The Economics of Housing Finance Reform

David Scharfstein
Harvard Business School and NBER

Adi Sunderam
Harvard Business School

First Draft: February 2011
This Draft: August 2011

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 can be valuable in periods of significant stress to the financial system, such as in the recent financial crisis. Thus, we propose the creation of a government-owned corporation that would play the role of "guarantor-of-last-resort" of newly-issued (not legacy) MBS during periods of crisis.

We thank our former colleagues at the U.S. Treasury Department and National Economic Council for sharing with us their many insights on housing finance reform. The views expressed in this paper are our own and should in no way be construed as reflecting their views or those of the Treasury or NEC. We are grateful to Martin Baily, Sam Hanson, and Jeremy Stein for very valuable discussions as we worked on this paper. We thank Toomas Laarits for excellent research assistance and the Harvard Business School Division of Research for financial support. This paper is forthcoming in *The Future of Housing Finance,* edited by Martin Baily, Brookings Institution Press.

1. Introduction

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, Federal Reserve economists, and other analysts—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 two types of 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.

Our analysis of the two leading proposals suggests that we need to reorient the goals of housing finance policy. We argue that housing finance policy should seek 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 reducing the risk of mortgage credit booms, protecting against a drought in mortgage credit, and ensuring that the financial system can withstand a steep downturn in the housing sector.

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 under normal financial conditions, we argue for the eventual elimination of Fannie Mae and Freddie Mac and significant privatization of mortgage markets. However, preventing the kind of mortgage credit boom that characterized the period from 2001 to 2006, requires significant and stringent regulation of private mortgage markets. These regulations would combine prohibitions on certain risky mortgages with enhanced capital requirements for financial firms, and a new regulatory regime for securitization markets that strengthens 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 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, there will still be a private securitization market for nonprime 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 would be to ensure the supply of high-quality, well-underwritten mortgages during a period of significant market stress such as the financial crisis of 2007–09. 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 and possibly less. This market share cap could only be lifted with the approval of the Financial Stability Oversight Council in response to a systemic crisis.

We propose 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 important, as a government-owned corporation it would likely 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 help provide mortgage credit in a severe housing downturn. Our proposal envisions less government involvement than the reinsurance proposals, but somewhat more than the pure privatization proposals.

The chapter is organized as follows. We begin by analyzing government guarantee proposals and then consider privatization proposals. We then build on the analysis to put forth a set of goals for housing finance reform and lay out our proposal. A final section 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 in a first-loss position. These proposals have two ostensible goals. The first is to preserve key features of GSE-guaranteed MBS, which provide liquidity and credit protection to their holders. The second

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, the National Association of Home Builders, and the National Association of Realtors; the Center for American Progress, a progressive think tank; and economists from the Federal Reserve Bank of New York and the Federal Reserve Board of Governors..[1]

We have four 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 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 socially valuable forms of investment such as education. It may not be desirable to distort investment further 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. Fourth, in stressed market conditions, private financial firms that guarantee mortgages will themselves be financially impaired. This will limit their ability to guarantee new MBS issues even if the government guarantee protects legacy MBS issues. Thus in a crisis the government may have to inject capital into private guarantors to ensure the continuing flow of mortgage credit, just as it has done with Fannie and Freddie.

[1] See Mortgage Bankers Association (2009), National Association of Home Builders (2010), National Association of Realtors (2010); Center for American Progress (2011); Dechario and others (2010); Hancock and Passmore (2010).

A. Effect of Properly Priced Government Guarantees on the Cost of Mortgage Credit

Advocates of government guarantees argue that they lower mortgage costs both because the government can absorb credit risk more efficiently 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, which are desirable from a consumer protection point of view. Here we raise several concerns about the validity of these arguments.

Lower MBS Yields and Mortgage Costs

It is generally believed that the guarantee fees charged by the two GSEs (approximately 22 basis points) were too low given the 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. Despite this small capital cushion, the implicit government guarantee meant that investors viewed GSE mortgage-backed securities 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 (2004), McKenzie (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.[2] After controlling for

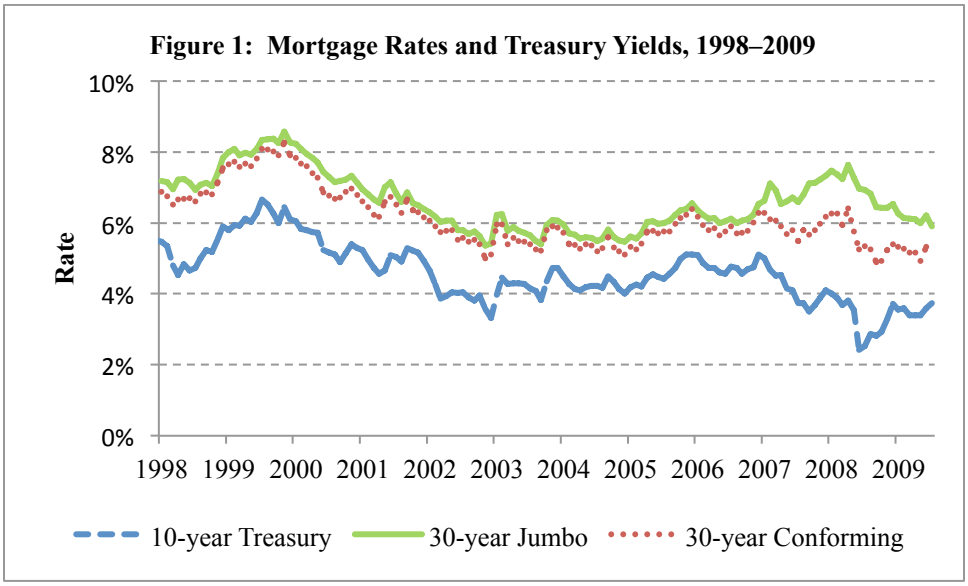
[2] This spread may underestimate the true value of the government guarantee. In particular, with the GSEs guaranteeing a large share of mortgage credit in the United States, jumbo mortgage lenders may have higher risk-

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 shows the thirty-year conforming mortgage rate, the thirty-year jumbo mortgage rate, and the ten-year Treasury yield. Over most of the period, until the financial crisis hit in mid-2007, the conforming and jumbo mortgage rates were quite similar, and both closely tracked the Treasury yield. Indeed, 90 percent of the variation in both rates over this period was driven by variations in the Treasury yield. The difference between conforming and jumbo rates, which could be attributed to the GSE guarantee, was small in comparison. It was only at the onset of the financial crisis in 2007 that jumbo rates rose relative to conforming rates. Thus the main value of guarantees is that they support the extension of mortgage credit in periods of financial market distress.

---

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 of lax regulation and the free government guarantee on mortgage rates, it stands to reason that the effect would be even smaller when regulation is tightened and the guarantee is priced.

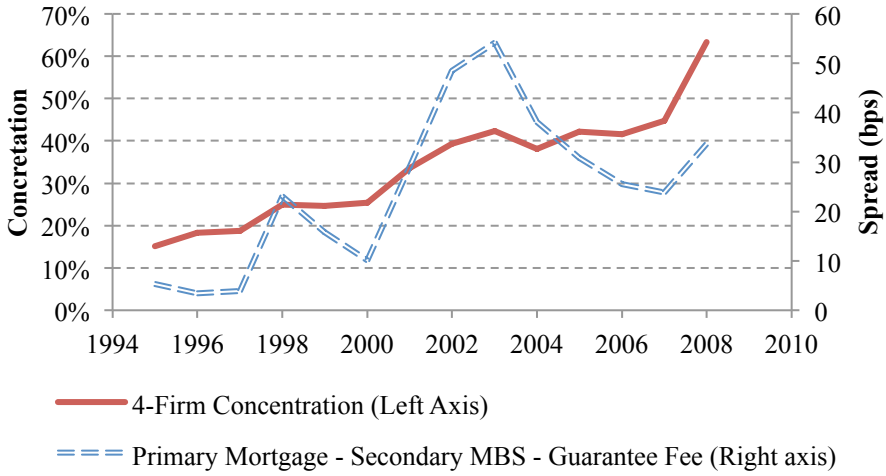


As noted by Hermalin and Jaffee (1996), one possible explanation of the small difference between jumbo and conforming mortgage rates is that the beneficiaries of the MBS subsidy are not homeowners, but the GSEs and their shareholders. Another possibility is that the benefits of the subsidy are captured by the banks that originate and then securitize the loan pools into GSE mortgage-backed securities. This would be the case if loan origination itself were imperfectly competitive. Indeed, as shown in Figure 2, there is some evidence of this. Over the last fifteen years the mortgage origination industry has become significantly more concentrated, according to data from *Inside Mortgage Finance*. The top four mortgage originators accounted for less than 15 percent of originations in 1995, but more than 60 percent 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 increased from about 5 basis points to more than 30 basis points.[3] While this evidence is not definitive, it does suggest that the market power of players throughout the mortgage origination chain could be an important consideration when

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

evaluating the benefits of government guarantees. Thus even if government guarantees lower MBS yields, they may not lower the mortgage costs for borrowers very much.

Figure 2: Originator Concentration and Spreads, 1994–2008



Properly Priced Government Guarantees and 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 risks on long-term, fixed-rate, pre-payable mortgages. They also bear liquidity risk, which we discuss later. Since holders of guaranteed MBS bear the same interest rate and pre-payment risks, our focus is on analyzing differences in the way credit risk is borne across the two types of securities.

Credit risk has two components: expected losses on the securities arising from troubled loans and co-variation of those losses with macroeconomic conditions in which investors suffer other losses. The yields on non-guaranteed MBS must therefore compensate their holders for expected losses and provide a risk premium for 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 to 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 non-guaranteed 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 the evidence above suggests that this may not be the case.

Thus determining the proper *GFee* that the government should charge is critical to analyzing 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 inequality(1).[4] In this case, the government prices the fee as if it were 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 yield advantage to guaranteed MBS.

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

Arrow and Lind (1970) show 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 (CAPM), purely idiosyncratic risk should not receive a risk premium.

However, this assumption of independence does not apply to the mortgage market. The realized costs of guarantees are high when mortgage defaults rise—that is, the costs are high when home prices, and hence taxpayer wealth and income, have fallen. Ultimately, government mortgage guarantees mean that taxpayers will bear greater tax liabilities in states of the world in which their wealth has fallen.[5] 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 investors to smooth their consumption than for the government to smooth its expenditures. A large adverse shock to the housing sector that leads to an increase in defaults means that holders

[5] This is exactly the situation that taxpayers now face as a result of the costs incurred in supporting the guarantees of the two GSEs. It is not just that the costs are high; it is also that they come at a time when taxpayers have incurred adverse wealth shocks.

of nonguaranteed mortgage-backed 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 refer to as mortgage-guarantee entities (MGEs), that guarantee mortgages and take first losses on mortgage guarantees, while the government acts as a reinsurer against catastrophic losses. In this hybrid system, the MGEs would charge a risk premium for their guarantees because their shareholders would need to be compensated not just for expected losses but also for the co-variation of those losses with the returns on the rest of their portfolio. 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 were 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 bear 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 investors will want more compensation for bearing the risks, including a risk premium for bearing systematic risk. The same will be true of all guarantors of mortgage credit, including both MGEs and the government.

What is the likely size of the risk premium—that is, how much compensation will MBS investors require for bearing the systematic risk associated with prime mortgages? The answer will tell us how large the *GFee* would have to be to cover the systematic risk borne by mortgage guarantors. To get a rough estimate of the risk premium on prime MBS, 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 percent. Unfortunately, we do not directly observe beta. However, the losses incurred by Fannie and Freddie during the crisis provide some useful information that we can use to estimate it. The FHFA's conservative estimate of total GSE credit losses is $337 billion, based on an adverse scenario where home prices decline a total of 45 percent peak-to-trough (put differently, this assumes a 25 percent drop from September 2010 to the trough). The FHFA's more moderate baseline estimate is $232 billion. The average of the two estimates is $285 billion. An estimated 30–40 percent of these losses come from prime loans, which constitute 70–75 percent of the guarantee book of $5.4 trillion.[6] Using the average loss estimate of $285 billion, this implies a loss rate of 1.7 to 3.0 percent. The higher loss estimate of $337 billion implies a loss rate of 2.5 to 3.5 percent.

[6] Fannie Mae (2010a, table 15); Federal Reserve (2010, table L.125).

While losses on prime mortgages were about 3 percent, the stock market was down about 50 percent from peak to trough, implying a beta of 0.06 (3/50 percent). Given a market risk premium of 5 percent, this implies a risk premium of 30 basis points (0.06 times 5 percent) on prime MBS. Under these assumptions mortgage guarantors should embed a risk premium of 30 basis points in their guarantee fees on top of expected losses.[7]

While we have argued that the government should charge a risk premium as a mortgage guarantor, our calculations imply that if the government insures prime mortgages, but does not charge a risk premium (that is, only requires a return equal to the risk-free rate), the *GFee* could be about 30 basis points lower than what private mortgage guarantors would charge. 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 have not been compensated.

Government Guarantees and Liquidity

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

[7] This calculation ignores the nonlinear feature of credit losses. Credit losses do not co-vary strongly with the stock market when the stock market is rising and the housing market is doing well since defaults are likely to be driven by person-specific factors rather than macroeconomic factors such as house values and unemployment. However, credit losses should co-vary more strongly with the stock market when the stock market is falling along with the house values and employment. Thus the beta of credit losses in a time series will tend to be underestimated and result in an underestimate of risk premiums. But, such concerns are alleviated by the fact that our calculations focus on a period when the market is falling and housing credit losses are actually being incurred. Our estimate of the risk premium essentially assumes that credit losses always co-vary as strongly with the stock market as they have in the recent crisis. This overstates the systematic risk of credit losses since they hardly co-vary with the stock market outside of crises. Thus our estimated risk premium and the associated guarantee fee are likely to be overestimates.

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 mortgage-backed securities 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 a day, while trading in corporate bonds averaged $16 billion a day.[8] Most trading of GSE mortgage-backed securities 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 mortgage-backed securities to be traded as though they were homogeneous 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, Jaffee, and Wallace 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 mortgage-backed securities that are eligible for delivery in the TBA market. TBA-eligible MBS

[8] SIFMA compilation of data from the Federal Reserve Bank of New York's primary dealer statistical release (www.sifma.org/uploadedFiles/Research/Statistics/StatisticsFiles/CM-US-Bond-Market-Trading-Volume-SIFMA.xls).

must satisfy certain requirements with regard to 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 lower than the yields on less liquid long-term bonds that were issued somewhat earlier. . However, this spread can increase dramatically during periods of market stress, such as in the fall of 1998, when the spread rose to about 25 basis points (Krishnamurthy 2002). Likewise, Longstaff (2004) estimates that Treasury notes trade at yields 10–15 basis points below government-guaranteed bonds issued by the Resolution Funding Corporation, the government-owned corporation set up to finance assets seized during the savings and loan crisis; he ascribes the spread to the difference in the liquidity of the two instruments. However, some studies on liquidity have found substantially larger effects. For instance, Krishnamurthy and Vissing-Jorgensen (2010) analyze the yields on Treasury bonds and AAA corporate bonds and conclude that high liquidity reduces Treasury yields by about 50 basis points. Nevertheless, they find no comparable effect for GSE mortgage-backed securities and suggest that prepayment risk may reduce the liquidity value of MBS.

Perhaps the most relevant study for our analysis is by Vickery and Wright (2010). They estimate the effects of liquidity for GSE mortgage-backed securities by comparing MBS that are eligible for delivery in the TBA market, where the large majority of GSE mortgage-backed securities are traded, with MBS that are not eligible for delivery in the TBA market. The difference in yields between TBA-eligible and -ineligible MBS should largely reflect the value of liquidity for MBS (although TBA-ineligible MBS contain high-balance loans and thus may also have greater prepayment risk than TBA-eligible MBS). They find that TBA-ineligible MBS

carry yields approximately 10–15 basis points higher than TBA-eligible MBS in normal times, although the spread was as high as 50 basis points 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 basis points 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 informationally insensitive (Standard & Poor's 2010). 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, Schultz, and Fabozzi 2008).

Government Guarantees and the Promotion of Long-Term, Fixed-Rate Mortgages

Beyond their liquidity benefits, many believe that government guarantees help to expand the availability and affordability of thirty-year, fixed-rate, amortizing, pre-payable mortgages. These observers have argued that such mortgages are desirable because they protect consumers against interest-rate and rollover risks. 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 rare in other countries. Part of the reason is that the interest rate protection that 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. However, these investors may not be able 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 the 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 the supply of long-term, fixed-rate mortgages. If the subsidy is removed, the long-term, fixed-rate mortgage will have lower supply and rates would be higher.

Third, it has been argued that, without government involvement, the thirty-year, fixed-rate, prepayable, amortizing mortgage would never have gotten off the ground in the first place. Indeed, a Depression-era government program sponsored by the Homeowners Loan Corporation introduced the long-term, fixed-rate, amortizing, mortgage to replace the short-term (about five-year maturity), nonamortizing 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 can hedge interest rate and prepayment risks at relatively low cost. Indeed, at the end of 2009, commercial banks, thrifts, and credit unions owned 21.7 percent of outstanding GSE mortgage-backed securities. These institutions also bear interest rate and prepayment risks in their role as mortgage servicers.[9] Fannie and Freddie themselves own 15.5 percent of the outstanding MBS they guarantee (Inside Mortgage Finance 2010, vol. 2). These institutions already have to hedge their interest rate and prepayment 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 to hold securitized, long-term, fixed-rate mortgages.

Moreover, while it may be true that some investors are averse to bearing or evaluating credit risk, if there is a sufficiently large clientele of such investors, securitizations of low-risk mortgages could be tranched to create mortgage products with very little credit risk but with the same interest rate and prepayment exposures as GSE mortgage-backed securities. 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 to 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 thirty years. Yet long-term, fixed-rate mortgages remain popular, suggesting that borrowers now appreciate the value of the long-term, fixed-rate

[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 percent of mortgage servicing rights (Inside Mortgage Finance 2010, vol. 1).

mortgage and that demand for it would likely be robust even in the absence of subsidies.[10] If not, it is possible to preference these loans through other types of government policy.

B. Efficiency and Effectiveness of Mortgage Credit Subsidies

The government could attempt to subsidize mortgage credit by mispricing its guarantee fee, perhaps by not charging a risk premium. However, lowering the costs of mortgage credit may not 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, benefiting existing owners, not purchasers, of homes. 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 mispriced government guarantee may not be particularly effective in achieving this goal.

Second, lowering mortgage financing costs distorts the consumption and investment behavior of households. Because real estate is a 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.

[10] Vickery (2007) provides some evidence suggesting that demand for long-term fixed-rate mortgages is quite price sensitive. He shows that crossing the conforming loan limit increases the costs of fixed-rate mortgages by 17 basis points relative to adjustable-rate mortgages. This cost increase is associated with a 14 percent decline in the market share of fixed-rate mortgages. Since the two GSEs guarantee both fixed-rate and adjustable-rate mortgages, the cost difference cannot be associated with credit risk and must be driven by the pricing of interest rate risk. However, over the sample period (1992–05), interest rate hedging technologies evolved substantially, suggesting that guarantees may play a smaller role in maintaining the market share of the fixed-rate mortgage than they once did. Furthermore, the reported price differential between fixed-rate and adjustable-rate mortgages may in part represent the underpricing by the GSEs of interest rate risk in their portfolios, rather than a direct effect of mortgage guarantees.

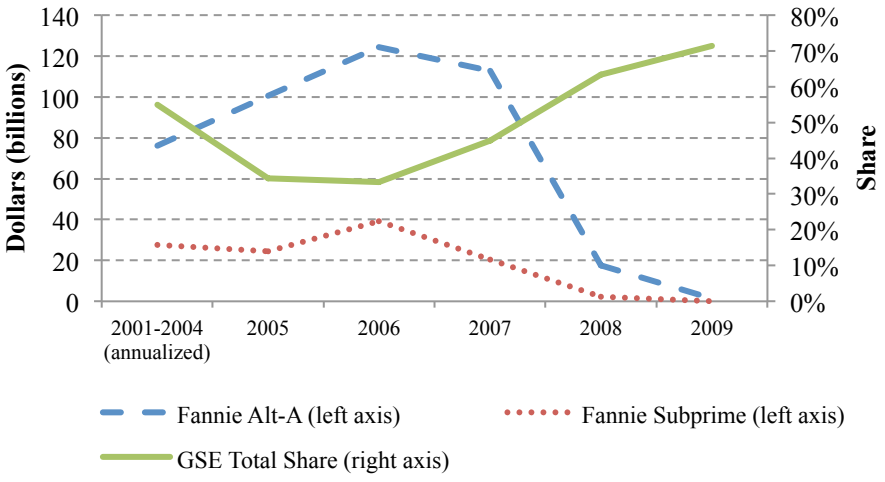
Finally, one could argue that positive externalities are associated with homeownership (Rossi-Hansberg, Sarte, and Owens 2010), which households do not internalize. In this case, lowering mortgage costs may help to achieve the right level of homeownership. However, lowering mortgage costs does not affect just the decision of whether to own or rent, but also the decision of how much housing to purchase. As noted, it is hard to believe that there is much value in promoting more consumption of housing 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 and Exposure to Uncompensated Risk

Some of the government guarantee proposals are likely to recreate the governance problems that plagued Fannie and Freddie. For example, both the Mortgage Bankers Association and the Center for American Progress have proposed creating mortgage guarantee entities that would provide guarantees on securitized mortgages. These MGEs would be for-profit entities subject to regulations designed to ensure that they have enough capital to meet their guarantee commitments. In addition, a government agency would be established to "wrap" the MBS—that is, to 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 an MGE cannot meet its obligation. In essence, these proposals recreate entities like Fannie and Freddie without sizable retained portfolios, government mandates to promote housing affordability, and implicit free government reinsurance of MBS.

In these proposals, the MGEs would be for-profit entities like Fannie and Freddie and 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 7-3 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 percent of Fannie's and Freddie's credit losses stemmed from their guarantees of Alt-A mortgages (FHFA 2010). 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.

Figure 3: GSE Share of New Issuance, 2001–2009



Second, for-profit MGEs will want low government reinsurance 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 taxpayers will bear losses on MBS 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, with some success, against significant increases in capital requirements as part of the Basel III process. 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."[11] 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, which were advocated for by the American Bankers Association.[12]

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 profit motive. Economists at the New York Fed have proposed establishing a single MGE that would be owned cooperatively by the financial institutions that issue MBS (Dechario and others 2010). This governance structure harkens back to the ownership structure of Fannie Mae established by the Charter Act of 1954, in which thrifts that sold their mortgages to Fannie Mae

[11] Bank of America comments on Basel Committee on Banking Supervision (2009) are available at www.bis.org/publ/bcbs165/boac.pdf.
[12] American Bankers Association position on FDIC premiums (www.aba.com/Industry+Issues/FDIC_RBP.htm).

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 Bank.

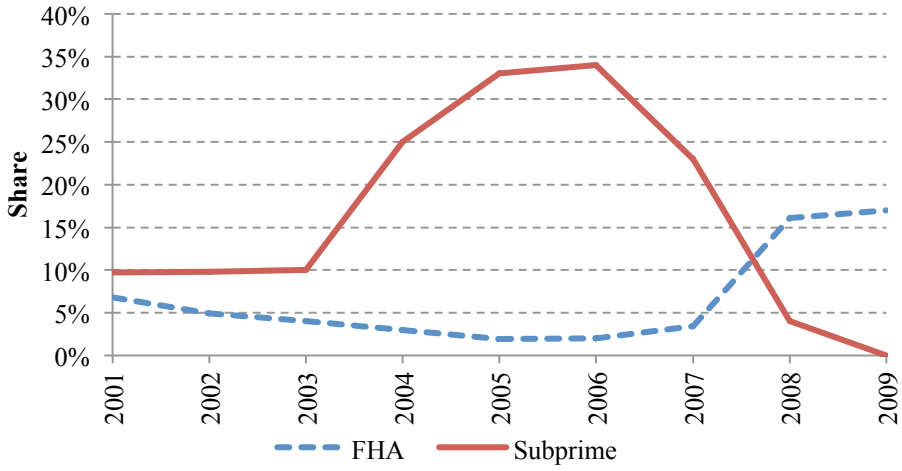
While the shareholders in this form of MGE may not chase profits quite as aggressively as Fannie and Freddie did, they would likely still push for low capital requirements. Indeed, the main opposition to the Charter Act of 1954 came from thrifts precisely because they did not want to use their own capital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

The proposals of the National Association of Home Builders and the National Association of Realtors 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 Federal Housing Administration and the Veterans Administration model of guarantees, although it is unclear whether their proposals would have the fund be 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, the 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 7-4 shows, as subprime mortgages increased from 10 percent to nearly 35 percent of the market, the FHA's share of new origination dwindled to 1.9 percent, from 6.8 percent.

Arguably, the 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 the FHA's guarantee book meant that its losses were also modest, particularly given the high ratios of loan to value (LTV) on the mortgages it guaranteed.

Figure 4: FHA and Subprime Share of New Issuance, 2001–2009



While the 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 precrisis 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 percent of new mortgages and 14.4 percent of refinanced mortgages. In no small measure, the 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.[13]

[13] The initial increase in market share during the crisis was less a conscious policy decision than a reflection of the insensitivity of FHA loan pricing to market forces. Later, during the Obama administration, there was concern

Thus one could argue that a benefit of having a government agency as the mortgage guarantor is that the agency can be directed more easily 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 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 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 significant moral hazard costs may be associated with deposit insurance, the *benefits* of providing deposit guarantees are likely to be significantly larger than the benefits of providing MBS guarantees. We make this claim for at least two reasons.

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 implications for efficiency.

Second, home 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

about the risks to the FHA of a considerable expansion of its market share and a conscious decision to try to protect the FHA from future losses while maintaining a large market share. See Streitfeld and Story (2009).

agency problems, often with hard-to-value or limited collateral. Such frictions mean that it is more likely that the private market will underinvest 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 would be to have a financial system with insured deposits for "narrow banks" that fund only mortgages[14] and long-term unguaranteed debt funding of less transparent credit assets like corporate loans and construction loans. The main benefit of such a system would be that the government would 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 toward overcoming underinvestment in asset classes where financial frictions are most severe. While this counterfactual is interesting, such a sweeping reorganization of the financial system is impractical from a policy perspective.

D. The Functioning of Private Mortgage Guarantee Entities in a Crisis

In hybrid guarantee proposals, where the government reinsures MBS that are guaranteed by private MGEs, government reinsurance protects the holders of existing MBS from taking losses. In these hybrid systems, many or all MGEs are likely to experience financial difficulty in a systemic crisis. Thus the ability of the system to guarantee *new* mortgages will be significantly impaired, impeding the extension of new mortgage credit, even if the government protects

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

existing MBS holders. For new MBS to be guaranteed, existing MGEs would have to raise capital, but their ability to do so would be very limited given their financial distress. Moreover, as an MGE's financial condition worsens, it is likely to scale back on guaranteeing mortgages in an attempt to conserve capital. Thus in any hybrid system of mortgage guarantees, the government would likely step in during a crisis to guarantee mortgages directly or to inject capital into existing MGEs.

The recent financial crisis provides ample evidence that MGEs would find it difficult to guarantee new mortgages. Fannie and Freddie are the most obvious examples. The government is not just protecting existing MBS holders; it is helping the two GSEs to guarantee new MBS. Recent experience with private mortgage insurers also provides evidence that MGEs would have problems in a crisis. The leading mortgage insurers, Mortgage Guarantee Insurance Corporation, PMI Group, Genworth Financial, and Radian Group, all had significant financial difficulties during the financial crisis. Their debt was downgraded, and their credit default swap spreads reached very high levels. They also had difficulty meeting regulatory capital requirements. At the peak of the crisis, their condition was so dire that they applied for capital injections from the Troubled Asset Relief Program, but were denied. The government was able to deny this support because it was already supporting the mortgage market through Fannie, Freddie, and the FHA. But if MGEs were the only guarantors, it is likely that the government would be forced to provide capital, just as it has done with Fannie and Freddie.

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

- Government guarantees provide little benefit to borrowers 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 relatively small. 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 guarantees with public guarantees risk the same sort of governance conflicts that ultimately led to the downfall of Fannie and Freddie.
- Private mortgage guarantee entities may find it difficult to guarantee new mortgages during periods of significant financial stress and may need government infusions of capital to guarantee new mortgages.

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. This does not mean that government-guaranteed mortgages should constitute a large share of the market during normal times. Instead, we argue later in this chapter that government guarantees should be offered when they are needed most, namely during periods of financial crisis. By implication, private markets should provide 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 US Government Accountability 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 the Department of Housing and Urban Development (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 empowered it to set capital standards and ensure the safety and soundness of Fannie and Freddie. It also mandated that HUD, the Treasury, the Congressional Budget Office, and the Government Accountability Office study whether Fannie and Freddie should be privatized. HUD opposed privatization, writing in conclusion, "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 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 echo many of the same concerns in the government reports, but they argue further that the two GSEs serve no useful public purpose (see McKinley 1997; Wallison and Ely 2000;

Calomiris 2001; Wallison, Stanton, and Ely 2004). More recently, Dwight Jaffee, an early critic of the GSEs, Edward Pinto, a former Fannie Mae 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 (see Jaffee 2010; Pinto 2010; Pollock 2010). Given the immense cost to taxpayers from supporting Fannie and Freddie through the recent crisis, the case for privatization appears to be a strong one.

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 or how it would be regulated. This is a significant shortcoming of their proposals, given that a good deal of responsibility for the subprime crisis resides with private market participants. While Fannie and Freddie were exposed to a very large share of Alt-A loans, they had a relatively small share of subprime mortgages. At the peak of the mortgage credit boom in 2006, Fannie and Freddie accounted for approximately 30 percent of new Alt-A and subprime mortgage lending.[15] 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.

However, most of the focus of privatization advocates has been on how to transition from a system in which the government guarantees 54 percent of all outstanding mortgages and the vast majority of all newly issued mortgages. Essentially, they support a continued winding 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

[15] Calculations based on Inside Mortgage Finance (2010); Fannie Mae (2010b); FHFA (2009, 2010).

on newly issued MBS. 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, 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 implications that require an enhanced regulatory regime. For one, "privatization" will 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 may increase the transmission of shocks from the housing sector to other sectors. Finally, privatization will increase the 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, 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 the current level of 28 percent. Indeed, some of the growth in GSE mortgage-backed securities over the years, and corresponding decline in the 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 basis points less capital against mortgage losses if the mortgages were securitized by the GSEs.[16]

Thus a benefit of moving mortgage credit back to the banks in the form of portfolio loans is that the 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 requirements are 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, market participants probably overstate the size of this effect.[17] Academic studies argue that bank capital is only modestly more expensive than debt because 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.[18] Thus if banks have to hold 1 or 2 percentage points more capital than the nonbank financial system, the effect on mortgage rates would likely be very modest.

[16] Specifically, portfolio loans on bank balance sheets get a 50 percent risk weight, which means that they have to hold 200 basis points of tier 1 capital (given a capital requirement of 400 basis points). By contrast, GSE mortgage-backed securities get a 20 percent risk weight, which corresponds to 80 basis points of capital. In combination with the 45 basis points that the GSEs hold, the total financial system capital held against loans in GSE mortgage-backed securities is only 125 basis points.

[17] See, for example, the comment letters of market participants in response to Basel Committee on Banking Supervision (2009). Comments can be found at www.bis.org/publ/bcbs165/cacomments.htm.

[18] Bank debt is less expensive than equity for two reasons in the framework of Kashyap, Stein, and Hanson (2010). 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 and others 2010). Moreover, 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 proposed 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 will eliminate one form of government guarantee, it will also increase the use of other explicit and implicit government guarantees. As of the third quarter of 2010, 40.5 percent of the commercial banking sector was financed by government-insured deposits.[19] Although banks pay deposit insurance premiums to the Federal Deposit Insurance Corporation (FDIC), these premiums 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 percent of their assets with insured deposits, the top four banks funded only 26.4 percent 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 than the current crisis (1.7 and 0.5 percent, respectively; Curry and Shibut 2000; CBO 2010a, 2010b).

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—originated 58.2 percent of all new residential mortgages in 2009.[20] While they now securitize a large share of these loans

[19] Authors' calculations from FDIC (2010, table III-B, p. 18).
[20] Authors' calculations from Inside Mortgage Finance (2010, vol. 1, p. 41).

through Fannie and Freddie (62.7 percent in 2009),[21] privatization may lead them to hold a larger share of their loans on their balance sheets. Although the Dodd-Frank Act took some steps to facilitate the resolution of large, systemic financial institutions, it is difficult to know whether the legislation will 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 percent of their liabilities are insured deposits. Thus it is misleading to suggest that eliminating 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 from 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. A large literature documents 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 they limited the exposure of 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 percent rather than 8.7 percent. 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

[21] Authors' calculations from Inside Mortgage Finance (2010, vol. 1, p. 41; vol. 2, p. 161).

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 regulation was lacking, others because regulations encouraged regulatory arbitrage. Privatization advocates have not addressed these flaws in securitization. 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 and others (2010) present evidence to this effect, showing that mortgages with FICO (credit) 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 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 uncreditworthy borrowers. For instance, Mian and Sufi (2010) show that securitization is

associated with increased availability of mortgage credit in subprime areas from 2002 to 2005 and elevated mortgage defaults in 2007.

There were also incentive problems with credit rating 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 home 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 do not 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.

The Dodd-Frank Act attempts to deal with these problems in four ways. First, it requires "skin in the game"; securitizers and originators must collectively hold 5 percent of the risk of mortgages that are not "qualified residential mortgages." Precisely how this requirement will be implemented is not yet known. Second, to reduce the conflicts of interest between securitizers and credit rating agencies, Dodd-Frank requires the Securities and Exchange Commission to study the feasibility of a system where credit rating 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 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.

While a good first step, the answer may be no. First, the 5 percent risk retention requirement may be too low 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 generated by 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 a deterioration in underwriting standards, including competition among securitizers and investor sentiment, which are better addressed through more direct regulation. Third, regulation of the credit rating agencies may improve their performance but is unlikely to change fundamentally 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 doing so 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.

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 and others (2011) show that portfolio loans are 26 to 36

percent more likely to be renegotiated than securitized loans and that these renegotiations have lower post-modification default rates.[22]

It is difficult to modify loans in securitizations for many reasons. 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

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

such contracts create. Therefore, it may be necessary to regulate securitization agreements in such a way as to discourage excessive foreclosure.

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 down 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 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.

Gennaioli, Shleifer, and Vishny (2011) suggest that securitization is inherently unstable because securitizers and investors are prone to neglect low-probability downside risk. Securitization structures that work well during normal times collapse when low-probability events materialize. Securitization collapsed during the recent crisis, but also during prior episodes, such as the 1994 breakdown in the market for collateralized mortgage obligations. Such arguments could provide a rationale for regulating the capital structure of securitizations.

Use of Asset-Backed Securities as Collateral in Short-Term Funding and Financing Vehicles

Asset-backed securities (ABSs) 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 (non-deposit) run on financial firms led to a sequence of interventions by the Federal Reserve and 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, how 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 later in this chapter, 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, several bills have been introduced in Congress to promote and regulate covered bond usage, although none has passed.[23]

Covered bonds are an important form of securitization in Europe, where they have been used since the 1700s (Treasury Department 2008). 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, but 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 loans that have been prepaid have to be replaced with other loans. Even more important, 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 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 covered bonds reduce 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, it has more incentives to engage in due diligence on mortgage quality and less incentive

[23] Most recently the U.S. Covered Bond Act of 2010, sponsored by Representatives Garrett, Kanjorski, and Bachus, was not voted on by the House of Representatives.

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 them.

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 it (see table 7-1). 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 percent can be included in the cover pool; Germany requires extra collateral for lower-quality mortgages (European Covered Bond Council 2010). If such restrictions were placed on the mortgages included in private-label MBS or agency MBS, these securities would also perform well. Thus it is not recourse to the issuer per se that promotes mortgage quality, but rather government regulation.[24] 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 United States 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 restricting the quality of mortgages in the cover

[24] In the United States, 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 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:

- If guarantee fees are properly determined it is hard to argue that mortgage financing costs would be materially lower 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 from adverse shocks to the housing market.*

These goals have three distinct components. The first is to support mortgage markets when support is needed most—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 by ensuring the proper supply of housing finance. The second component 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 to 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 United States, 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 (2009) show that a single foreclosure reduces the value of each home within 0.05 mile of that foreclosure by 1 percent. Moreover, Mian, Sufi, and Trebbi (2011) show that foreclosures lead not only to a decline in home prices, but also to a sharp decline in durable consumption. And, as noted by Guiso, Sapienza, and Zingales (2011), 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 the borrower. 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 have seen in the recent crisis and in numerous other crises both in the United States 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 housing credit outstanding—a crisis in housing 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 macroprudential 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 from adverse shocks, and, in so doing, they 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 macroprudential 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. Unfortunately, we do not have a complete regulatory regime for securitization.

5. The Proposal

This section outlines a policy proposal to achieve the goals of housing finance reform articulated above. We first discuss approaches to regulating mortgage financing that would help to reduce excess volatility in the supply of housing credit. We then turn to policies for stabilizing housing finance in periods of market stress. Finally, we discuss issues surrounding the transition to a new system of mortgage finance.

A. Regulation of Private Forms of Housing Finance

The most direct way to achieve 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 through strict regulation of 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 to satisfy core goals of housing finance policy, may be at odds with broader goals of housing policy. Indeed, if a primary goal of housing policy is to promote homeownership, then one might want looser underwriting standards. There is a clear trade-off, 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 a 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 target more precisely the source of the credit bubble, with less adverse spillover to the rest of the economy. Next, 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, setting of bank capital requirements, and regulation of securitization.

Regulation of Mortgage Products

Subprime lending became a subprime crisis because subprime borrowers—those with low FICO scores and little or no documentation of income—did not just get mortgages, they got mortgages with very risky mortgage terms, such as loans with high LTV ratios, seller-financed down payment assistance, adjustable rates, and negative amortization. This toxic combination was a recipe for default. For example, Agarwal and others (2010) show that, controlling for LTV and FICO, delinquent borrowers with adjustable-rate mortgages are 5 percentage points more likely to end up in foreclosure. The FHA also reports that mortgages with seller-financed down

payment assistance are three times more likely to become delinquent than those without such assistance (HUD 2010).

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, both resulting in high default rates. Greenwood and Hanson (2010) show that the corporate credit markets routinely experience 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 they could only afford at low teaser rates. One could argue that this episode was caused by a one-time innovation in securitization that market participants, including rating agencies, poorly understood. While true, it is also the case that many imprudent loans were made by banks and retained in their portfolios. This is one of the reasons why bank failure rates were 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 for borrowers with less-than-perfect FICO scores,

but require that they be fixed-rate, full-documentation, amortizing mortgages with no seller-financed down payment 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, and amortizing or not. Some combinations would be allowable; others would not. This approach has recently been introduced by Fannie, Freddie, and the 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 measurable 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 home prices result in borrowers who are underwater on their loans. Studies in 2009 by Amherst Securities and the credit scoring agencies Equifax and Experian 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 home prices. Third, borrowers can alter the LTVs they face by taking out second mortgages or home equity lines of credit 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 by 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 will be foreclosed upon. These considerations suggest the need for strict regulatory scrutiny of high LTV loans.

Setting of 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 one-to-four-family residential mortgages get a 50 percent risk weight in capital regulations "presum[ing] that such loans will meet … prudent underwriting standards."[25] In practice, banks are given fairly wide latitude in determining what constitutes prudent underwriting standards. A better policy would be to make risk weights dependent on mortgage characteristics. This is done with multifamily mortgages where only fixed-rate mortgages with LTVs below 80 percent or floating-rate mortgages with LTVs below 75 percent get a 50 percent 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

[25] Code of Federal Regulations, Title 12, ch. 1, pt. 3, app. A.

collateral, loan warehousing, underwriting income, and servicing income. Leading up to the crisis, neither regulators nor financial firms themselves understood the full extent of this consolidated exposure. Capital requirements should be based on this consolidated exposure.

In determining the correct capital requirement, a macroprudential approach is needed along the lines suggested by the Basel Committee on Banking Supervision as well as the Dodd-Frank Act.[26] Specifically, capital requirements should be set based not just on the risk to the specific financial institution making the loan, but also on the risk to the system if that loan, and loans like it, become distressed.

The financing that 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 of maturity transformation or liquidity creation, doing so significantly increases the risks of runs and fire sales. Intermediaries are unlikely to internalize all of 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, as does financing whole loans with uninsured deposits.[27]

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

[26] Dodd-Frank Act, sec. 171.7; Basel III: A Global Regulatory Framework for More Resilient Banks and Banking Systems, Part IV.

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

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, as part of both 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. Here we discuss a few possibilities.

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 renegotiation of distressed mortgages is made more difficult by agency problems between servicers and MBS investors (Agarwal and others 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 away from large, highly leveraged financial institutions and into long-term, "real money" investors like pension funds and mutual funds.

An intermediate solution would be to require a single investor in the securitization of a risky mortgage to hold a "vertical strip" in all of the tranches equal to some percentage—say, 20 percent—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 its dealings with the borrower. This would provide some of the benefits of securitization, while ensuring that some party has the proper economic incentives to deal with distressed borrowers and to evaluate credit risk. This would provide greater incentives than the 5 percent skin-in-the-game requirement in the Dodd-Frank legislation.

Capital Structure Regulation. Another approach would be to allow securitization of risky mortgages, but to 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 rating agencies would properly assess the risk of senior and junior tranches, but they failed to do so in the current crisis, and it is not clear that they will do so in the future. If the size of the senior tranche is limited so that it is nearly safe, 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 managing risk and analyzing 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 the credibility of their ratings, they are unlikely to internalize their full importance within the financial sector. Although Dodd-Frank takes steps to reduce regulatory reliance on ratings, this

effort 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 to preserve the credibility of the rating agencies and improve financial stability.

Prohibition on Re-Securitizationand 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 when a bank overvalues a mortgage in its portfolio. However, one could adopt additional regulations to reduce the likelihood of such overvaluation. First, one could prohibit resecuritization of junior tranches (or so-called CDO squared). Coval, Jurek, and Stafford (2009) show that the value of a resecuritization is highly sensitive to the assumed correlation in the default rates of mortgages in the underlying 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, this could lead to overvaluation of these tranches and thus to overvaluation of the underlying mortgage pools.

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 would probably have only small effects on the costs of risky mortgages and may be only modestly effective at preventing bubbles from developing in the housing market.

B. Government Backstop

The regulations proposed here are an important part of ensuring the stability of housing finance. However, other shocks to the financial system may significantly impair the extension of mortgage credit. For instance, adverse shocks to bank capital originating outside the housing sector may constrain mortgage lending. Alternatively, as argued by Hanson and Sunderam (2010), investors may grow wary of securitized products, which happened during the recent financial crisis and on several previous occasions, leading to a drought in securitized mortgage financing.[28] Furthermore, despite their best efforts, regulators may fail to oversee private forms of housing finance properly, 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. Finally, as suggested by Gennaioli, Shleifer, and Vishny (2011), securitizers and investors may simply neglect the risk of low-probability events and choose forms of mortgage finance that perform very poorly when those risks emerge.

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.[29] 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.

---

[28] The recent financial crisis is not the first time that investors have become wary of mortgage-backed securities. In 1994 collateralized-mortgages obligations, which resecuritize 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 concern about the quality of the underlying mortgages (Bartke 1971).

[29] One way that loose monetary policy can stimulate the economy during a financial crisis is to encourage refinancing of fixed-rate mortgages as interest rates fall. If such refinancing is hampered by a decline in the supply of mortgage credit, then monetary policy may be less effective.

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 guaranteeing and securitizing *new* high-quality, well-underwritten mortgages when private securitization and bank balance sheets are significantly constrained. As shown in figure 7-1, guarantees are most valuable in a crisis. In the current crisis, they significantly reduced the costs of conforming mortgages relative to jumbo mortgages and have probably increased mortgage availability. The proposed 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, no private party would be in a first-loss position. It would also not insure existing mortgages; the goal is not to protect banks and investors from losses on legacy mortgage assets that they purchased in normal or boom times.[30] 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 to 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 the 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.

[30] Of course, guaranteeing legacy assets may help to maintain financial stability. However, it may be unnecessary to commit to bailing out all legacy security holders ex ante, as proposals involving government reinsurance would do. If particular holders of legacy securities are particularly important for financial stability, they can be selectively supported in a crisis.

The backstop's market share during normal market conditions would be small, in the range of 5–10 percent. The reason it should have even a small market share is to maintain the risk management infrastructure, personnel, and private market contacts necessary for it 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 billion and $300 billion. This is about roughly the same market share that the FHA had prior to its loss of market share during 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 determination of systemic risk from the Financial Stability Oversight Council, 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 or the quantities of the guarantees. 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 percent if the market found the price of guarantees attractive and 0 percent 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 underprices 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 to mitigate adverse selection problems.

In a significant housing downturn, the backstop, with the approval of the Financial Stability Oversight Council, 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 would face significant risk management challenges. It would 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 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 a 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 the 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 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 guarantee new loans at the onset of a crisis.

In this respect, the backstop would resemble the FHA. As the subprime market took off in 2001 and peaked in 2005, the FHA's market share dwindled from 7 percent down to 2 percent. 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 play a countercyclical role over the past three years. It did take losses on high LTV loans guaranteed during the boom, but this can be ascribed to its mission of providing credit to underserved borrowers. Moreover, the losses were not so large as to prevent it from increasing its guarantee program.

The backstop may also be subject to political pressure. In particular, it could face strong pressure to intervene at the 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 the crisis. Making the backstop an independent government-owned corporation, rather than a government agency, would help to alleviate these concerns.

Political economy concerns also argue against embedding the guarantor-of-last-resort function within an existing housing agency such as the 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 the institutional focus on risk management. Setting up the mortgage guarantor as a separate 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 percent annual reductions in the two GSEs' portfolios 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 prepaid. In the end, the GSEs' portfolios, which once reached a combined total of $1.9 trillion, will have been eliminated.[31]

The more difficult question is how and when to phase out the GSEs' guarantee function. The GSEs, with 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 new mortgages that the GSEs guarantee. This can be achieved, as Jaffee (2010) 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 mortgage-backed securities 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

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

obligations would remain with the GSEs, which would be transferred from a conservatorship to a receivership and wound down.

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

Our focus here has been on enhancing the safety of the housing finance system. As noted, the easiest way to achieve this goal is by enforcing 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 households. The benefits of meeting this policy objective have to be traded off against the benefits of financial stability. This trade-off is probably better implemented by regulating underwriting standards rather than by targeting quantities of lending to low- and moderate-income 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 provide mortgage credit to low- and moderate-income households on reasonable terms, the FHA would be able to do so.

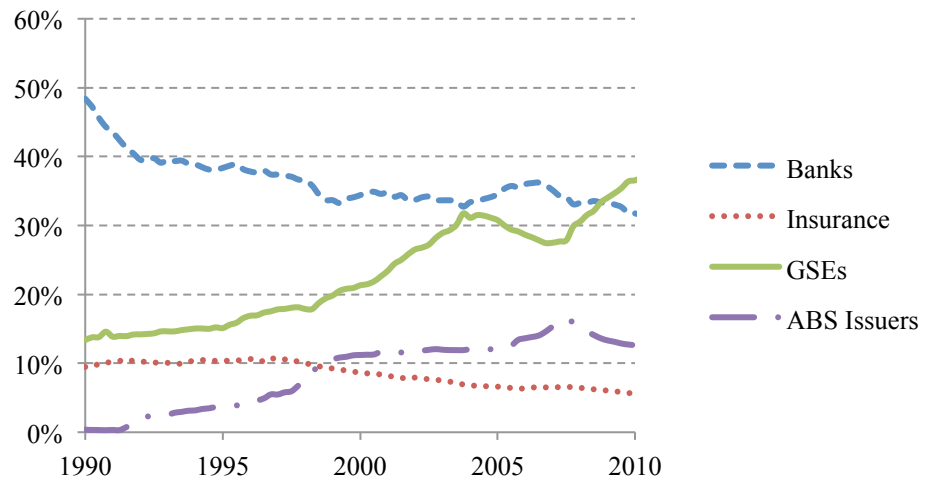
Multifamily rental housing, while only providing housing for 13 percent of all households, is an important source of housing for low- and moderate-income households. Most multifamily housing units have rents that are considered affordable for households at the median level of income in a metropolitan area. As of the third quarter of 2010, almost 38 percent of multifamily housing debt was owned or guaranteed by GSEs.[32] Their total exposure is more than $315 billion. Most of the GSEs' involvement has been with multifamily housing properties of greater than fifty units. While most are considered affordable, there are notable exceptions, such

[32] Authors' calculations based on Federal Reserve Board (2010).

as the GSEs' disastrous funding of the private-equity investment in Stuyvesant Town, an 80-acre luxury apartment complex in New York City.

Figure 7-5 plots the market share of the GSEs in multifamily mortgages since 1990 as well as the market shares of banks, insurance companies, and ABS issuers. Over the years, the GSEs have increased their shares substantially, from 13.4 percent in 1990 to the current peak of 37.5 percent. During the mid-2000s, the GSEs lost market share to ABS issuers, but that market collapsed in 2007, and their share has grown. Indeed, all of the growth in net multifamily residential credit from the start of the financial crisis through the third quarter of 2010 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 that they played a countercyclical role when markets were more modestly disrupted at other times.

Figure 7: Share of Multifamily Mortgages, 1990–2010



It is natural to ask whether our proposal should be applied to multifamily housing—that is, whether multifamily 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 multifamily property can roll over the debt. If the owner cannot, then the property either is sold to a real estate investor who can put in equity or is 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 multifamily housing have less important wealth effects and foreclosure externalities for individual households. Thus the multifamily 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 multifamily market, given that individual wealth effects and foreclosures are not significant issues.

Some observers, however, believe that multifamily 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 rollback 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, properly priced government guarantee programs have had as their objective the reduction of mortgage interest rates. We think that this approach is

problematic: *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 hazard 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, which 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 chapter proposes some 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.

References

Acharya, Viral, Philipp Schnabl, and Gustavo Suarez. 2010. "Securitization without Risk Transfer." Working Paper. New York University; Federal Reserve Board.

Adelino, Manuel. 2010. "Do Investors Rely Only on Ratings? The Case of Mortgage-Backed Securities." Working Paper. Dartmouth College, Tuck School of Business.

Adelino, Manuel, Kristopher Gerardi, and Paul Willen. 2010. "Why Don't Lenders Renegotiate More Home Mortgages? Redefaults, Self-Cures, and Securitization." Working Paper 10-2. Federal Reserve Bank of Boston.

Admati, Anat, Peter DeMarzo, Martin Hellwig, and Paul Pfleiderer. 2010. "Fallacies, Irrelevant Facts, and Myths in the Discussion of Capital Regulation: Why Bank Equity Is Not Expensive." Working Paper 86. Stanford University, Rock Center for Corporate Governance.

Agarwal, Sumit, Gene Amromin, Itzhak Ben-David, Souphala Chomsisengphet, and Douglas Evanoff. 2010. "Market-Based Loss Mitigation Practices for Troubled Mortgages Following the Financial Crisis." Working Paper 2010-03-019. Fisher College of Business.

———. 2011. "The Role of Securitization in Mortgage Renegotiation." Working Paper 2011-03-002. Fisher College of Business.

Ambrose, Brent, Michael LaCour-Little, and Anthony Sanders. 2004. "The Effect of Conforming Loan Status on Mortgage Yield Spreads: A Loan-Level Analysis." *Real Estate Economics* 32, no. 4: 541–69.

Arrow, Kenneth, and Robert Lind. 1970. "Uncertainty and the Evaluation of Public Investments." *American Economic Review* 60, no. 3: 364–78.

Ashcraft, Adam, Paul Goldsmith-Pinkham, and James Vickery. 2010. "MBS Ratings and the Mortgage Credit Boom." Staff Report 449. Federal Reserve Bank of New York.

Barr, Michael, Sendhil Mullainathan, and Eldar Shafir. 2009. "The Case for Behaviorally Informed Regulation." In *New Perspectives on Regulation*, edited by David Moss and John Cisternino. Cambridge, Mass.: Tobin Project.

Barro, Robert. 1974. "Are Government Bonds Net Wealth?" *Journal of Political Economy* 82, no. 6: 1095–117.

Bartke, Richard. 1971. "Fannie Mae and the Secondary Mortgage Market." *Northwestern University Law Review* 66, no. 1: 1–78.

Basel Committee on Banking Supervision. 2009. "Strengthening the Resilience of the Banking Sector." Consultative Document. Basel (December).

Becker, Bo and Todd Milbourne. 2010. "How Did Increased Competition Affect Credit Ratings?" HBS Working Paper. Harvard Business School (September).

Bergstresser, Daniel, Robin Greenwood, and James Quinn. 2009. "Washington Mutual's Covered Bonds." Case 209-093. Harvard Business School.

Bernanke, Ben. 2010. "Monetary Policy and the Housing Bubble." Speech given at the annual meeting of the American Economic Association (www.federalreserve.gov/newsevents/speech/bernanke20100103a.htm).

Bernanke, Ben, and Mark Gertler. 2000. "Monetary Policy and Asset Price Volatility." NBER Working Paper 7559. Cambridge, Mass.: National Bureau of Economic Research (February).

Calomiris, Charles. 2001. "An Economist's Case for GSE Reform." In *Serving Two Masters, Yet Out of Control: Fannie Mae and Freddie Mac*, edited by Peter J. Wallison. Washington: AEI Press.

Campbell, John, Stefano Giglio, and Parag Pathak. 2009. "Forced Sales and House Prices." NBER Working Paper 14866. Cambridge, Mass.: National Bureau of Economic Research.

Carroll, Michael, and Alyssa Lappen. 1994. "Mortgage-Backed Mayhem." *Institutional Investor* 7 (July): 81–96.

Case, Karl, John Quigley, and Robert Shiller. 2005. "Comparing Wealth Effects: The Stock Market Versus the Housing Market." *Advances in Macroeconomics* 5, no. 1: 1–34.

Center for American Progress. 2011. "A Responsible Market for Housing Finance: A Progressive Plan to Reform the U.S. Secondary Market for Residential Mortgages." Washington.

CBO (Congressional Budget Office). 2001. "Federal Subsidies and the Housing GSEs." Washington: Government Printing Office.

———. 2010a. "The Budgetary Impact of Fannie Mae and Freddie Mac." Washington (November 16).

———. 2010b. "Report on the Troubled Asset Relief Program—November 2010." Washington (November).

Courtemanche, Charles, and Kenneth A. Snowden. 2010. "Repairing a Mortgage Crisis: HOLC Lending and Its Impact on Local Housing Markets." NBER Working Paper 16245. Cambridge, Mass.: National Bureau of Economic Research.

Coval, Joshua, Jakub Jurek, and Erik Stafford. 2009. "The Economics of Structured Finance." *Journal of Economic Perspectives* 23, no. 1: 3–25.

Covitz, Daniel, Nellie Liang, and Gustavo Suarez. 2009. "The Evolution of a Financial Crisis: Panic in the Asset-Backed Commercial Paper Market." Working Paper. Washington: Federal Reserve Board (March).

Curry, Timothy, and Lynn Shibut. 2000. "The Cost of the Savings and Loan Crisis: Truth and Consequence." *FDIC Banking Review* 13, no. 2: 26–35.

Dang, Tri Vi, Gary Gorton, and Bengt Holmstrom. 2010. "Opacity and the Optimality of Debt for Liquidity Provision." Working Paper. Yale University; National Bureau of Economic Research; Massachusetts Institute of Technology (November 30).

Dechario, Toni, Patricia Mosser, Joseph Tracy, James Vickery, and Joshua Wright. 2010. "A Private Lender Cooperative Model for Residential Mortgage Finance." Staff Report 466. Federal Reserve Bank of New York.

DeMarzo, Peter. 2005. "The Pooling and Tranching of Securities: A Model of Informed Intermediation." *Review of Financial Studies* 18, no. 1: 1–35.

Downing, Chris, Dwight Jaffee, and Nancy Wallace. 2009. "Is the Market for Mortgage-Backed Securities a Market for Lemons?" *Review of Financial Studies* 22, no. 7: 2457–94.

Duffie, Darrell, and Peter DeMarzo. 1999. "A Liquidity-Based Model of Security Design." *Econometrica* 67, no. 1: 65–99.

European Covered Bond Council. 2010. *Fact Book*. Brussels.

European Mortgage Federation. 2009. *Hypostat 2009—A Review of Europe's Mortgage and Housing Markets*. Brussels. (www.hypo.org/Objects/6/Files/Hypostat%202008%20-%20light%20version.pdf.)

Fannie Mae. 2010a. "Fannie Mae 2010Q3 10-Q Filing." Washington (November 5).

———. 2010b. "Fannie Mae 2010 Third-Quarter Credit Supplement." Washington (November 5).

FDIC (Federal Deposit Insurance Corporation). 1997. "History of the Eighties." Washington (www.fdic.gov/databank/hist80).

———. 2010. *FDIC Quarterly* (third quarter). Washington.

Federal Reserve Board. 2010. *Flow of Funds Accounts of the United States: 2010 Quarter 3.* Washington: Board of Governors of the Federal Reserve System.

FHFA (Federal Housing Finance Agency). 2009. *Report to Congress.* Washington.

FHFA (Federal Housing Finance Agency). 2010. *Conservator's Report on the Enterprises' Financial Performance, Third Quarter 2010.* Washington.

Gan, Jie. 2007. "The Real Effects of Asset Market Bubbles: Loan- and Firm-Level Evidence of a Lending Channel." *Review of Financial Studies* 20, no. 6: 1941–73.

Geanakoplos, John. 2009. "The Leverage Cycle." In *NBER Macroeconomic Annual 2009,* vol. 24, pp. 1–65. University of Chicago Press.

Gelpern, Anna, and Adam Levitin. 2009. "Rewriting Frankenstein Contracts: The Workout Prohibition in Residential Mortgage-Backed Securities." Working Paper. American University Washington School of
Law; Georgetown University Law Center.

Gennaioli, Nicola, Andrei Shleifer, and Robert W. Vishny. 2011, "A Model of Shadow Banking." NBER Working Paper 17115. Cambridge, Mass: National Bureau of Economic Research.
Gorton, Gary, and Andrew Metrick. 2010a. "Regulating the Shadow Banking Sector." Working Paper. Yale University; National Bureau of Economic Research (October).

———. 2010b. "Securitized Banking and the Run on Repo." ICF Working Paper 09-14. Yale University (November).

Gorton, Gary, and George Pennacchi. 1990. "Financial Intermediaries and Liquidity Creation." *Journal of Finance* 45, no. 1: 49–71.

Greenwood, Robin, and Samuel Hanson. 2010. "Issuer Quality and Corporate Bond Returns." Working Paper 1734528. Harvard Business School.

Griffin, John, and Dragon Tang. 2010. "Did Subjectivity Play a Role in CDO Credit Ratings?" Working Paper. University of Texas at Austin, Department of Finance; University of Hong Kong, Department of Economics and Finance (September 30).

Guiso, Luigi, Paola Sapienza, and Luigi Zingales. 2011. "The Determinants of Attitudes towards Strategic Default on Mortgages." ECO Working Paper 2010/31. Florence: European University Institute, Department of Economics.

Hancock, Diana, and Wayne Passmore. 2010. "An Analysis of Government Guarantees and the Functioning of Asset-Backed Securities Markets." Finance and Economics Discussion Series Paper 46. Washington: Federal Reserve Board.

Hanson, Samuel, and Adi Sunderam. 2010. "Are There Too Many Safe Securities? Securitization and the Incentives for Information Production." Working Paper. Harvard University (December 29).

Hermalin, Benjamin, and Dwight Jaffee. 1996. "The Privatization of Fannie Mae and Freddie Mac: Implications for Mortgage Industry Structure." In *Studies on Privatizing Fannie Mae and Freddie Mac*, pp. 225–302. Washington: U.S. Department of Housing and Urban Development, Office of Policy Development and Research.

HUD (Department of Housing and Urban Development). 2010. *Annual Report to Congress Regarding the Financial Status of the FHA Mutual Mortgage Insurance Fund Fiscal Year 2010.* Washington (November 15).

Inside Mortgage Finance. 2010. *The 2010 Mortgage Market Statistical Annual.* 2 vols. Bethesda, Md.

Jaffee, Dwight. 2010. "How to Privatize the Mortgage Market." *Wall Street Journal*, October, 25.

Kashyap, Anil, Jeremy Stein, and Samuel Hanson. 2010. "An Analysis of the Impact of 'Substantially Heightened' Capital Requirements on Large Financial Institutions." Working Paper. University of Chicago Booth School of Business; Harvard University.

Keys, Benjamin, Tanmoy Mukherjee, Amit Seru, and Vikrant Vig. 2010. "Did Securitization Lead to Lax Screening? Evidence from Subprime Loans." *Quarterly Journal of Economics* 125, no. 1: 307–62.

Khwaja, Asim, and Atif Mian. 2008. "Tracing the Impact of Bank Liquidity Shocks." *American Economic Review* 98, no. 4: 1413–42.

Krishnamurthy, Arvind. 2002. "The Bond/Old-Bond Spread." *Journal of Financial Economics* 66, no. 2: 463–506.

Krishnamurthy, Arvind, and Annette Vissing-Jorgensen. 2010. "The Aggregate Demand for Treasury Debt." Cambridge, Mass.: National Bureau of Economic Research (May 12).

Lancaster, Brian, Glenn Schultz, and Frank Fabozzi. 2008. *Structured Products and Related Credit Derivatives: A Comprehensive Guide for Investors.* Hoboken, N.J.: John Wiley and Sons.

Longstaff, Francis. 2004. "The Flight-to-Liquidity Premium in U.S. Treasury Bond Prices." *Journal of Business* 77, no. 3: 511–26.

Lucas, Deborah, and Marvin Phaup. 2010. "The Cost of Risk to the Government and Its Implications for Federal Budgeting." In *Measuring and Managing Federal Financial Risk*, edited by Deborah Lucas, pp. 29–54. University of Chicago Press.

Lusardi, Anna Maria. 2008. "Financial Literacy: An Essential Tool for Informed Consumer Choice?" Working Paper UCC08-11. Harvard University, Joint Center for Housing Studies (February).

Lusardi, Anna Maria, and Olivia Mitchell. 2008. "How Much Do People Know about Economics and Finance? Financial Illiteracy and the Importance of Financial Education." Policy Brief. Ann Arbor: Michigan Retirement Research Center.

McKenzie, Joseph. 2002. "A Reconsideration of the Jumbo/Non-Jumbo Mortgage Rate Differential." *Journal of Real Estate Finance and Economics* 25, no. 2-3: 197–213.

McKinley, Vern. 1997. "The Mounting Case for Privatizing Fannie Mae and Freddie Mac." Cato Policy Analysis 293. Washington: Cato Institute.

Mian, Atif, and Amir Sufi. 2010. "House Prices, Home Equity–Based Borrowing, and the U.S. Household Leverage Crisis." NBER Working Paper 15283. Cambridge, Mass.: National Bureau of Economic Research .

Mian, Atif, Amir Sufi, and Francesco Trebbi. 2011. "Foreclosures, House Prices, and the Real Economy." NBER Working Paper 16685. Cambridge, Mass.: National Bureau of Economic Research.

Mortgage Bankers Association. 2009. "MBA's Recommendation for the Future Government Role in the Core Secondary Mortgage Market." Washington.

National Association of Home Builders. 2010. "Future of Fannie Mae and Freddie Mac and the Housing Finance System." NAHB Resolution 3. Washington.

National Association of Realtors. 2010. "Recommendations for Restructuring the GSEs." Washington.

Packer, Frank, Ryan Stever, and Christian Upper. 2007. "The Covered Bond Market." *BIS Quarterly Review* (September): 43–55.

Passmore, Wayne, Shane M. Sherlund, and Gillian Burgess. 2005. "The Effect of Housing Government-Sponsored Enterprises on Mortgage Rates." *Real Estate Economics* 33, no. 3: 427–63.

Peek, Joseph, and Eric Rosengren. 1997. "The International Transmission of Financial Shocks: The Case of Japan." *American Economic Review* 87, no. 4: 495–505.

Pennacchi, George. 2009. "Deposit Insurance." Paper prepared for the Conference on Private Markets and Public Insurance Programs. American Enterprise Institute, January 15.

Pinto, Edward J. 2010. "The Future of Housing Finance." *Wall Street Journal*, August 17.

Piskorski, Tomasz, Amit Seru, and Vikrant Vig. 2010. "Securitization and Distressed Loan Renegotiation: Evidence from the Subprime Mortgage Crisis." *Journal of Financial Economics* 97, no. 3: 369–97.

Pollock, Alex. 2010. “To Overhaul the GSEs, Divide Them into Three Parts.” *American Banker*, August 26.

Poterba, James. 1984. “Tax Subsidies to Owner-Occupied Housing: An Asset-Market Approach.” *Quarterly Journal of Economics* 99, no. 4: 729–52.

Poterba, James, David Weill, and Robert Shiller. 1991. “House Price Dynamics: The Role of Tax Policy and Demography.” *Brookings Papers on Economic Activity* 2: 143–83.

Quinn, Brian. 2008. “Failure of Private Ordering and the Financial Crisis of 2008.” *New York University Journal of Law and Business* 5, no. 2: 549–615.

Rajan, Uday, Amit Seru, and Vikrant Vig. 2010. “Statistical Default Models and Incentives.” *American Economic Review Papers and Proceedings* 100 (May): 506–10.

Reinhardt, Carmen, and Kenneth Rogoff. 2008. “This Time Is Different: A Panoramic View of Eight Centuries of Financial Crises.” NBER Working Paper 13882. Cambridge, Mass.: National Bureau of Economic Research.

———. 2009. *This Time Is Different: Eight Centuries of Financial Folly.* Princeton University Press.

Rossi-Hansberg, Esteban, Pierre-Daniel Sarte, and Raymond Owens III. 2010. “Housing Externalities.” *Journal of Political Economy* 118, no. 3: 409–32.

Sherlund, Shane. 2008. “The Jumbo-Conforming Spread: A Semiparametric Approach.” Finance and Economics Discussion Series 2008-01. Washington: Federal Reserve Board.

Shleifer, Andrei, and Robert Vishny. 2010. “Unstable Banking.” *Journal of Financial Economics* 97, no. 3: 306–18.

Standard & Poor’s. 2010. “U.S. Residential Mortgage Default Index: Defaults Are Waning But Cumulative Default Rates Remain Extremely High for Recent Vintages.” New York (May 24).

Streitfeld, David, and Louise Story. 2009. “F.H.A. Problems Raising Concern of Policy Makers.” *New York Times*, October 9.

Torregrosa, David. 2001. “Interest Rate Differentials between Jumbo and Conforming Mortgages, 1995–2000.” Washington: Congressional Budget Office.

Treasury Department. 2008. *Best Practices for Residential Covered Bonds*. Washington.

Vickery, James. 2007. “Interest Rates and Consumer Choice in the Residential Mortgage Market.” Working Paper. Federal Reserve Bank of New York.

Vickery, James, and Joshua Wright. 2010. "TBA Trading and Liquidity in the Agency MBS Market." Staff Report 468. Federal Reserve Bank of New York.

Wallison, Peter. 2011. "Financial Crisis Inquiry Commission, Dissenting Statement." Washington: Financial Crisis Inquiry Commission (January).

Wallison, Peter, and Bert Ely. 2000. *Nationalizing Mortgage Risk: The Growth of Fannie Mae and Freddie Mac.* Washington: AEI Press.

Wallison, Peter, Thomas Stanton, and Bert Ely. 2004. *Privatizing Fannie Mae, Freddie Mac, and the Federal Home Loan Banks: Why and How.* Washington: AEI Press.

Table 1. Covered Bond Legislation in Europe

Country and bond	*Special covered bond legislation?*	*Ratio of 2009 outstanding covered bond to GDP*	*Required over-collateralization*	*Loan-to-value limit*	
				Residential	*Commercial*
Austria	Yes, since 1905	1.9	2	60	60
Denmark	Yes	143.3	8[a]	80	70
Finland	Yes, since 2000	4.5		60	
France, obligations foncières, CRH	Yes, since 1999	9.1	0	80	
Germany, Pfandbriefe	Yes, since 1927	9.4	2	60	60
Greece	Yes, since 2007	2.7		80	60
Hungary	Yes	7.6		70	60
Ireland, asset covered securities	Yes, since 2001	18.2	3	75	60
Italy, OBG	Yes, since 2007	0.9	10	80	60
Luxembourg, lettres de gage	Yes, since 1997	0.0	2	80	60
Netherlands	Yes, since 2008	5.0		80 or 125	
Poland	Yes	0.2			
Portugal	Yes, since 1990	12.4	5	80	60
Slovakia	Yes	5.7		70	
Spain	Yes, since 1999	31.8	11	80	
Sweden	Yes	46.5		75	70
United Kingdom, regulated covered bonds	Yes, since 2003	12.9	10	80	