

The GSE Reform Debate: How Much Capital Is Enough?

**Sizing to the 2007
Experience and Commenting
on Overlooked Considerations**

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Abstract

Over the past eight months, a broad consensus has been emerging as to what the future state of housing finance should look like. There are several plans, including the Corker-Warner bill, under which private-sector entities would continue to originate and service mortgages, with other private-sector entities providing credit enhancement for mortgage-backed securities (MBS). A public entity would be the guarantor of last resort, absorbing the catastrophic risk. The public entity would also provide the securitization platform as well as regulatory oversight. In all these plans, the government's catastrophic coverage is meant to kick in under extraordinary circumstances; thus the amount of capital the private sector is required to invest must be sufficient to cover all but catastrophic conditions. This paper demonstrates that collateral composition, house price experience, and diversification significantly affect credit risk, and thus the capital requirement. Our empirical results demonstrate that 4–5 percent capital would have covered Fannie Mae and Freddie Mac (the GSEs) using the 2007 experience. With the GSEs' current book of business, that is too high, as collateral composition has changed in favor of much more pristine loans. Risk also increases with smaller or less geographically diverse MBS pools. Investors are likely to be willing to take credit risk in MBS only if pools are large and geographically diverse. This will make loan-level risk-based pricing more difficult. It is critical to calibrate the capital needs correctly; if capital requirements are too low relative to the credit risk, the catastrophic government guarantee will be invoked far more than should be the case. If capital requirements are too high, banks will respond by holding more high-quality loans in portfolio, shifting the ultimate credit risk of their lower-quality loans to the government.

The GSE Reform Debate: How Much Capital Is Enough?

It has been five years since Fannie Mae and Freddie Mac were put into conservatorship. Although housing finance has continued to flow, policymakers are increasingly focusing on what comes next. All proposals call for private capital to take significantly more credit risk in the market for mortgage-backed securities. How much private capital is enough?

Introduction

In the past eight months, a consensus has been emerging as to what housing finance reform should look like. Three similar plans have been put forward: the Housing Finance Reform and Taxpayer Protection Act of 2013 (S.1217; also referred to as the Corker-Warner bill, or CW); the Bipartisan Policy Center (BPC) Housing Commission's "Housing America's Future: New Directions for National Policy"; and the Moody's Analytics, Urban Institute, Milken Institute's (MUM) "A Pragmatic Plan for Housing Finance Reform."¹ In all three of these plans, private-sector entities would, as today, originate and service mortgages. Other private-sector entities would provide credit enhancement to cover normal risks. A federal government entity would be the guarantor of last resort, absorbing catastrophic risk. The public entity would also provide regulatory oversight and a securitization platform for at least the government-guaranteed securities.

In all three plans, the government's guarantee is meant to kick in only under catastrophic circumstances. Thus, the private-sector credit enhancement must be large enough to absorb all but catastrophic risk. There are differences in what this means. CW explicitly calls for a 10 percent credit enhancement, the BPC proposal calls for enough credit enhancement to cover home price depreciation of 30–35 percent, and the MUM plan calls for enough credit enhancement to cover stress housing and economic scenarios.

It is hard to determine how much capital is "enough" to cover non-catastrophic circumstances directly, especially since new laws and regulations, particularly pursuant to the Dodd-Frank Act, will change the nature of mortgages going forward. But we can get a sense for the appropriate level of capital to back the type of mortgages likely to obtain a government guarantee under any of the three plans by looking at recently released loan-level credit data from Fannie Mae and Freddie Mac (the GSEs).² In particular, by examining the loss experience of loans purchased by the GSEs in 2007 (the year that produced the greatest losses) and overlaying that experience on the more pristine loans the GSEs have been purchasing since 2009, we can estimate how much capital would have been sufficient to cover the entire GSE book of

business. We also can determine the capital required to cover the current book of business if house prices were once again to decline by 30–35 percent.

We find that 4–5 percent capital would have covered the GSEs’ book of business in the aggregate. With the current pristine book of business, this percentage is way too high. Applying 2007 default levels to the current book of business would produce losses of 2.5 to 3 percent, confirming that collateral composition and housing market experience are important determinants of the amount of capital required.

In addition to the quality of loans and housing market experience, diversification is a very important determinant of credit risk. All the plans mentioned above are somewhat vague on how the credit enhancement is to be structured. In particular, under CW, credit enhancement could be provided on either a specific pool of loans in a single security (“capital markets execution”), or through a “bond guarantor,” or insurer. BPC also allows for both forms of credit enhancement; MUM clearly calls for credit enhancement to be provided through “MBS insurers,” which are similar to CW’s bond guarantors. This paper demonstrates that credit enhancement would need to be higher for nondiversified pools of loans, a particular concern with capital markets execution. This suggests that investors would demand that any capital markets execution cover a large, diversified book of business.³ One consequence of this likely demand for large diversified pools is that pricing each loan according to its risk will become more difficult.

As the reform proposals have been debated, some have argued that if a 5 percent capital requirement is sufficient, a 10 percent requirement would be better because it would provide greater protection to taxpayers. But what is the cost and impact of requiring “too much” capital? One likely result is that mortgage rates would be higher than necessary. However, if capital requirements on securitizations are excessive, the result may not be completely reflected in mortgage rates. Rather, banks would be inclined to hold more of these mortgages on balance sheet, and specifically hold more of the highest quality mortgages, resulting in adverse selection to government-guaranteed loans and potentially a smaller overall mortgage market. If the securities market gets “too small,” the liquidity of the GSE replacement market could get compromised, widening bid/ask spreads for investors and making it much more difficult for borrowers to lock in a mortgage rate.⁴

Freddie and Fannie Risk-Sharing Data

The Fannie Mae and Freddie Mac loan-level data described earlier enable us to explore these questions. Loans are removed from the data when they are six months delinquent or the loan is otherwise terminated.⁵ We refer generically to loans that were terminated because they were more than six months delinquent or disposed of via short sales, third-party sales, deeds-in-lieu of foreclosure, or real estate

owned (REO) acquisitions as “defaulted.” To convert these default numbers to loss numbers, we need to (1) adjust for the loans that go six months delinquent and then either self-cure or are modified and do not suffer a credit loss, and (2) multiply the number of delinquent mortgages that eventually default by the severity of the loss on default.

We can use the information contained in the first Freddie Mac risk-sharing transaction to convert defaults to losses. We believe Freddie Mac did an internal study to set severity levels appropriately. The risk-sharing transaction provides that if the percent of mortgages that go six months delinquent is less than or equal to 1 percent, the severity used for the transaction is 15 percent; if the percent of mortgages that go six months delinquent is greater than 1 percent but less than or equal to 2 percent, the applicable severity is 25 percent. If the percent of mortgages that go six months delinquent is greater than 2 percent, a 40 percent severity is used. Since we are going to key our analysis to a 2007-type environment, we will use a 40 percent severity, which is consistent with the loss severities on prime jumbo securities.⁶

Collateral Composition and Housing Market Experience

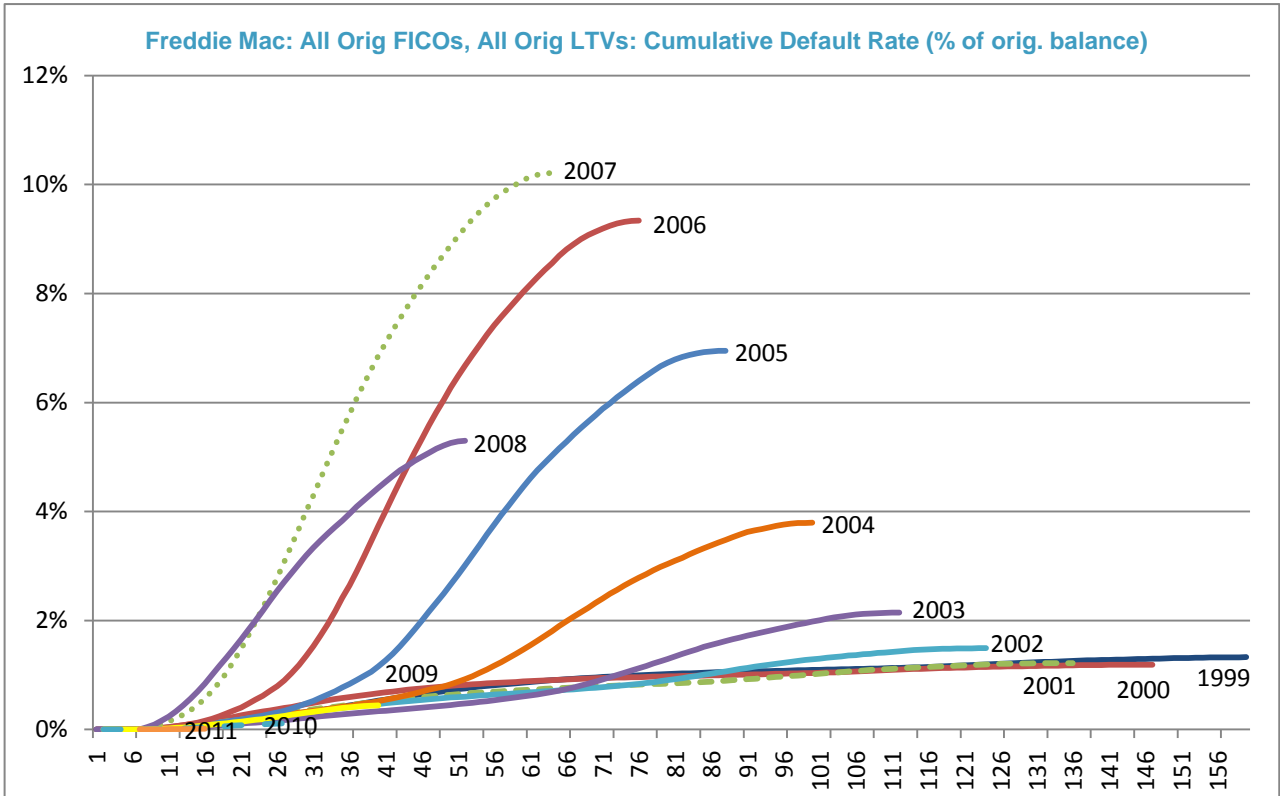
2007 Vintage Performance

Default experience is dependent on both home price experience and the credit composition of a vintage. Figure 1 shows the cumulative percent of the vintage that defaulted for Freddie Mac (top) and Fannie Mae (bottom). This analysis is based on the original principal balances, not loan count, as capital is a dollar-based measure. Note that the 1999–2002 Freddie Mac vintages had defaults totaling 1.3 percent, while the 2007 vintage had defaults totaling 10.2 percent. For Fannie Mae 2000–02 vintages, defaults totaled 1.6 percent; defaults for the 2007 vintage were 13.6 percent.

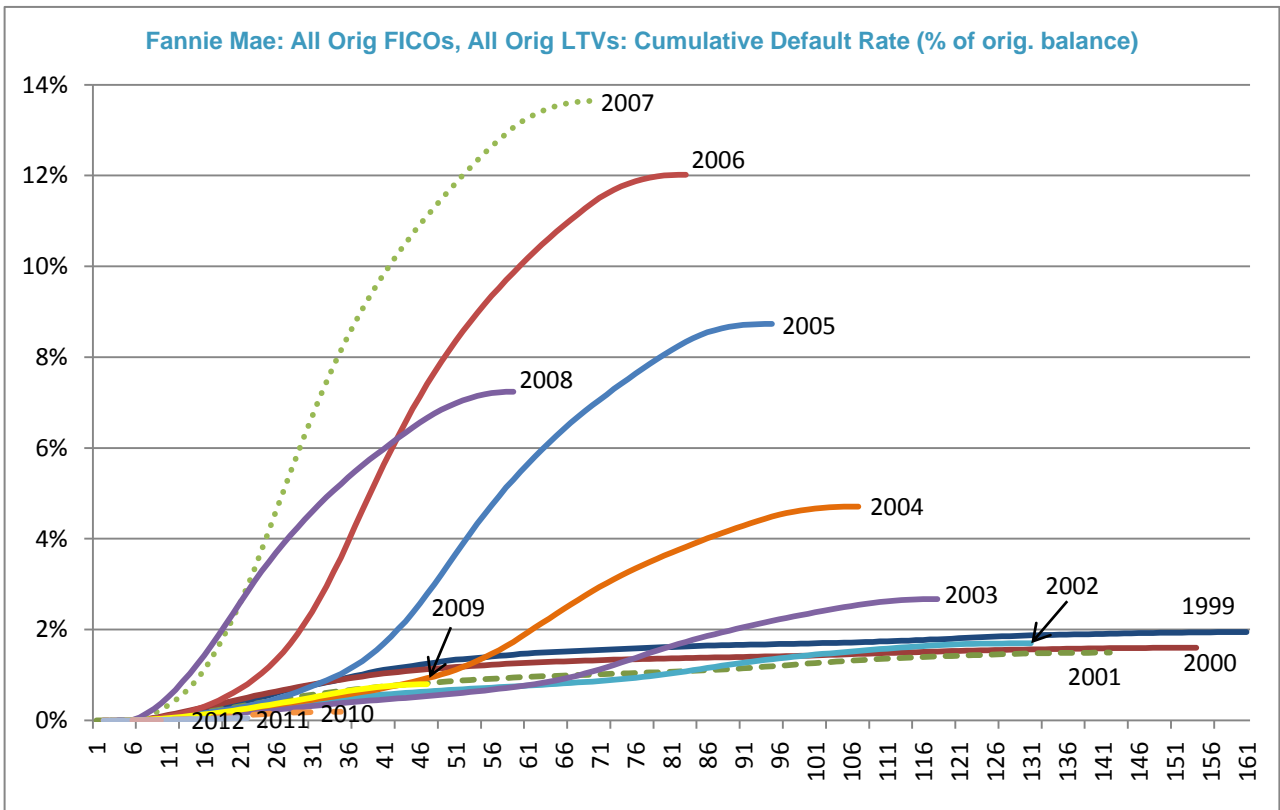
The different default experiences are heavily influenced by the very different home price and interest rate experiences of the borrowers. The 1999–2002 vintages experienced a number of years of very robust home price appreciation and benefited from the large drop in rates and an attendant prepayment boom in 2002–03. So by 2004, roughly 75 percent of the Fannie loans originated in 2000 had prepaid. And when home prices did drop in 2006, most of the 2000-vintage borrowers still had positive equity in their home. By contrast, the 2007 originations immediately experienced a major drop in home prices, and until the Home Affordability Refinance Program was introduced in 2009, they had no refinancing opportunities.

Thus, if we were to size the capital requirement to the 2007 experience,⁷ the results above would suggest that capital of 4–5 percent is necessary (10% defaults x 40% loss severity for Freddie, 13.6% defaults x 40% loss severity for Fannie).⁸

Figure 1. Cumulative Default Rates by Vintages



Source: Freddie Mac.



Source: Fannie Mae.

Differences in the Composition of the Books of Business over Time

Before 2009, the GSEs catered to a wide range of borrowers. In table 1, we show the FICO/LTV⁹ distribution for three vintage years: 2001, 2007 and 2010. The 2001 and 2007 compositions are very similar—both GSEs catered to a fairly wide range of borrowers. In both cases, 35–39 percent of the borrowers had FICO scores less than or equal to 700, and 19–25 percent of the loans had LTVs greater than 80. Contrast this to the 2010 vintage for both GSEs, which consists of pristine mortgage origination: only 8 percent of borrowers had FICO scores of or below 700, and only 9 percent of loans had LTVs over 80. In fact, for the 2010 vintage, 70 percent of borrowers had FICOs above 750, compared with 30–38 percent for the 2001 and 2007 vintages.

Table 1. Composition of Origination Balance by FICO and LTV for Selected Vintages

Orig. Year	Orig. FICO	Orig. LTV					Total
		≤ 60	60–70	70–80	80–90	> 90	
FREDDIE MAC							
2001	≤ 700	3.17%	3.83%	17.87%	6.16%	6.05%	37.09%
	>700–750	3.92%	4.03%	16.51%	3.71%	3.25%	31.43%
	> 750	6.74%	5.08%	15.50%	2.40%	1.86%	31.59%
	Total	13.84%	12.95%	50.00%	12.25%	11.12%	100.00%
2007	≤ 700	4.32%	4.76%	15.64%	4.73%	5.15%	34.60%
	>700–750	3.89%	3.47%	14.31%	2.61%	2.72%	26.98%
	> 750	8.57%	5.45%	19.21%	2.53%	2.61%	38.37%
	Total	16.79%	13.66%	49.16%	9.85%	10.50%	100.00%
2010	≤ 700	2.19%	1.56%	3.91%	0.33%	0.31%	8.31%
	>700–750	4.76%	3.58%	12.60%	1.65%	1.14%	23.73%
	> 750	17.19%	10.96%	33.73%	3.80%	2.02%	67.80%
	Total	24.14%	16.10%	50.28%	5.76%	3.47%	100.00%
FANNIE MAE							
2001	≤ 700	3.86%	4.81%	18.05%	6.27%	5.99%	38.97%
	>700–750	3.99%	4.01%	15.30%	4.30%	3.87%	31.46%
	> 750	6.23%	4.59%	13.73%	2.78%	2.25%	29.56%
	Total	14.08%	13.41%	47.07%	13.34%	12.10%	100.00%
2007	≤ 700	5.48%	6.16%	17.01%	5.95%	3.55%	38.15%
	>700–750	4.08%	3.94%	12.80%	3.02%	1.72%	25.57%
	> 750	8.01%	5.78%	17.83%	2.91%	1.76%	36.28%
	Total	17.57%	15.88%	47.64%	11.88%	7.03%	100.00%
2010	≤ 700	1.88%	1.36%	3.33%	0.25%	0.20%	7.02%
	>700–750	4.69%	3.26%	11.80%	1.69%	1.00%	22.44%
	> 750	18.71%	11.43%	34.54%	4.01%	1.85%	70.54%
	Total	25.28%	16.04%	49.68%	5.94%	3.06%	100.00%

Sources: Freddie Mac, Fannie Mae, and Urban Institution calculations.

The credit performance of mortgages of different vintages differs dramatically (table 2). For all vintages, the most risky mortgages default at a multiple of the least risky. But for 2001 originations, all mortgages default at absolutely low levels; the highest Freddie Mac default rate for any cohort was 4.63 percent, for loans with FICOs under 700 and LTVs over 90. In contrast, defaults of the 2007 vintage are significantly higher. Even loans with FICOs over 750 and LTVs between 70 and 80 performed worse (a default rate of 4.82 percent) than the worst cohort for 2001; loans with FICOs less than or equal to 700 and LTVs over 90 had a 23 percent default rate.

Table 2. Average Default Rates by Origination FICO and LTV for Selected Vintages

Orig. Year	Orig. FICO	Orig. LTV					Total
		≤ 60	60–70	70–80	80–90	> 90	
FREDDIE MAC							
2001	≤ 700	0.83%	1.23%	1.93%	4.12%	4.63%	2.57%
	>700–750	0.21%	0.33%	0.51%	1.17%	1.46%	0.63%
	> 750	0.07%	0.13%	0.22%	0.57%	0.69%	0.23%
	Total	0.29%	0.52%	0.93%	2.54%	3.05%	1.22%
2007	≤ 700	8.60%	15.79%	16.76%	21.15%	23.00%	17.13%
	>700–750	3.50%	8.78%	10.33%	13.67%	13.94%	9.83%
	> 750	1.06%	3.43%	4.82%	7.77%	8.88%	4.25%
	Total	3.57%	9.09%	10.22%	15.74%	17.13%	10.22%
2010	≤700	0.35%	0.62%	0.60%	0.54%	0.73%	0.54%
	>700–750	0.06%	0.12%	0.19%	0.20%	0.37%	0.16%
	>750	0.01%	0.03%	0.05%	0.11%	0.14%	0.05%
	Total	0.05%	0.11%	0.13%	0.16%	0.27%	0.11%
FANNIE MAE							
2001	≤ 700	1.30%	1.97%	2.42%	4.10%	4.85%	2.90%
	>700–750	0.22%	0.38%	0.66%	1.58%	1.69%	0.82%
	> 750	0.08%	0.16%	0.27%	0.75%	0.89%	0.31%
	Total	0.46%	0.87%	1.22%	2.59%	3.11%	1.48%
2007	≤ 700	12.99%	22.05%	22.09%	29.85%	30.48%	22.77%
	>700–750	4.47%	10.66%	12.63%	18.85%	17.92%	12.12%
	>750	1.41%	4.09%	5.58%	11.16%	10.95%	5.13%
	Total	5.74%	12.69%	13.37%	22.47%	22.53%	13.65%
2010	≤ 700	0.53%	0.93%	1.14%	0.88%	1.40%	0.94%
	>700–750	0.11%	0.22%	0.34%	0.40%	0.63%	0.29%
	>750	0.02%	0.05%	0.09%	0.20%	0.35%	0.08%
	Total	0.08%	0.16%	0.22%	0.29%	0.51%	0.19%

Sources: Freddie Mac, Fannie Mae, and Urban Institute calculations.

Mortgages from 2009 on have been very clean, and few loans have any risk layering. The default rates for these newer vintages have been very low, but we have limited history. If we were to graft the default experience from the 2001 vintage year to the 2010 vintage year (that is, use the 2001 default rate and the 2010 composition), the overall default rate on both the Freddie Mac and Fannie Mae books of business would be in the neighborhood of 0.5 percent. If we were to do the same thing for the 2007 default rate and the 2010 composition, the overall default rate would be a hair over 6 percent on the Freddie Mac book of business and 7–8 percent on the Fannie Mae book of business. The difference between the default rate of 10.2 percent (13.6 percent) for the 2007 vintage Freddie Mac (Fannie Mae) loans, and the rate of 6 percent (7.2 percent) for the 2010 vintage using 2007 default rates reflects purely the effect of changing composition.

Adjusting defaults to account for losses, on the 2010 Freddie Mac book of business, defaults of approximately 6 percent in a 2007 scenario with a severity of 40 percent suggest losses around 2.4 percent. On the Fannie Mae book of business, defaults of 7–8 percent with a severity of 40 percent suggest losses around 3 percent. Even if we size to the 2007 experience and composition, with home prices down 35 percent from the peak, and a very wide credit availability box, 4–5 percent is more than sufficient to cover the risk.

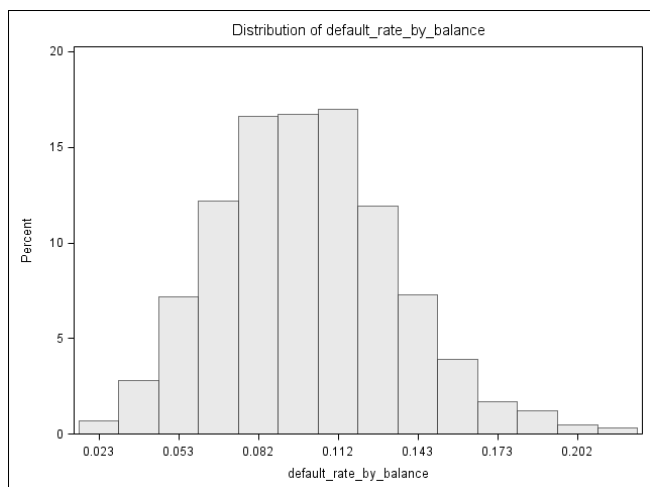
Diversification

Thus far, we have focused on the amount of capital necessary to protect the books of business as a whole. However, at least some of the proposals (CW in particular) are based on a pool-level capital requirement. Clearly, the size and diversification of the pool matters. At the extreme, even with a 10 percent capital requirement, if the pool is only one loan, with no ability to access capital supporting other loans, then the government’s catastrophic commitment is quite high. Conversely, 10 percent capital on a pool consisting of all loans from a given vintage would bring the government’s catastrophic commitment to near zero.

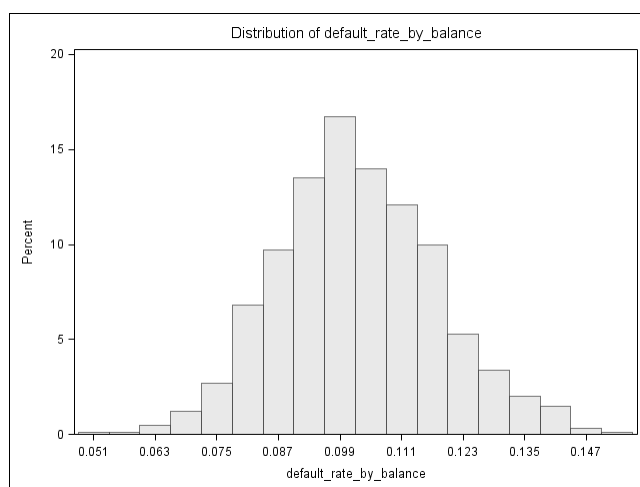
In figure 2, we look at 1,000 Freddie Mac pools of different sizes from the 2007 vintage, randomly drawn from the credit database we used in the first section of this report. The first chart (upper left) shows that while the average default rate for the vintage was 10.2 percent, for 1,000 draws of 100 randomly selected loans, the default rate ranged from .05 percent to 22 percent. For 1,000 draws of 500 loans each (upper right chart), the distribution is much narrower, ranging from just under 5 percent to just over 15 percent. Finally, if we increase the number of loans to 2,500 (bottom chart), the distribution narrows further from 8 percent to just over 12 percent, not much different from the 10.2 percent default rate for the vintage as a whole.

Figure 2. Simulation Results for Freddie Mac’s Aggregate 2007 Portfolio

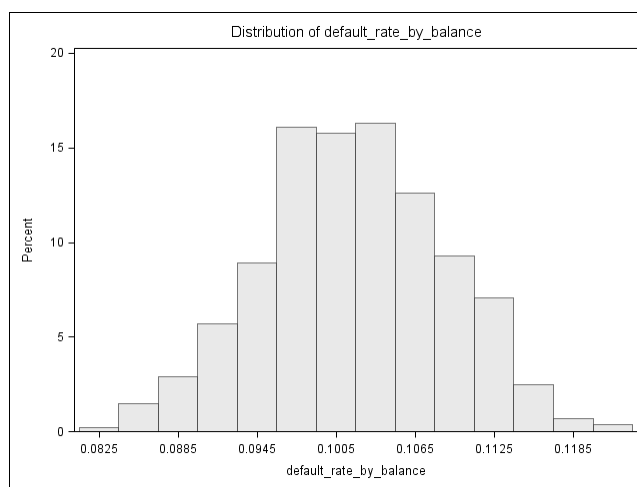
100-loans experiment



500-loans experiment



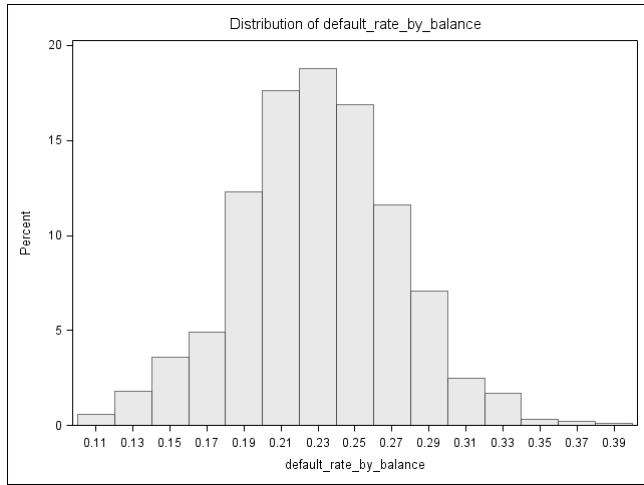
2,500-loans experiment



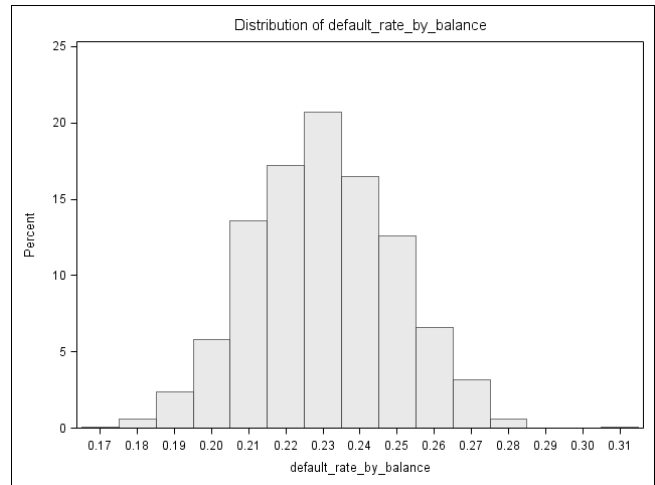
This analysis actually understates the extent of the problem of non-diversification, as we have randomly drawn loans from the whole vintage. If a pool is limited to a single state—say, Arizona—the dispersion of results is even greater. The upper left chart in figure 3 shows the default distribution of 1,000 pools of 100 Arizona loans originated in 2007. The default distribution ranges from 11 percent to 40 percent, averaging 23 percent. For the same 2007 vintage, the default distribution of 1,000 pools of 500 Arizona loans ranges from 17 percent to 31 percent (upper right chart); for 1,000 pools of 2,500 Arizona loans (bottom chart), the default distribution ranges from 20 percent to 26 percent.

Figure 3. Simulation Results for Freddie Mac's Arizona 2007 Portfolio

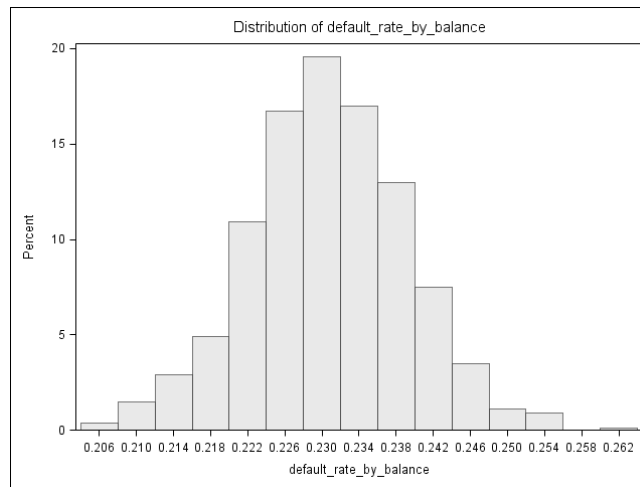
100-loans experiment



500-loans experiment



2,500-loans experiment



We could have looked at this on a number of other dimensions, but the point would be the same. A loan pool exclusively from Arizona (or any other state for that matter), no matter the pool size, is going to need more credit enhancement than a more geographically diversified pool. And, smaller pools are going to have a greater variability of returns and, hence, require more capital to protect the government, the catastrophic risk provider.

Thus, all future state proposals need to focus on how to ensure the necessary degree of diversification. This is true whether the credit enhancement comes in the form of a capital market execution or a mortgage insurance execution. In a mortgage insurance execution, the mortgage insurer is itself diversified. In a capital market execution, this diversification must occur at the pool level. Investors are likely to demand more diversified pools, as it creates more certainty about their level of risk. In addition, we would

expect that the government would require that any capital market execution be on large, diversified pools as smaller pools and less-diversified pools magnify the government's potential for losses. A likely corollary of the preference for large, diversified pools is that loan-level risk-based pricing would become more difficult because there would be little transparency concerning the contribution of a given loan to the cost of capital for the pool.

Capital Sizing, Origination Channel, and Cost

While it would seem that more capital is better, in that there is a bigger buffer before the government might be required to step in, a substantial cost is associated with capital requirements that are too high. This additional cost makes it more expensive to securitize loans, which would be reflected in higher mortgage rates to the borrower. Moreover, requiring excess capital only on securitizations with a government guarantee will affect the origination channel. Originators will be more likely to hold the loans on balance sheet or securitize with private label, rather than securitize with a GSE guarantee. Again, this might seem consistent with the desire to reduce the government's role in the mortgage market, but the likely impact would be that more of the highest quality mortgages would be held on bank balance sheets (or perhaps securitized in private-label form) rather than securitized with a government guarantee.¹⁰

How Much Higher Would Mortgage Rates Be under Corker-Warner?

What would be the impact of Corker-Warner's 10 percent capital requirement on a bond guarantor's potential guarantee fee? We must first determine the cost of capital to private investors for requiring them to take losses consistent with a 30–35 percent decline in home prices. Andrew Davidson estimated these costs at 31–46 basis points (bps)¹¹ of annual credit charges. Mark Zandi argues that a 50 basis points guarantee fee (the current level of GSE guarantee fees) would allow borrowers to sustain 5 percent losses (our estimate of losses in a 2007 scenario) with home prices down 30–35 percent. With both estimates in the same area, we use 50 basis points as the estimate for the capital cost of covering a 30–35 percent decline in home prices.

We showed earlier that if we sized to the diverse 2007 composition of the GSEs' books of business and 2007 experience of a 30–35 percent decrease in home prices, 5 percent is the right capital requirement.¹² Corker-Warner requires 10 percent—5 percent more capital than is necessary—although some of this can be debt capital, which is much less expensive than equity capital. If this extra capital were provided in a capital market structure, we would be converting 5 percent of senior bonds into subordinated bonds. If we assume subordinated bonds sell for 300 basis points more than senior debt, the additional cost would be:

$$\text{The additional cost} = (300 \text{ bps} \times 5\%) = 15 \text{ bps} \quad (1)$$

If the additional capital were provided using a guarantor entity, the results would be very similar. The guarantor would need to raise additional debt capital to provide the extra 5 percent cushion, and this would be invested at the going market rate. Assuming the guarantor's cost of debt capital is 6 percent, and this money is used to fund additional investments yielding 3 percent, the cost is 15 basis points, identical to the 15 basis points in the capital markets structure.

The total cost of the catastrophic insurance under CW can be estimated as follows:

$$\begin{aligned} \text{Total cost} &= 50 \text{ bps base case cost of providing protection (current GSE guarantee fee)} \\ &+ 15 \text{ bps additional cost to bring private first loss capital to 10\%} \\ &+ 17 \text{ bps to capitalize the mortgage insurance fund}^{13} \\ &+ 7 \text{ bps for the market access fund}^{14} \\ &= 89 \text{ bps total} \end{aligned} \quad (2)$$

Thus, the total cost is approximately 39 basis points higher than the present system.¹⁵ Originators would have to raise mortgage rates by approximately 39 basis points to retain their current level of profit.

Impact on Origination Channels

The appendix compares the costs of a bank holding a mortgage in portfolio, securitizing it with a government guarantee, and private-label securitization with no guarantee. At the present time, securitizing through the GSEs is marginally better than retaining a loan in a bank's portfolio. This is confirmed by the high proportion of loans that are being securitized,¹⁶ as well as by anecdotal evidence from originators. It is important to realize that, over the past 18 months, guarantee fees at the GSEs have nearly doubled (from 28 bps to 50 bps). This makes the decision to securitize much more marginal than was the case in earlier years.

And the landscape is tilting away from securitization even in the absence of GSE reform. In particular, changes in the capital treatment of mortgage servicing rights (MSRs) under the new Basel III bank capital rules will make it less economic to securitize in the years ahead.¹⁷ We have shown in our analysis that if GSE reform is accompanied by a 10 percent capital requirement, as is suggested in CW, the cost of securitization with a government guarantee will increase by 39 bps. This increase will certainly tilt the decision toward holding loans in bank portfolios, as an additional 39 bps will make holding a loan in portfolio significantly less costly to the bank than securitizing with a guarantee.

This finding has two corollaries. First, since a bank holding a loan in portfolio bears the full credit risk, if there is no cost difference between securitizing lower- and higher-quality loans with a government guarantee, the bank will likely choose to hold on to the higher-quality loans and use the government guarantee for the less-creditworthy loans. Second, since holding loans in portfolio costs less than buying the government guarantee, the price of high-quality loans is likely to increase by less than 39 bps. Conversely, the cost of lower-quality loans that nevertheless qualify for a government guarantee will rise by at least 39 bps and potentially by a good deal more if the guarantee is priced for the credit risk of individual loans.

Conclusion

Capital of 4–5 percent would have been sufficient for the GSEs to sustain all their losses under a 2007 home price scenario, with a much more diverse mix of business than they have now. With the current GSE book of business (which is admittedly too restrictive), a 2007 scenario would produce losses on the order of 2–3 percent.

However, these capital calculations in essence assume that all GSE loans are in one giant pool. Smaller and/or less diverse pools would need quite a bit more credit enhancement to cover a 2007-type environment. To minimize their risk, investors will be willing to provide first credit loss capital only to large, geographically diversified pools. There is an inherent contradiction between the diversity the market will require and reliance on risk-based pricing. The pricing of large diversified pools does not allow for price discovery, and it suggests that loan pricing will be uniform across borrowers and will not be based on risk characteristics.

Corker-Warner's 10 percent capital requirement is excessive, especially in a bond guarantor execution, and comes with a cost. If the full effect were felt in mortgage rates, rates would be about 39 bps higher than the present system. More likely, banks will choose to portfolio many more loans, and these loans are likely to be of the highest quality. Rates on these loans are likely to rise much less than our calculated number. In contrast, depending on how a risk-based pricing system for the government guarantee is implemented (or not), lower-quality loans will become the province of whatever government guarantee replaces the GSEs and those borrowers would feel the full effect of the increase.

Appendix

In this appendix, we compare the cost of holding a mortgage on balance sheet to the cost of securitization today and under Corker-Warner to the cost of private-label securitization:

Holding the Mortgages in Portfolio

The recent Federal Reserve guidance on Basel III allows most first-lien mortgages to retain their current 50 percent risk weight. The Basel III capital requirements (based on risk-weighted assets) will be higher than current levels; under Basel III, the total capital ratio is 8 percent of risk-weighted assets (of which 6 percent must be Tier 1 capital). In addition, Basel III introduces two capital buffers: a 2.5 percent capital conservation buffer, and, beginning in 2016, banking organizations that use the advanced approach to Basel III could be subject to a countercyclical capital buffer that could raise their required capital by as much as 2.5 percent, for a total capital charge of 13.0 percent (8%+2.5%+2.5%). These capital buffers must be met with equity capital. Assuming a 50 percent risk weight and a 13 percent risk-based capital requirement, mortgages would require 6.5 percent capital. The rest (93.5%) would be borrowed from the bank. Then the total funding cost is given by the following equation.

$$\text{Funding costs} = (\text{the cost of bank borrowing} \times 93.5\% \text{ financing}) + (\text{the cost of capital} \times 6.5\%) \quad (A-1)$$

So, two things determine the funding cost. One is the cost of bank borrowing and one is the capital cost. We assume that the cost of bank borrowing is the average of the 5-year and 10-year swap rates + 10 bps. As of September 24, 2013, the 5-year swap rate was 1.59 percent and the 10-year swap rate was 2.81 percent, for an average of 2.2 percent. Adding 10 bps brings us to 2.3 percent, and 93.5 percent of that equals 215 basis points or 2.15 percent.

What is the cost of capital? We assume equity capital must return 15 percent, debt capital must return 6 percent, and the institution is funded by 90 percent equity and 10 percent long-term subordinated debt for a blended capital cost of 14.1 percent.

$$\begin{aligned} \text{Capital cost} &= \text{equity return} \times \% \text{ equity} + \text{debt return} \times \% \text{ debt} \\ &= (15\% \times 90\%) + (6\% \times 10\%) = 14.1\% \end{aligned} \quad (A-2)$$

The cost of capital is 14.1 percent. Multiplying by *the capital share* of 6.5 percent yields a cost of 91.6 basis points or 0.916 percent. Adding *the cost of funds* and *the cost of capital* together, the total funding cost is 3.076 percent.

The return to a mortgage on a bank balance sheet is shown in the equation below:

$$\begin{aligned} \text{Return to a mortgage on a bank balance sheet} = \\ \text{coupon on the mortgage} - \text{costs associated with the mortgage} - \text{funding costs} \end{aligned} \quad (A-3)$$

The costs associated with the mortgage include the cost of origination, the costs of servicing the mortgage and incurring any credit losses, and option costs. Assume that credit costs are 10 bps per annum, option costs are 55 bps per annum, servicing costs are 5 bps per annum, and the annualized origination costs are 50 bps per annum. Thus, the total costs associated with the mortgage are 120 basis points or 1.2 percent.

Putting it all together, if we assume the rate paid by the on the mortgage is 4.50 percent (the Primary Mortgage Market Survey rate as of September 19, 2013), the profit of the mortgage on balance sheet is given by the following equation.

$$\begin{aligned} \text{Profit} &= (4.50 - .10 - .55 - .05 - .50 - (2.3(.935) + 14.1(.065))) \\ &= 4.5 - 1.2 - 3.066 \\ &= 23 \text{ bps per annum} \end{aligned} \quad (A-4)$$

These numbers are broken down below.

Hold on a bank balance sheet	
Coupon on the mortgage	4.5
– Credit costs	0.10
– Option costs	0.55
– Servicing costs	0.05
– Annualized origination costs	0.50
– Cost of funds	2.1505
– Cost of capital	0.9165
Total proceeds	0.233

Securitizing a Mortgage with a Government Guarantee—Current and under CW

If the lending institution were to securitize and sell the mortgage, the table below shows proceeds under current circumstances. In particular, under current pricing, the bank makes a 4.50 percent mortgage. It would retain 25 basis points in servicing and pay a GSE guarantee fee of around 50 basis points, leaving the bank with a 3.75 (4.5 – 0.25 – 0.5) percent coupon. This could be sold into a 4 percent mortgage pool by buying up the coupon, or it could be sold into a 3.50 percent mortgage pool by retaining the excess servicing. We assume the latter execution is chosen, with the original 4.50 percent mortgage sold into a 3.5 percent mortgage pool. We need to calculate the net proceeds from the securitization. The net proceeds would be given by the equation below.

Net proceeds =

$$\begin{aligned} & \textit{Annualized gain on sale} + \textit{servicing fee} - \textit{cost to service} - \textit{origination cost} - \textit{capital charge} \\ & \textit{on the MSR} \end{aligned} \tag{A-5}$$

The bank would receive \$101.50 (price of a Fannie Mae 3.5 on September 25, 2013). The up-front premium of \$1.50 is a one-time gain on sale. We want to convert this to an annual number, which we do by dividing the \$1.50 premium by the duration of the mortgage loan (4.5 years), to obtain an annual gain of 33 basis points.

In addition, the bank retains 25 basis points base servicing and 25 basis points (3.75% – 3.5%) excess servicing. So, the total servicing fee is 50 basis points. Assume that the cost to actually service the mortgage is 5 basis points and the capital cost of the MSR is 3 basis points. The annualized origination cost is 50 basis points. Thus, we can calculate the new proceeds as below:

Net proceeds =

$$\begin{aligned} & 33 \textit{ bps annualized gain on sale} + 50 \textit{ bps in servicing fees} - 5 \textit{ bps cost to service} - 50 \textit{ bps} \\ & \textit{origination costs} - 3 \textit{ bps capital charge on the MSR} \\ & = 25 \textit{ bps} \end{aligned} \tag{A-6}$$

Thus, at the present time, GSE securitization is very slightly preferable to bank portfolio execution, which yields 23 basis points per annum in net proceeds.

We showed in the text that CW will add approximately 39 basis points to the securitized execution. The calculations below show that for originators to maintain the same profitability, primary mortgage rates must be 39 bps higher. Conversely, the table also shows that if current pricing were retained, the loans would have a per annum loss of 53 bps under CW. That is, if mortgage rates do not rise, the mortgage would be placed in a 3.0 percent pool rather than a 3.5 percent pool; 3.0 percent pools sold at a discount to par, hence there would be a loss on sale, not a gain. The implications: lenders will send more loans through bank portfolio channels, and mortgage rates are likely to rise close to 40 bps for borrowers who do not have a bank portfolio option, but much less for borrowers who do have the portfolio option.

Securitize with a government guarantee	Present	CW scenario-profitability constant	CW scenario-mortgage rates constant
Coupon on the mortgage	4.5	4.89	4.5
– Note rate on the mortgage	3.5	3.5	3.0
– Guarantee fee	0.5	0.89	0.89
= Servicing proceeds	0.5	0.5	0.61
Agency MBS price minus par	1.5	1.5	-2.5
+ (= Annualized gain on sale)	0.33	0.33	-0.55
– Servicing costs	0.05	0.05	0.05
– Annualized origination costs	0.5	0.5	0.5
– Capital charge on MSR	0.03	0.03	0.04
= Total proceeds	0.25	0.25	-0.53

Nongovernment Guaranteed Securitization

To complete the picture, the table below shows the very rough costs of securitization without a guarantee. We divide this in to a senior/subordinated structure, in which the senior bond is 93 percent of the issue and is assumed to price at 60 basis points over agency MBS (currently 3.27 percent) for a yield of 3.87 percent (3.27% + 0.6%), and the subordinated bonds are assumed to price at a loss adjusted yield of 300 basis points over agency MBS. Thus, the cost of the senior bonds is 3.6 percent (3.87% x 93%), while the cost of the subordinated bonds is 54 basis points (((3% + 3.27%) x 7%) + 0.1%). On an annualized basis, the servicer is retaining 36 bps. From this, we must subtract the costs of servicing (5 bps), the costs of origination (50 bps), and the costs of holding the mortgage servicing rights (4 bps), for a net return of -23 basis points. Realize that this calculation is grossly oversimplified. First, we have not optimized the deal structure at all. This is quite important and can make for considerably better execution. Second, with spreads on the senior bonds this wide, many originators would wait for a better time to come to market. Even so, it is clear that under current circumstances, this is the least appealing execution; it is approximately 21 basis points worse than agency execution. However, it would be considerably better than Corker-Warner with a 10 percent capital requirement.

Securitize without a government guarantee	
Coupon on the mortgage	4.5
– Cost of senior bond	3.6
– Cost of subordinated bond	0.54
– Servicing costs	0.05
– Annualized origination costs	0.5
– Capital charge on MSR	0.04
Total proceeds	-0.23

Implications of Varying the Channel

- What is the consequence of a significant (35–40 bps) rise in the fee for a government execution? While it is possible that mortgage rates rise 35–40 bps, the full effect of this on all mortgages is unlikely. It is more likely that depository institutions will hold more mortgages in portfolio, and that there will be new entrants into the depository institutions market, founded expressly for the purpose of holding mortgage backed securities funded by deposits. Thus, banks are likely to retain more mortgages, and retain the highest quality mortgages, as the credit costs are the lowest. The result will be that the highest quality mortgages will rise in price by much less than 35–40 bps.
- Let us consider the implications for lower-quality mortgages. These have significantly higher credit costs. Banks would be much less eager to hold these mortgages, although they may choose to do so, depending on the structure of guarantee fees for catastrophic risk. (In the securitization model, it is unclear if lower-quality loans will be charged more; it does not look like this will be the case.) Thus, securitization is apt to be the execution vehicle for lower-quality mortgages, and the lower-quality mortgages are apt to rise in rate more than their higher-quality counterparts.

Notes

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- ¹ In addition, Representatives Scott Garrett, Jeb Hensarling, and others have introduced H.R. 2767, the Protecting American Taxpayers and Homeowners Act of 2013. H.R. 2767, which has been reported out of the Financial Services Committee, would not include any government guarantee outside programs of the Federal Housing Administration, the Department of Veterans Affairs, and the Department of Agriculture. It is not considered in this paper.
- ² In connection with new securities issuances that, unlike their standard issuances, would share credit risk with private investors, Freddie Mac started to release loan-level credit data in March 2013; Fannie Mae followed in April. The Freddie Mac data cover loans acquired from 1999 through June 2013. Fannie Mae data cover purchases from 2000 through March 2012. In both cases, the data include performance history through the end of 2012. The data are for 30-year, fixed-rate, fully amortizing, full-documentation mortgage loans, about half the GSEs' purchases during the period.
- ³ The same principle applies for insurers, but, especially if there were only 5–10 insurers, as the MUM plan predicts, each insurer would likely have a highly diversified book of business.
- ⁴ Under the existing system, borrowers can get a commitment of up to 90 days from lenders to maintain (or lock in) a specific interest rate on a mortgage for which they have qualified but which they are not ready to close. This allows borrowers to shop for a house knowing how much they will pay for a mortgage. The lock in is possible only because of the existence of the TBA or “to be announced” market, which allows the forward sale of as-yet-unissued GSE mortgage-backed securities. While many factors enable the TBA market to exist, the very large size of the existing GSE market is clearly important.
- ⁵ Reasons for termination include voluntary prepayments; 180 days delinquent (DQ); and, if it occurred prior to 180 days DQ, loans that were disposed of via short sales, third-party sales, deeds-in-lieu of foreclosure, REO acquisitions, and repurchases.
- ⁶ The jumbo prime securities have a larger loan size, which lowers severity (due to the fixed costs of foreclosure). The jumbo prime data, however, are derived from actual liquidations, which imparts an upward bias, as we would expect some percentage of the loans that go six months delinquent to self-cure or be modified.
- ⁷ Not only did the 2007 book of business experience an immediate drop in house prices, but 2007 was a period in which the GSEs often waived income documentation for higher FICO borrowers, and appraisal fraud was common.
- ⁸ Sizing to the 2007 experience of a 30–35 percent downturn in home prices sidesteps the question of whether home price depreciation would have been worse had there been no government involvement. For the purposes of this analysis, we use the 2007 numbers as calculated; a downturn of this magnitude would be expected to generate a government response.
- ⁹ FICO refers to a borrower's credit score—a measure of the likelihood a loan will be repaid. FICO scores range from 300 to 850; higher scores are better. Traditionally, scores over 680 were considered prime and scores under 620 subprime. LTV refers to the loan-to-value ratio of a loan. Loans with greater than 80 percent LTV require credit enhancement, such as private mortgage insurance, for sale to the GSEs.
- ¹⁰ Stated differently, the additional capital requirement would serve as a “tax” on securitization, such that more of the securitization activity would be shifted to banks, both existing institutions and those newly formed to benefit from regulatory arbitrage. This move to retain mortgages will be amplified by some of the changes in Basel III, the proposed new regulation concerning bank capital. In particular, the unfavorable capital treatment given to mortgage servicing rights (MSRs) in Basel III makes retention of mortgages on bank balance sheets more likely even if there is no GSE reform.
- ¹¹ A basis point is one one-hundredth of a percentage point.
- ¹² Using the more recent vintage composition (mostly pristine collateral) but putting it through a 2007-type home price scenario, 2 percent is the proper capital requirement.
- ¹³ This covers the cost of building up the Mortgage Insurance Fund created under CW to 2.5 percent of outstanding eligible mortgages over 15 years.
- ¹⁴ CW establishes a fund to support access and innovation in mortgage finance, which will be financed through a 5–10 bp fee on guaranteed securities.
- ¹⁵ Mark Zandi and Cristin deRitis, in their July 2013 article “Evaluating Corker Warner,” do an excellent job laying out the costs of the proposal, and we use their layout and their framework. We derive a lower number for the cost of the excess capital, as we believe the differential cost of the excess capital that matters (in a capital market structure, it is the difference between a senior and a subordinate bond; in an insurance structure, it is the difference between the cost of capital and what it can be invested in).
- ¹⁶ In 2012, according to Inside MBS & ABS, approximately 86 percent of all mortgages originated were securitized.
- ¹⁷ When an institution securitizes, it generally retains the MSR, and the capital requirements on these instruments will increase dramatically under Basel III. Under current capital requirements, MSRs are a 100 percent risk weight. Under Basel III, MSRs will have a 250 percent risk weight as long as MSRs consist of less than 10 percent of bank capital. If MSRs exceed 10 percent of bank capital, however, the charges increase to a dollar-for-dollar capital reduction (equivalent to a 769 percent risk weight), skewing the results even more against securitization.