS.

However, the good performance of covered bonds is likely to derive less from the benefits of recourse to the issuer and more from government regulations requiring either that only high quality mortgages can be included in the cover pool, or that issuers must add cash or other liquid assets to the cover pool if they include lower quality mortgages in the cover pool. (See Exhibit 1 at the end of the paper.) For example, in Denmark -- which has been held up by many as a model for covered bond usage -- only mortgages with an LTV at or below 80% can be included in the cover pool; Germany requires extra collateral for lower quality mortgages.[28] If such a restriction were placed on the mortgages included in private-label MBS or Agency MBS, these securities would also have performed well. Thus, it is not recourse to the issuer per se that promotes mortgage quality, but rather government regulation.[29] As further evidence that recourse alone does not solve the problem one has only to look at the current crisis. Many banks failed in the U.S. failed precisely because of recourse: they issued very risky mortgages and kept them in their portfolios. And, Acharya, Schnabl, and Suarez (2010) show that banks provided recourse to many investors who purchased securitized products. Thus, a covered bond system without strict controls on what types of mortgages can be included in the cover pool runs the risk of transmitting housing shocks to bank balance sheets in a way that destabilizes the financial system. This risk could be mitigated by restrictions on the quality of mortgages in the cover

[28] *Fact Book*, European Covered Bond Council, 2010.

[29] In the U.S., only Washington Mutual and Bank of America have issued a few covered bonds. The mortgages backing these bonds were generally of very high quality even though there was no government restriction against including lower-quality mortgages (Bergstresser, Greenwood and Quinn 2009). Given the small number of such issues it is difficult to conclude that all covered bond issues would be backed by high quality mortgages without regulation.

pool, but then off-balance-sheet securitization would likely work just as well. One could also mitigate transmission to the financial sector by making the covered bond issuers separate mortgage finance companies. The success of such an approach relies on those financial institutions being very well capitalized, again through strict regulation.

To summarize, we make three main points about privatization proposals, all of which suggest that privatization must be accompanied by a strong regulatory regime for housing finance:

- Privatization does not eliminate the taxpayer's exposure to mortgage risk because of the presence of deposit insurance and other implicit or explicit government safety nets.
- Privatization would increase the banking sector's exposure to mortgage risk and thus increase the probability that distress in the housing market is transmitted to other sectors.
- Privatization would increase the use of private-label securitization, which has significant structural flaws.

## 4. The Goals of Housing Finance Reform

Proponents of explicit government guarantees for MBS believe that a properly designed system of guarantees can significantly lower mortgage costs at minimal risk to the government. Advocates of privatization believe that such guarantees would do little to lower mortgage costs, and would expose the government to considerable risk. The debate therefore centers on how costly guarantees would be and how much they would lower average mortgage financing costs.

We do not think that this should be the central issue in the debate on housing finance reform for the following reasons, which we have described in more detail above.

- If guarantee fees are properly determined it is hard to argue that mortgage financing costs would be materially lowered during normal market conditions.
- Guarantee programs that lower required yields on MBS do not necessarily benefit borrowers.

- Lowering mortgage financing costs may not be an effective way to achieve policy goals related to housing or investment more broadly.

This is not to say that there is no role for the government in housing finance. Indeed, we argue that the government's main goals in designing housing finance policy should be to *reduce excessive volatility in the supply of housing credit and protect the financial system for adverse shocks to the housing market.*

These goals have three distinct components. The first is to support mortgage markets when support is most needed – during crises like the Great Depression and the one we are now experiencing. During such periods, private markets are likely to function poorly, and the government can have a significant impact on ensuring the proper supply of housing finance. The second part of the goal is to reduce the likelihood that a housing-related crisis starts in the first place. This can be done through regulatory measures that prevent the kind of excess supply of housing credit that characterized the period from 2001-2006 in the United States. The third component involves ensuring that the financial system does not collapse if there is a housing-related crisis.

Because real estate values are so dependent on credit terms, reducing excess volatility in housing finance can help to mitigate booms and busts in this sector. Doing so is important because such booms and busts have significant consequences for the real economy. Since housing assets are the principal asset for most families in the U.S., the bursting of a housing bubble is particularly damaging to the U.S. economy. For instance, Case, Quigley, and Shiller (2005) find that the marginal propensity to consume out of housing wealth is two to three times larger than the marginal propensity to consume out of other financial wealth. Furthermore, when a housing bubble bursts it can lead to an increase in foreclosures, which imposes negative externalities on neighbors. For instance, Campbell, Giglio, and Pathak (2010) show that a single foreclosure reduces the value of each home within 0.05 miles of that foreclosure by 1%. Moreover, Mian, Sufi and Trebbi (2010) show that foreclosures not only lead to a decline in house prices, but also a sharp decline in durable consumption. And, as noted by Guiso, Sapienza, and Zingales (2009), mortgage defaults may make strategic default more socially acceptable, leading to more defaults. Such costs are not borne by the defaulting borrower or the lender who forecloses on him. Housing finance policy must play a role in mitigating these spillovers.

Housing finance policy should also ensure that when there are large adverse shocks to real estate, the financial system has adequate levels of capital and liquidity so that its ability to lend is not too adversely affected. As we saw in the recent crisis, and in numerous other crises both in the U.S. and abroad, when a housing bubble bursts it impairs the ability of financial firms – particularly leveraged financial firms – to extend credit because their capital and liquidity are eroded. Since housing credit is the single-largest type of credit in the economy – there is $10.6 trillion of it outstanding – when there is a crisis in housing it has a particularly severe effect on the ability of banks and other leveraged financial institutions to lend. Indeed, $9 trillion of wealth was lost when the Internet bubble burst. That led to a recession, but not a financial crisis, as leveraged financial institutions did not have a large exposure to this sector. Reinhardt and Rogoff (2009) document that real estate crashes are a big part of most financial crises, and these crises have large long-term negative effects on economic growth.

These policy goals are consistent with the government's regulatory approach to the banking sector. Capital requirements exist in part to ensure that banks do not lend too much during good times, and have a buffer during bad times so that they do not cut lending excessively. Indeed, the macro-prudential approach to bank regulation attempts to reduce excess volatility in the supply of credit by raising capital requirements in good times and cutting them in bad times. Moreover, deposit insurance is designed to prevent bank runs, which can lead to drastic reductions in lending. And, as the lender of last resort, the Federal Reserve can supply liquidity to the banking sector so that banks are not forced to cut lending and sell assets at fire sale prices to generate liquidity. Collectively these policies are consistent with the three policy goals for housing finance: they lean against excessive volatility in credit supply, they protect the financial system form adverse shocks and, in so doing, help to soften the blow of an adverse shock on the economy.

If all housing credit were supplied by banks one could conceivably rely on macro-prudential bank regulation to limit excess volatility in the supply of housing credit. However, given the importance of securitization in housing finance, bank regulation alone will not be enough. Moreover, tight regulation of mortgage credit in the banking sector would just move more credit into private securitization. Unfortuanately, we do not have a well-developed regulatory regime for securitization. We discuss some possible regulatory approaches in the next

section. We also discuss ways to promote mortgage securitization during periods of considerable market stress.

## 5. The Proposal

### A. Regulation of Private Forms of Housing Finance

The most direct way of achieving the basic goals of housing finance policy – limiting excess volatility in the supply of housing credit and insulating financial firms from adverse shocks to real estate values – is to strictly regulate mortgage underwriting. For example, one might only allow mortgages with loan-to-value ratios below 80 percent and borrower FICO scores above 700. However, such restrictions, while helping regulators satisfy core housing finance policy goals, may be at odds with broader housing policy goals. Indeed, if a primary housing policy goal is to promote homeownership, then one might want looser underwriting standards. There is a clear tradeoff then between housing *finance* policy, which targets financial stability, and housing policy, which targets sustainable homeownership.

Of course, the goal of promoting homeownership is itself somewhat controversial. Many blame the financial crisis on the affordability and homeownership goals established for Fannie and Freddie by Title XIII of the Housing and Community Development Act of 1992 as well as the tightening of the Community Reinvestment Act in 1995; see, for example, Wallison (2011). Furthermore, it is unclear that policies designed to increase the availability of financing have a large effect on the long run rate of homeownership. At the same time, few policymakers would support extremely strict underwriting standards to ensure the absolute safety of housing finance – say LTVs below 60 and FICO scores above 740. So implicitly policymakers are trading off homeownership goals and housing finance goals. How these competing goals are traded off is not for us to decide. Instead, we describe the approaches one could adopt to deal with the risks inherent in relaxing underwriting standards to promote homeownership.

One such approach is to use monetary policy to dampen mortgage credit cycles. However, as suggested by Bernanke (2010) and Bernanke and Gertler (2000) monetary policy may be a blunt tool for countering mortgage credit bubble because monetary tightening in the

face of a bubble may have significant costs for the rest of the economy. By contrast, regulation can more precisely target the source of the credit bubble, with less adverse spillover to the rest of the economy. Below, we consider three regulatory levers that policymakers can use to deal with the risks inherent in relaxing underwriting standards to promote homeownership: regulation of mortgage products; bank capital requirements; and regulation of securitization.

Regulation of Mortgage Products

The reason that subprime lending became a subprime crisis is that subprime borrowers – those with low FICO scores and little or no documentation of income – did not just get mortgages, but they got mortgages with very risky mortgage terms, e.g., loans with high LTVs, seller-financed down-payment assistance, adjustable rates, and negative amortization. This toxic combination was a recipe for default. For example, Agarwal et. al. (2010) show that controlling for LTV and FICO, delinquent borrowers with adjustable-rate mortgages were five percentage points more likely to end up in foreclosure. FHA has also reported that mortgages with seller-financed down-payment assistance are three times more likely to become delinquent than those without such assistance.[30]

One could argue that offering toxic mortgages was a one-time mistake that lenders will not make again; however, financial history is full of examples in which imprudent lending practices are repeated. For instance, the junk-bond boom of the late 1980s was followed by a similar boom in the mid-2000s, with both resulting in high default rates. Greenwood and Hanson (2010) show that the corporate credit markets routinely go through episodes of lax credit followed by poor performance on corporate bonds. The boom, and subsequent bust, in commercial and residential real estate values in New England and California in the late 1980s was, in part, the result of banks' lax underwriting practices (FDIC, 1997). These practices included qualifying buyers for mortgages that they could only afford at low teaser rates. One could argue that this episode was caused by a one-time innovation in securitization that was poorly understood by market participants including ratings agencies. While true, it is also the

[30] *Annual Report to Congress Regarding the Financial Status of the FHA Mutual Mortgage Insurance Fund Fiscal Year 2010*, U.S. Department of Housing and Urban Development, November 15, 2010.

case that many imprudent loans were made by banks and retained in their portfolios. This is one of the reasons bank failure rates are so high.

Furthermore, even if lenders become better at protecting themselves from losses when they extend risky mortgages to borrowers, we may want to regulate those products for consumer protection reasons. A wide range of research, including Lusardi (2008), Lusardi and Mitchell (2008), and Barr, Mullainathan and Shafir (2009) has shown that the typical consumer does not understand many features of the financial products they use. When negotiating with more sophisticated lenders, these consumers may end up unknowingly bearing excessive risks.

Thus, there is a case to be made for prohibiting mortgages with very risky characteristics. For example, one could allow high LTV loans to borrowers with less-than-perfect FICO scores, but require that they be fixed-rate, full-documentation amortizing mortgages with no seller-financed downpayment assistance. More generally, there could be a matrix of allowable mortgage products determined by LTV, FICO score, debt-to-income ratio, fixed or floating rate, amortizing or not. Some combinations would be allowable; others would not. This approach has recently been introduced by Fannie, Freddie and FHA. In choosing which types of mortgages to allow, policymakers would have to trade off broad housing policy goals against housing finance policy goals.

One caveat in the design of such regulations is that the relationships between measureable characteristics and true mortgage default risk can change over time. For instance, Rajan, Seru, and Vig (2010) argue that the default risk models used by the credit rating agencies failed because they were calibrated on a sample of well-underwritten loans, in which FICO and LTV were the key risk factors. As a result, lenders began to ignore other measures of borrower quality. This changed the set of loans being made, resulting in default behavior that was not predicted by the models. Regulators must be watchful for innovations in the mortgage market that change the risk profiles of mortgages.

Despite these concerns, LTV is a measure of mortgage riskiness that deserves special scrutiny for several reasons. First, high LTV mortgages are at risk of strategic default because even small declines in house prices result in borrowers who are underwater on their loans. Studies by Amherst Securities (2009), and the credit scoring agencies Equifax and Experian

(2009) suggest that strategic default among underwater borrowers make up a meaningful fraction of mortgage defaults. Second, as suggested by Geanakoplos (2009), asset prices are strongly affected by the LTV that lenders are willing to accept from borrowers who want to purchase the assets. In the context of housing, this means that variations in the LTVs accepted by mortgage lenders have a strong impact on the potential for bubbles in house prices. Third, borrowers can alter the LTVs they face by taking out second mortgages or home equity lines of credit (HELOCs) without the knowledge of the first mortgage lender. Private mortgage insurance (PMI) can similarly drive a wedge between the LTVs faced by the borrower and the lender. Both second mortgages and PMI increase the riskiness of loans by introducing frictions into the workout process for distressed loans, increasing the probability that those loans are foreclosed upon. These considerations suggest strict regulatory scrutiny for high LTV loans.

Bank Capital Requirements

Another way to protect financial stability while allowing somewhat riskier mortgages is to make bank capital requirements sensitive to mortgage risk. Currently, all 1-4 family residential mortgages get a 50% risk weight in capital regulations "presum[ing] that such loans will meet … prudent underwriting standards."[31] In practice, banks are given fairly wide latitude in determining what constitutes prudent underwriting standards. A better policy would be to make risk weights depend on mortgage characteristics. This is done with multi-family mortgages where only fixed-rate mortgages with LTV below 80% or floating-rate mortgages with LTV below 75% get a 50% risk weight. Increasing capital requirements for riskier loans creates a larger buffer against loss. It also raises the cost of making riskier loans to a modest degree, and it puts more bank capital at risk, which may mitigate moral hazard problems.

A critical lesson from the crisis is that bank exposure to housing has to be measured on a *consolidated* basis, including contributions from whole loans, mortgage-backed securities, repo collateral, loan warehousing, underwriting income, and servicing income. Leading up to the crisis, neither regulators nor financial firms themselves really understood the full extent of this consolidated exposure. Capital requirements should be based on this consolidated exposure.

[31] Code of Federal Regulations, Title 12, Chapter 1, Part 3, Appendix A.

In determining the correct capital requirement, a macro-prudential approach is needed along the lines suggested by the Basel Committee on Banking Supervision as well as Dodd-Frank Act.[32] Specifically, capital requirements should not just be set based on the risk to the specific financial institution making the loan, but also the risk to the system if that loan, and loans like it, become distressed.

The financing banks use for their mortgage holdings should also be regulated. Mortgages are long-duration financial assets. While there may be some benefits to financing these assets with short-term funding in terms maturity transformation or liquidity creation, doing so significantly increases the risks of runs and fire sales. Intermediaries are unlikely to fully internalize these costs when making their financing decisions. This logic applies to bank holdings of both whole loans and mortgage-backed securities. Financing security holdings with repo or asset-backed commercial paper opens the door for runs, just as financing whole loans with uninsured deposits does.[33]

Regulation of Securitization

Higher and more risk-sensitive capital requirements could be used to make the banking sector safe, but they threaten to move all risky mortgages outside of banks and into the securitization market to avoid such capital requirements. Such an outcome would not meet our proposed goals for housing finance policy. The supply of mortgage credit would still be subject to booms and busts with potentially severe consequences for the real economy. Furthermore, the core banking system would still have significant indirect exposures to unregulated risky mortgage lending through its effects on prices and foreclosures. Thus, if capital requirements are to be enhanced, both as part of the Basel III capital reforms and housing finance policy reforms, regulation of securitization must also be enhanced. Unfortunately, there is no well-accepted paradigm for such regulation. Below we discuss a few possibilities.

[32] Dodd-Frank Act Section 171.7; Basel III: A global regulatory framework for more resilient banks and banking systems, Part IV.

[33] For example, see Gorton and Metrick (2010) for documentation of the withdrawal of repo funding from large financial firms.

*Prohibitions on Securitization for Risky Mortgages and "Vertical Strips."* One possible approach is simply to prohibit risky mortgages from being securitized. There is some merit in this approach given the difficulty of regulating securitization and the fact that renegotiating distressed mortgages is made more difficult by agency problems between servicers and MBS investors (Agarwal et. al., 2011; Piskorski, Seru and Vig , 2010) However, such a prohibition means that considerable mortgage risk would be on the balance sheets of leveraged financial institutions, the very ones we want to insulate from such risk because of the important role they play in intermediating credit to other sectors of the economy. Ideally, and as originally conceived, securitization would improve financial stability by transferring exposure to housing from large, highly leveraged financial institutions and into long-term, "real money" investors like pension funds and mutual funds.

An intermediate solution is to regulated to require a single investor in a securitization of a risky mortgage to hold a "vertical strip" in all of the tranches equal to some percentage – say 20% of the economic interest in the loan. This investor would have to be a qualified financial institution with the capability to deal with a distressed borrower, and would have all the decision rights with respect to their dealings with the borrower. This would provide some of the benefits of securitization while ensuring that there is some party with the proper economic incentives to deal with distressed borrowers and to evaluate credit risk. This would likely be a more effective solution to the problem than the modest 5% skin-in-the-game requirement in the Dodd-Frank legislation.

*Capital Structure Regulation.* Another approach is to allow securitization of risky mortgages, but regulate the capital structure of securitization trusts in much the same way that we regulate the capital structure of financial institutions. For example, there could be a prohibition against having more than two tranches – a debt tranche and an equity tranche – along with the requirement of a minimum equity percentage (or maximum debt-tranche percentage). Those parameters could then vary with the risk of the underlying loan pools.

Ideally, the ratings agencies would properly assess the risk of senior and junior tranches, but they failed to do so and it is not clear that they will do so in the future. Limiting the size of the senior tranche so that it is nearly safe means that relatively uninformed fixed-income investors are unlikely to overpay for these securities, which they did during the subprime boom.

If they do not overpay, this reduces the likelihood that the underlying mortgages in the loan pool will be overpriced and that borrowers will be able to borrow on excessively attractive terms. This helps to prevent a credit-induced housing boom.

Furthermore, as the recent crisis has demonstrated, many investors now rely heavily on the credit rating agencies for risk management and the analysis of credit quality (Adelino, 2010). Thus, the functioning of the financial system relies critically on the credibility of the credit rating agencies, and in particular the credibility of AAA ratings. While the agencies value their credibility highly, they are unlikely to fully internalize their importance within the financial sector. And while Dodd-Frank takes steps to reduce regulatory reliance on ratings, it is unlikely to result in significantly less reliance on them among private investors. Limiting the size of senior tranches would decrease the likelihood of a wave of downgrades in a housing downturn, helping preserve the credibility of the rating agencies and improve financial stability.

*Prohibition on Re-Securitization and Regulation of Financing.* It is possible that even if the debt tranche is safe and properly valued, the equity tranche of the securitization could be overvalued. It is difficult to know how to deal with this possibility, but it is no different than a bank that overvalues a mortgage in its portfolio. However, one could adopt additional regulations to reduce the likelihood of such overvaluation. First, one could prohibit re-securitization of junior tranches (or so-called CDO squared). Coval, Jurek and Stafford (2010) show that the value of a re-securitization is highly sensitive to the assumed correlation in the default rates of the mortgages in the loan pools. Second, one could regulate the leverage used to finance the purchase of a junior tranche. If the market is willing to finance such purchase on very favorable terms then it could lead to overvaluation of these tranches and thus lead to overvaluation of the underlying mortgage pools.

It should be noted that bank capital requirements and regulation of securitization structures are likely to improve the ability of the housing finance system to absorb and work through a housing downturn. However, by the logic of the Modigliani-Miller theorem, total financing costs do not depend strongly on the mix of financing used. Thus, these interventions are likely to have only small effects on the costs of risky mortgages, and be only modestly effective at preventing bubbles from developing in the housing market.

### B. Government Backstop

The regulations proposed above are an important part of ensuring the stability of housing finance. However, there may still be shocks to the financial system that significantly impair the extension of mortgage credit. For instance, adverse shocks to bank capital originating outside the housing sector may constrain mortgage lending. Alternatively, investors may grow wary of securitized products, as happened during the recent financial crisis and at other times, leading to a drought in securitized mortgage financing.[34] Furthermore, despite their best efforts, regulators may fail to properly oversee private forms of housing finance, resulting in a credit boom and a subsequent collapse in mortgage credit. Such regulatory failures are far from uncommon both in the United States and abroad.

Thus, even if there is a carefully regulated, largely-private system of mortgage finance, it is still possible to have a collapse in the availability of private mortgage financing. Given the importance of credit for the housing market, such an episode could result in a severe housing downturn, with serious consequences for the macroeconomy. As a result, if the goal of housing finance policy is to achieve some measure of financial stability, the government should be prepared to step in and support mortgage markets during periods of significant market stress.

To this end, we propose establishing a "guarantor of last resort" for the housing market. This entity would be a government-owned corporation responsible for for guaranteeing and securitizing *new* high quality, well-underwritten mortgages when private securitization and bank balance sheets are significantly constrained. As we saw in Figure 1 above, guarantees are most valuable in a crisis. In the current crisis, they significantly reduced the costs of conforming mortgages relative to jumbo mortgages. The corporation would function like Ginnie Mae in that it would issue MBS, while guaranteeing full and timely payments to MBS holders. Unlike many of the government guarantee proposals, there would be no private party in a first-loss position. It would also not insure existing mortgages; the goal is not to protect banks and investors from

[34] The recent financial crisis is not the first time that investors became wary of mortgage-backed securities. In 1994,collateralized-mortgages obligations, which re-securitize Agency MBS into various tranches for separate claims on principal and interest, collapsed when interest rates rose dramatically (Carroll and Lappen, 1994). In addition, commercial mortgage-backed securities were popular in the 1920s and then disappeared for many years out of concerns about the quality of the underlying mortgages (Bartke, 1971).

losses on legacy mortgage assets that they purchased in normal or boom times. Instead, it is to ensure the continued availability of relatively low-risk, high-quality mortgages as losses from those legacy assets are absorbed by private sector entities. Having a small footprint most of the time helps insulate taxpayers from losses that inevitably occur in the aftermath of a credit boom.

At present, Fannie Mae and Freddie Mac (with government backing), and the FHA are effectively playing this guarantor-of-last-resort role. With private capital still on the sidelines, the GSEs and FHA are together responsible for almost all new mortgage originations today. The backstop we are proposing would formalize this guarantor-of-last-resort role in a separate government-owned corporation, rather than having existing organizations fill the role on an *ad hoc* basis.

The backstop's market share during normal market conditions would be small – in the range of 5-10%. The reason it should have even a small market share is to maintain the risk management infrastructure, personnel, and private market contacts necessary for the backstop to act effectively and expeditiously in a severe downturn. In a typical year this would mean that the government-owned corporation would guarantee MBS of between $100 and $300 billion. This is about roughly the same market share that FHA had prior to its loss of market share in the housing boom leading up to the financial crisis. To ensure that the market share stays small in normal times, the guarantor could have a preset limit on its market share that could only be waived with a systemic risk determination from the Financial Stability Oversight Council (FSOC), established as part of the Dodd-Frank Act.

The small share of the backstop in normal times could be achieved by manipulating either the prices of the guarantees or their quantities. The backstop could set guarantee fees high enough that its market share would be low. However, to the extent that the market demand for guarantees is relatively elastic, as it would be in the absence of frictions, it may be difficult to control market share through price alone; the guarantor's share would be 100% if the market found the price of guarantees attractive and 0% if it did not. Alternatively, the backstop could directly control the quantity of guarantees offered, selling a fixed supply on a daily or weekly basis. If guarantees were sold through an auction, clearing prices would reflect market conditions. However, reserve prices in these auctions would have to be set appropriately to protect the government at times when the private market under-prices credit risk. Like any

mortgage guarantor, the backstop is at risk of adverse selection; mortgage originators could try to put the lowest-quality mortgages into pools guaranteed by the backstop. The guarantor could control the scope for such adverse selection by offering guarantees on mortgages with a relatively specific set of observable characteristics. Giving the guarantor the ability to levy significant penalties on originators who pass on low-quality mortgages would also help mitigate adverse selection problems.

In a significant housing downturn, the backstop, with the approval of the FSOC, would increase the quantity of guarantees it makes available to ensure continuity in the availability of mortgage credit. This would likely increase the backstop's market share substantially. Presumably the price of the guarantee would also increase given the withdrawal of private mortgage credit, although the extent of the increase would depend on how much the backstop increases its supply of guarantees. Like any lender of last resort, the backstop will face significant risk management challenges. It will have to decide whether a drought in the supply of mortgage credit reflects a malfunctioning of the private market or the appropriate reluctance on the part of the private market participants to lend to borrowers that are not creditworthy. This issue confronts any government entity extending credit or liquidity in the midst of a crisis.

A key feature of this proposal is that the backstop entity should be in the form of government-owned corporation. Given that a severe nationwide downturn is likely to impair the balance sheets of most or all private sector financial firms, the government is likely to be the most effective – possibly only effective – guarantor of last resort. Indeed, virtually all proposals that retain some government involvement in the mortgage market involve government reinsurance of privately guaranteed mortgage-backed securities for exactly this reason. Moreover, as the recent experiences of Fannie and Freddie (as well as the monoline insurers) demonstrate, private firms seeking to maximize shareholder value have strong incentives to chase market share during normal or boom times. This means they are likely to be highly exposed to housing credit entering a bust and thus are too impaired to play a countercyclical role (just as Fannie and Freddie would have been without government support). A government-owned corporation would have much weaker incentives to seek market share in normal times and would have the "dry powder" necessary to new guarantee loans at the onset of a crisis.

In this respect, the backstop would resemble FHA. As the subprime market took off in 2001 and peaked in 2005, the FHA's market share dwindled from 7% down to 2%. In part because it is a government agency, the FHA had little incentive to chase market share, and was able to increase the size of its guarantee program to serve a countercyclical role over the past three years. FHA did take losses on high LTV loans they guaranteed during the boom, but this can be ascribed to its mission of providing credit to under-served borrowers. Moreover, the losses were not so large as to prevent FHA from increasing their guarantee program.

The backstop may also be subject to political pressure. In particular, it could face strong pressure to intervene at first hint of a downturn. It could also face pressures to reduce guarantee fees and loosen eligibility standards during a longer crisis. These changes would then likely be difficult to reverse after crisis. Making the backstop an independent government-owned corporation, rather than a government agency, would help alleviate these concerns.

Political economy concerns also argue against embedding the guarantor-of-last-resort function within an existing housing agency such as FHA, which has separate policy objectives in normal times. As the track records of Fannie and Freddie show, giving housing organizations multiple objectives opens the door for mission creep and weakens institutional focus on risk management. Setting up the mortgage guarantor as a distinct entity from the Federal Reserve would have similar benefits, maintaining the distinction between fiscal and monetary policy.

### C. Transitioning to the New System

Since we are in the midst of a housing crisis, transitioning to the new system could take many years. One element of this transition is already taking place through minimum 10% annual reductions in the two GSEs' portfolio of mortgages and MBS, which were mandated by the Housing and Economic Recovery Act of 2008. These reductions will occur mainly by natural

runoff as mortgages either mature or are pre-paid. In the end, the GSEs' portfolios, which once reached a combined total of $1.9 trillion, will have been eliminated.[35]

The more difficult question is how and when to phase out the GSEs' guarantee function. Note that the GSEs, with the support of the government, are currently playing the role of the backstop entity that we envision as part of the new housing finance system. They should continue to play this role as long as it is necessary, but there should be a gradual reduction in the fraction of the new mortgages that the GSEs guarantee. This can be achieved, as Jaffee (2009) suggests, by gradually increasing guarantee fees, which would stimulate private market lending including securitizations. This gradual transition would give market participants who have traditionally purchased GSE MBS the time to develop the expertise necessary to evaluate and manage credit risk. It would also allow for the slow reallocation of capital from investors who are constrained to purchasing guaranteed MBS (by regulation or investment charter) to investors with broader investment mandates. At some point, the GSEs' guarantee capabilities, including information systems and personnel, should be transferred to the new backstop entity, which would take over the GSEs' guarantee function. The GSEs' legacy obligations would remain with the GSEs, which would be transferred from a conservatorship to a receivership and wound down.

### D. Housing Availability and Affordability for Low- and Moderate-Income Households

Our focus here has been on enhancing the safety of the housing finance system. As noted earlier in the section, the easiest way to achieve this goal is with strict regulation on underwriting standards. To the extent that underwriting standards are relaxed, it is presumably to meet the policy objective of promoting the availability and affordability of mortgage credit to low- and moderate-income (LMI) households. The significant benefits of meeting this policy objective have to be traded off against the benefits of financial stability. This tradeoff is probably better implemented through regulation of underwriting standards rather than by targeting quantities of lending to LMI households, which was done in the Community Reinvestment Act and Title VIII of the Housing and Community Development Act. To the extent that the private market fails to

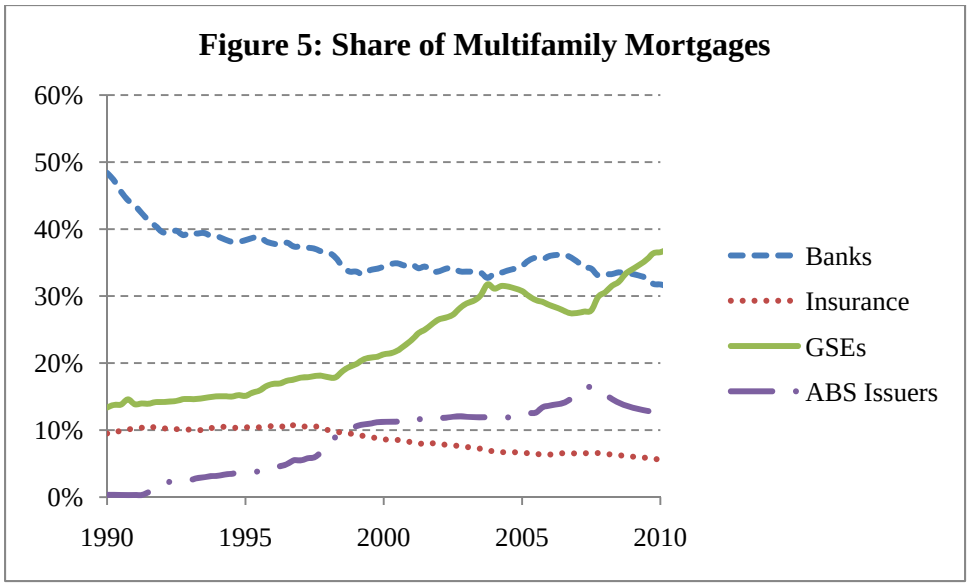
[35] In the new system, the government backstop entity would have only a de minimus portfolio simply because it will have to purchase loans that default to satisfy its guarantees of those loans. These loans would ultimately be sold.

provide mortgage credit to LMI households on reasonable terms, the FHA would be able to do so.

Multi-family rental housing, while only providing housing for 13% of all households, is an important source of housing for LMI households. Most multi-family housing units have rents that are considered affordable to households at the median level of income in a metropolitan area. As of 2010Q3, almost 38% of multi-family housing debt was owned or guaranteed by GSEs.[36] Their total exposure is over $315 billion. Most of the GSEs' involvement has been with large multi-family housing properties of greater than 50 units. While most are considerable affordable, there are notable exceptions such as the GSEs' disastrous funding of the private-equity investment in Stuyvesant Town, an 80-acre luxury apartment complex in New York City.

Figure 5 below plots the market share of the GSEs in multi-family mortgages since 1990, as well as the market shares of banks, insurance companies, and asset-backed securities issuers. Over the years, the GSEs have increased their shares substantially, from 13.4% in 1990 to its current peak of 37.5%. During the mid-2000s, the GSEs lost market share to ABS issuers, but as that market collapsed in 2007, the GSEs have increased their share. Indeed, all of the growth in net multi-family residential credit from the start of the financial crisis through 2010Q3 has come from the GSEs. Thus, they appear to be playing a countercyclical role (with government backing) in the current crisis, but there is no evidence of them playing a countercyclical role when markets were more modestly disrupted at other times.

[36] Authors' calculations based on *Flow of Funds Accounts of the United States*, Board of Governors of the Federal Reserve System, 2010 Quarter 3.




It is natural to ask whether our proposal should be applied to multi-family housing, i.e. whether multi-family housing deserves the same level of regulatory scrutiny as single-family housing, and whether the government should be backstopping this market as well. The answer is arguably no. The main issue in a severe housing downturn is whether the owner of a multi-family property can roll over the debt. If the owner cannot, then the property is either sold to a real estate investor who can put in equity, or foreclosed by the lender and then sold to a real estate investor. Unlike owner-occupied housing, no one is evicted and financial losses are borne by real estate investors and lenders. Although this can have adverse effects on the capital of leveraged financial firms, disruptions in multi-family housing have less important wealth effects and foreclosure externalities for individual households. Thus, the multi-family housing sector would seem to warrant the same level of regulatory oversight as other forms of commercial real estate, but probably not more. The backstop function is also probably less important in the multi-family market given that individual wealth effects and foreclosures are not significant issues.

Some observers, however, believe that multi-family housing is undersupplied by the private market relative to single-family housing. If true, it may be better to address this concern through some type of direct subsidy. This subsidy could be funded by taxes on single-family mortgage credit or a roll-back of the mortgage interest deduction for single-family homes.

## 6. Conclusion

Housing finance was at the center of the recent financial crisis, just as it has been in other financial crises in the United States and abroad. This is not surprising given that residential mortgage debt is the single largest type of credit in the U.S. economy. And it suggests that reform of the housing finance system should have financial stability as its main policy objective.

Unfortunately, the two leading proposals have largely ignored financial stability. Instead, advocates of broad-based, explicit, priced government guarantee programs have had as their objective the reduction of mortgage interest rates. We think this approach is misguided: *properly-priced* guarantees will do little, if anything, to lower mortgage interest rates. The only way that such guarantees can lower rates is if the government takes on risk for which it is not compensated. Ultimately, that risk is borne by taxpayers. Given the moral hazards associated with government guarantee programs, the likely costs of such a large program outweigh the benefits.

Privatization advocates have made much of these moral hazard costs and have argued that the government should not guarantee mortgages. We note, however, that government guarantees elsewhere in the financial system mean that "privatization" does not eliminate the government's exposure to mortgage risks. Indeed, the private housing finance system, not just the two GSEs, performed poorly during the past decade, leading the government to intervene extensively in financial markets. Privatization advocates have provided little guidance about how to reform housing finance to avoid the need for such interventions in the future.

Drawing on this analysis, we craft our own reform proposal. Our proposal has three components. First, we argue that private markets can provide attractively priced mortgage credit without government guarantees in normal times and that the private market should be the main supplier of mortgage credit. Second, we argue that privatization must be combined with careful regulation because private markets are prone to destabilizing boom and bust cycles. Third, we propose the creation of a government-owned corporation that would play the role of "guarantor-of-last-resort" during periods of crisis, when government guarantees of MBS are most valuable.

This paper proposes a number of fundamental reforms of the housing finance system. None will be easy. But such reform is necessary for promoting the overall stability of the financial system, and ultimately the real economy.

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**Exhibit 1: Covered Bond Legislation In Europe**

| Country-Bond | Special covered bond legislation? | 2009 outstanding covered bond/GDP | Required Over-collateralization | LTV Limit Residential | LTV Limit Commercial |
|---|---|---|---|---|---|
| **Austria** | Yes, since 1905 | 1.90% | 2% | 60% | 60% |
| **Denmark** | Yes | 143.30% | 8% of risk weighted assets | 80% | 70% |
| **Finland** | Yes, since 2000 | 4.50% | | 60% | |
| **France-Obligations Foncières, CRH** | Yes, since 1999 | 9.10% | 0 | 80% | |
| **Germany-Pfandbriefe** | Yes, since 1927 | 9.40% | 2% | 60% | 60% |
| **Greece** | Yes, since 2007 | 2.70% | | 80% | 60% |
| **Hungary** | Yes | 7.60% | | 70% | 60% |
| **Ireland-Asset Covered Securities** | Yes, since 2001 | 18.20% | 3% | 75% | 60% |
| **Italy-OBG** | Yes, since 2007 | 0.90% | 10% | 80% | 60% |
| **Luxembourg-Lettres de Gage** | Yes, since 1997 | 0 | 2% | 80% | 60% |
| **Netherlands** | Yes, since 2008 | 5% | | 80% or 125% | |
| **Poland** | Yes | 0.20% | | | |
| **Portugal** | Yes, since 1990 | 12.40% | 5% | 80% | 60% |
| **Slovakia** | Yes | 5.70% | | 70% | |
| **Spain** | Yes, since 1999 | 31.80% | 11% | 80% | |
| **Sweden** | Yes | 46.50% | | 75% | 70% |
| **UK-Regulated Covered Bonds** | Yes, since 2003 | 12.90% | 10% | 80% | |

*Source: European Covered Bond Council Factbook 2010, European Mortgage Federation-Hypostat 2009*