

The Case for Accelerated Amortization

By Alan Boyce, Glenn Hubbard, Christopher Mayer, and James Witkin¹

June 16, 2012

Background

A recent Zillow report² estimates that almost one-third of homeowners with a mortgage are underwater, with an average negative equity of over \$70,000. Despite facing daunting personal financial circumstances, about 90 percent of these underwater homeowners remain current on their mortgage. With house prices not expected to rise for years, these borrowers face an extended period of time in which they will need to continue making regular payments just to get back to even, let alone to a position from which they might be able to sell their home to move for a better job or trade up to a new property to make room for an expanding family. Underwater borrowers are at much greater risk of delinquency leading to foreclosure if they experience a negative economic, family, or health shock (death, disability, divorce, or unemployment). Such a shock not only leads to the tragic loss of a home, but it also imposes large losses on taxpayers and lenders who hold or guarantee the underwater mortgage.

Recently a number of policymakers have proposed that the government encourage underwater borrowers to take advantage of low interest rates to shorten the amortization periods on their mortgages (and in many cases also reducing their monthly payments). Such a plan would enable these borrowers to pay down their debt more quickly by taking advantage of mortgage rates that are even lower for 15-year and 20-year mortgages (currently about 3 percent and 3.5 percent respectively) than for 30-year mortgages

¹ Alan Boyce is CEO of the Absalon Project; Glenn Hubbard is dean and Russell L. Carson Professor of Finance and Economics at Columbia Business School; Christopher Mayer is Paul Milstein Professor of Real Estate, Finance and Economics at Columbia Business School and Visiting Scholar at the Federal Reserve Bank of New York; James Witkin is Research Manager at the Paul Milstein Center for Real Estate at Columbia Business School. The authors would like to thank Daniel Hubbard for excellent research support. All opinions are those of the authors and do not represent the views of the Federal Reserve Bank of New York. BlackBox Logic, Equifax, Knowledge Decision Sciences, and Zillow provided crucial data for our analysis.

² <http://www.zillow.com/blog/research/2012/05/24/despite-home-value-gains-underwater-homeowners-owe-1-2-trillion-more-than-homes-worth/>

(currently about 3.8 percent).³ Many borrowers can decrease the term of their loan by five years or more, saving money on their monthly payments while simultaneously getting out from being underwater much more quickly.

We analyze the costs and benefits of a government policy that would offer to pay the closing costs for underwater homeowners who choose a shorter amortization period for their refinanced mortgage. It is important to note that the benefits of such a plan require that government sponsored entities Fannie Mae and Freddie Mac (the GSEs) allow underwater borrowers to refinance their mortgages without constraints. We have called for the implementation of unrestricted refinancing in the past, but the GSEs have not yet allowed this refinancing to take place. As we have argued, an unrestricted refinancing program for GSE borrowers would allow up to 12 million borrowers to access low rates.⁴

When implemented in conjunction with a widespread refinancing program, we show that a proposal to encourage shorter amortization would save American taxpayers up to \$6.7 billion through lower default rates and smaller losses on foreclosed homes for mortgages guaranteed by Fannie Mae and Freddie Mac.⁵ As well, homeowners would be able to emerge from the indebtedness sooner, enabling them to avoid housing lock-in and costly foreclosures. The broader economy benefits as well, as potential workers are more flexible to move to locations where jobs are more prevalent and home prices stabilize with fewer foreclosures.

³ The Rebuilding Equity Act of 2012, recently introduced by Senator Merkley, proposes that Fannie Mae and Freddie Mac (the GSEs) incentivize underwater borrowers with mortgages guaranteed by the GSEs to refinance into mortgages with reduced loan terms. For these borrowers, the bill would have the GSEs pay the closing costs on HARP refinancings with a loan term of 20 years or less; see the full text of bill online at <http://thomas.loc.gov/cgi-bin/query/z?c112:S.2909>:

⁴ See <http://www4.gsb.columbia.edu/realestate/research/housingcrisis>. Senators Boxer and Menendez have sponsored a bill to allow unrestricted refinancing that is similar to the plan above.

⁵ All results are based on scaling up the statistics from our initial sample of 9.1 million 30-year GSE-guaranteed FRMs with an aggregate balance of \$1.7 trillion, of which 1.57 million (\$292 billion) are underwater. The initial sample represents 56.4 percent of the total universe of 30-year GSE-guaranteed FRMs in terms of loan count and 62.9 percent of the outstanding balance. This imbalance is a result of restricting our data to zip codes in which we have Zillow HPI data to accurately calculate LTV. Our sample is thus more concentrated around MSAs and is likely to underrepresent rural areas that generally experienced lower home value depreciation and therefore have fewer underwater borrowers. As such, we scale up our results assuming we have captured three quarters of the universe of underwater GSE-guaranteed borrowers.

An Example

To understand this plan better, consider its impact on a particular group of underwater borrowers where there are clear benefits from its adoption. We have extensive data on GSE-guaranteed mortgages grouped by origination year, mortgage rate, and current loan-to-value (LTV) ratios.⁶ In this section, we examine the approximately 25,000 American homeowners who have GSE-guaranteed mortgages originated in 2007, with interest rates between 6.5 percent and 6.99 percent and current LTV ratios between 110 percent and 125 percent. These mortgages have weighted average characteristics as follows: an outstanding balance of \$176,000, a mortgage note rate of 6.66 percent, a LTV ratio of 116.8 percent, and 306 months until maturity with a monthly payment of \$1,088.

If these borrowers do not refinance and house prices remain constant, they will be, on average, underwater until late 2019. If there are defaults, the government must absorb the entire balance of the negative equity plus the large costs of managing a default and foreclosing on a property. Evidence shows that underwater borrowers are at heightened risk of default and foreclosure if they are subsequently hit with a negative economic or health shock (the so-called “double trigger” theory of mortgage default).⁷

If these underwater borrowers are able to refinance, they can choose among new 30-, 25-, 20-, or 15- year mortgages.⁸ Table 1 below summarizes the borrowers’ potential choices using the respective prevailing market rates:

⁶ Source: Lender Processing Services (formerly McDash). Current LTV ratios calculated using Zillow zipcode-level HPI indices.

⁷ See, for example, Bhutta, Neil, Jane Dokko, and Hui Shan (2010). "The Depth of Negative Equity and Mortgage Default Decisions," Finance and Economics Discussion Series 2010-35, Board of Governors of the Federal Reserve System. The authors present evidence in favor of the “double trigger” theory in which negative equity combined with a bad economic shock lead to a high probability of default. For additional evidence, see Gerardi, Kristopher, Adam Hale Shapiro, and Paul S. Willen. “Decomposing the Foreclosure Crisis: House Price Depreciation versus Bad Underwriting,” Federal Reserve Bank Working Paper 2009-25, September 2009.

⁸ See <http://www.freddiemac.com/pmms/> and http://www.mortgagenewsdaily.com/mortgage_rates/ for prevailing interest rates. Our program is slightly different than the Merkley bill in that we also allow borrowers to choose 25-Year mortgages and model the closing-cost payment as dependent on term reduction vis-à-vis the current mortgage, with larger reductions rewarded with higher reimbursements for closing costs.

Table 1: Borrower Statistics for Potential Refinancings

	Mortgage Term				
	Current	30-Year	25-Year	20-Year	15-Year
Mortgage Rate	6.66%	3.81%	3.81%	3.45%	3.09%
Months to Maturity	306	360	300	240	180
Monthly Payment	\$1,088	\$746	\$828	\$924	\$1,112
Monthly Savings (%)	NA	31%	24%	15%	-2%
LTV in 5 Years	106.45%	105.31%	101.39%	94.65%	83.69%
Months Until Positive Equity w/o Home Appreciation	89	84	65	46	32

Clearly, these borrowers have a large incentive to refinance, as their current mortgage rate greatly exceeds today's much lower rates.⁹ However, these borrowers will remain underwater for the next seven years if they choose the most commonly originated 30-year fixed rate mortgage and house prices remain at today's levels. By contrast, if such borrowers chose a 20-year mortgage, they would reduce their current monthly payments by 15 percent, while also achieving positive equity in less than four years. If they chose a 15-year mortgage, their payments would increase only slightly, while they would obtain positive equity by 2015 (that is, less than three years hence).

From the taxpayers' perspective, the GSEs save substantial funds if the borrowers can be convinced to choose a shorter amortization term. To calculate the GSEs' savings from these refinancings, we project the losses from default under each scenario. We estimate borrower default probabilities by applying the commonly used HAMP NPV Default model.¹⁰ One of the primary implications of this model, used by servicers

⁹ As we have written before, many of these borrowers have been unable to refinance due to frictions in the refinancing market. We believe that the combination of opening up refinancing for all GSE borrowers without any qualification requirements as well as proving incentives to shorten amortization will offer the strongest benefits for taxpayers. See <http://www4.gsb.columbia.edu/realestate/research/housingcrisis>.

¹⁰ The primary inputs for this model are LTV, debt-to-income ratio (DTI), and FICO score. For DTI, we assume that the initial mortgage balance was three times the borrower's income and that home payments make up 65 percent of total debt service. For FICO scores, we use the average FICO scores for April 2012 rejected GSE refinancing applications, as reported by Ellie Mae (See http://www.elliemae.com/aboutus/about_reports.asp). For LTV ratios, we use the Year-5 LTV, as this

participating in HAMP to evaluate potential modifications, is that it shows that the LTV ratio has a large quantitative impact on predicting defaults relative to other variables such as the monthly mortgage payment or borrower credit. Therefore policies that reduce LTVs can have an especially large impact on reducing default rates relative to policies that reduce monthly payments alone. The HAMP NPV model is particularly sensitive to LTV reductions that get borrowers back to positive equity. LTV reductions that leave the borrower with LTVs in excess of 125 have much lower impact. Table 2 shows the predicted default probability and government savings under each scenario:

Table 2: Government Impact by Potential Refinancings

	Mortgage Term				
	Current	30-Year	25-Year	20-Year	15-Year
Default Rate	15.78%	14.14%	12.13%	9.17%	5.76%
Delinquency Severity	55%	55%	50%	50%	50%
Projected Losses	\$13,884	\$12,440	\$9,702	\$7,339	\$4,611
Government Savings (per borrower)		\$1,444	\$4,182	\$6,545	\$9,273

The potentially large government savings from borrowers refinancing to a shorter mortgage term come as a result of lower default probabilities for lower LTV borrowers and a lower loss severity conditional on default since borrowers pay down their mortgage more quickly under the program. Given these results, the government has a strong incentive to encourage borrowers to reduce their amortization term when refinancing as long as the cost of encouraging borrowers to take a shorter amortization exceeds the estimated savings. In the subsequent sections, we will evaluate whether a government payment is a cost-effective means to achieve this goal when applied to all GSE borrowers.

Net Impact to Taxpayers

To understand the aggregate impact of an upfront government subsidy, we expand the above analysis to cover the universe of underwater borrowers with GSE-backed

allows default rates to vary with loan term. Even using Year-3 LTVs yields a positive government NPV. For more information on the HAMP NPV model, see www.hmpadmin.com/portal/programs/docs/hamp_servicer/npvmodeldocumentationv403.pdf

mortgages.¹¹ In order to be eligible for the simulated program, borrowers must be underwater on their mortgage and current on their payments with no more than one late payment in the past 12 months.¹² Under our simulated program, the GSEs would pay between \$1,000 and \$3,000 in closing costs associated with a refinancing, with higher payments for borrowers who choose to take shorter amortization mortgages.¹³ We evaluate the program based on a matrix of take-up rates, in which borrowers prefer shorter amortization mortgages, but only if a shorter amortization period comes with lower mortgage payments. In the earlier example, our take-up matrix would predict that a borrower would likely choose to refinance into a 20-year mortgage, instead of the 15-year mortgage, because the payments for the 15-year mortgage would be higher than their current mortgage payments on the existing high-interest rate 30-year mortgage. However, an appropriate incentive payment would encourage the borrowers to choose the 20-year mortgage instead of the traditional 30-year mortgage when these borrowers refinance. Finally, we assume that house prices depreciate another 5 percent from today's levels before bottoming out.

The analysis shows that there are 1.68 million eligible underwater mortgages guaranteed by the GSEs. Of that group, we estimate that 1.44 million would choose to refinance in a streamlined refinancing plan, a very high take-up rate, but consistent with the view that many of the underwater borrowers receive strong benefits from refinancing but have been locked out from doing so up to now.¹⁴ With our incentives, about 151,000 borrowers would still choose a 30-year term, while the remainder would choose a shorter amortization schedule. Overall monthly payments would decrease by more than 10 percent relative to their current mortgages. Weighted-average LTVs in the fifth year

¹¹ The simulations are available in an Excel spreadsheet at <http://www4.gsb.columbia.edu/realestate/research/housingcrisis>

¹² We do not impose a cut-off date restriction. This makes our estimated benefits slightly larger than would apply with the Merkley bill.

¹³ This is similar to the Merkley bill, which pays \$3,000 toward closing of any loan with a term of 20 years or less. Our simulations give borrowers a \$1,000 credit for reducing amortization by up to 24 months, \$2,000 for reducing amortization 24 to 48 months, and \$3,000 for reducing the term more than 48 months. Based on MBS pricing and the average loan balance, we impute the implied interest rate reduction per government dollar paid.

¹⁴ See Appendix Figure 1 for a complete breakdown of refinancings by new term length.

would decrease by 8 percent, and borrowers would achieve positive equity nearly three years faster than in the baseline.

Next, we quantify the government's financial costs and benefits from implementing such a program. The direct costs of the closing-cost subsidy are approximately \$3.35 billion, which we compute by summing the individually calculated government payments for each cohort of refinancings. Next, we turn to benefits. Using the HAMP NPV Default Model, we predict a decrease in the overall default rate of approximately 7.1 percent off a baseline predicted default rate of approximately 27 percent.¹⁵ The estimated default rate is very high for this group of borrowers because many are appreciably underwater. The lower default rate combined with a smaller estimated loss severity for those who take up the program generates savings of about \$12.8 billion. However, this figure provides an overestimate of the program's benefits because some portion of the borrowers would have refinanced into a shorter-term mortgage even without the government subsidy. These borrowers represent a pure cost to the government, as the incentive payment has no impact on their behavior. So we reduce this figure by the percentage of borrowers that already would have refinanced into an accelerated amortization mortgage. Using data from January to April of 2012, we estimate that 21.5 percent of underwater borrowers who refinanced their mortgage (likely using a HARP refinancing) would have taken out a mortgage with less than a 30-year term even without government intervention.¹⁶ Reducing the previous default savings by 21.5 percent yields a government savings of \$10 billion over the baseline default calculations. Combining the savings with the direct costs of the subsidy, the plan would have a net positive impact on the government of \$6.67 billion. Thus, the program would generate substantial savings for taxpayers even before considering potential benefits for the housing market in terms of lower defaults and for the economy as workers become more mobile.

¹⁵ To be conservative in our estimates, we define the baseline default rate as the lower of the current default probability and the default probability of a new 30-year mortgage.

¹⁶ See the Appendix Figure 2 for a breakdown of underwater originations by term length. This figure represents the percentage of underwater borrowers refinancing into mortgages with terms of 25 years or less. It is almost certainly too high (leading to more conservative government savings), as borrowers who have been able to refinance are likely less financially constrained and more likely to select a non-traditional mortgage product.

Discussion of the Results

We now consider the reasonableness and robustness of the assumptions used for our computations. One possible critique is that the HAMP model overstates the impact of negative equity on losses going forward. For example, some might wonder whether negative equity will really have a large impact on default probabilities going forward for a group of borrowers who have been making their mortgage payments on time throughout the crisis. We examine more recent data from LPS/McDash to evaluate this possibility. Looking at the first quarter of 2012, we observe that 17.3 percent of underwater mortgages are delinquent compared to a 3.8 percent delinquency rate for borrowers with a current LTV of 80-99 percent, a relative increase in default rate of more than 350 percent. Of course, the GSEs should only care about newly delinquent borrowers. We then limit our analysis to mortgages that were current in December 2011. In the following quarter, on average, 1.5 percent of underwater mortgages became newly delinquent per month, compared to 0.62 percent of mortgages that had an LTV of 80-99 percent, a relative increase in the default rate of 140 percent.¹⁷ Our preliminary analysis considers any type of delinquency, not just serious defaults, and does not condition on other factors that lead to default such as credit score or monthly payments. Nonetheless, the data support the view that LTV remains an important factor in predicting mortgage defaults and that a program that lowered LTV would likely generate appreciable savings through lower defaults.

Another possible area of concern is what borrowers might have chosen absent a government payment. As mentioned earlier, nearly 80 percent of underwater borrowers currently refinance into new 30-year mortgages. In our analysis, we estimate that this option is the right one for only about 6 percent of underwater refinancings. These two statistics appear contradictory, but the answer lies in the products that are currently marketed to consumers. If we eliminate the 25-year and 20-year options, our model predicts that 94.5 percent of refinancings would be 30-year mortgages. Such a scenario is

¹⁷ On an annualized basis, this suggests that 17.3 percent underwater borrowers will become delinquent, while only 7.7 percent of borrowers in the lower LTV category are delinquent. See Appendix Table 1 and Appendix Table 2 for delinquency statistics by LTV ratio.

clearly a simplification, but it sheds light on the real issue: why do more borrowers not choose 25- and 20-year mortgage terms when the economics are so appealing?

The answer is that these are unconventional products that are not readily available to borrowers in the market today. Only one of the “Big Four” banks posts mortgage rates for 20-year fixed-rate mortgages on its website’s refinancing section, and no big bank posts 25-year mortgage rates.¹⁸ Because lenders do not openly offer them, borrowers may be unaware of these options.¹⁹ This proposal would go a long way toward opening up the market for 20- and 25-year mortgages by spurring demand and thus creating liquidity for this new product.

Conclusion

We expect that a program to pay the closing costs of borrowers who choose to pay off their mortgage more quickly would lead over one million underwater borrowers to choose a shorter amortization mortgage, enabling these homeowners to get out of debt more quickly and lowering their estimated likelihood of default. Such a program would help stabilize the housing market and benefit the overall economy through greater labor mobility and lower indebtedness without cost to taxpayers.

¹⁸ Bank of America, JP Morgan Chase, Citi, Wells Fargo. Websites accessed June 11, 2012. Only Bank of America posted 20-year rates, and those rates had to be manually added.

¹⁹ When these 20 or 25-year loans are made, they are separately pooled and sold to the bond market at a big premium to 30-year TBAs, which shows that lenders face no difficulty securitizing them.

Appendix Tables

Appendix Table 1

Overall weighted-average delinquency rates (defined as non-Current) by LTV, as of March 2012

LTV	Weighted Average Current Delinquency Rate	Relative Change in Total Delinquency Rate as Compared to LTV 80-99.99
0-59.99	2.09%	N/A
60-79.99	3.37%	N/A
80-99.99	5.47%	N/A
100-109.99	10.89%	99.00%
110-124.99	15.14%	176.70%
125 and above	26.08%	376.83%
Missing	5.61%	N/A

NOTE: The denominator for "% Delinquent" is all GSE first mortgages that were active both in December 2011 and March 2012, with no missing payment statuses in the past four

Source: Lender Processing Services/McDash

Appendix Table 2

Monthly and annualized weighted-average new delinquency rates from January to March 2012 by LTV for loans current the prior month

LTV	Monthly Percent Going From Current to Delinquent	Increase Relative to LTV 80-99.99	Annualized Rate	Increase Relative to LTV 80-99.99
0-59.99	0.47%	N/A	5.78%	N/A
60-79.99	0.59%	N/A	7.36%	N/A
80-99.99	0.76%	N/A	9.47%	N/A
100-109.99	1.18%	55.97%	15.12%	59.69%
110-124.99	1.44%	90.21%	18.71%	97.58%
125 and above	1.97%	160.41%	26.39%	178.68%
Missing	0.93%	N/A	11.77%	N/A

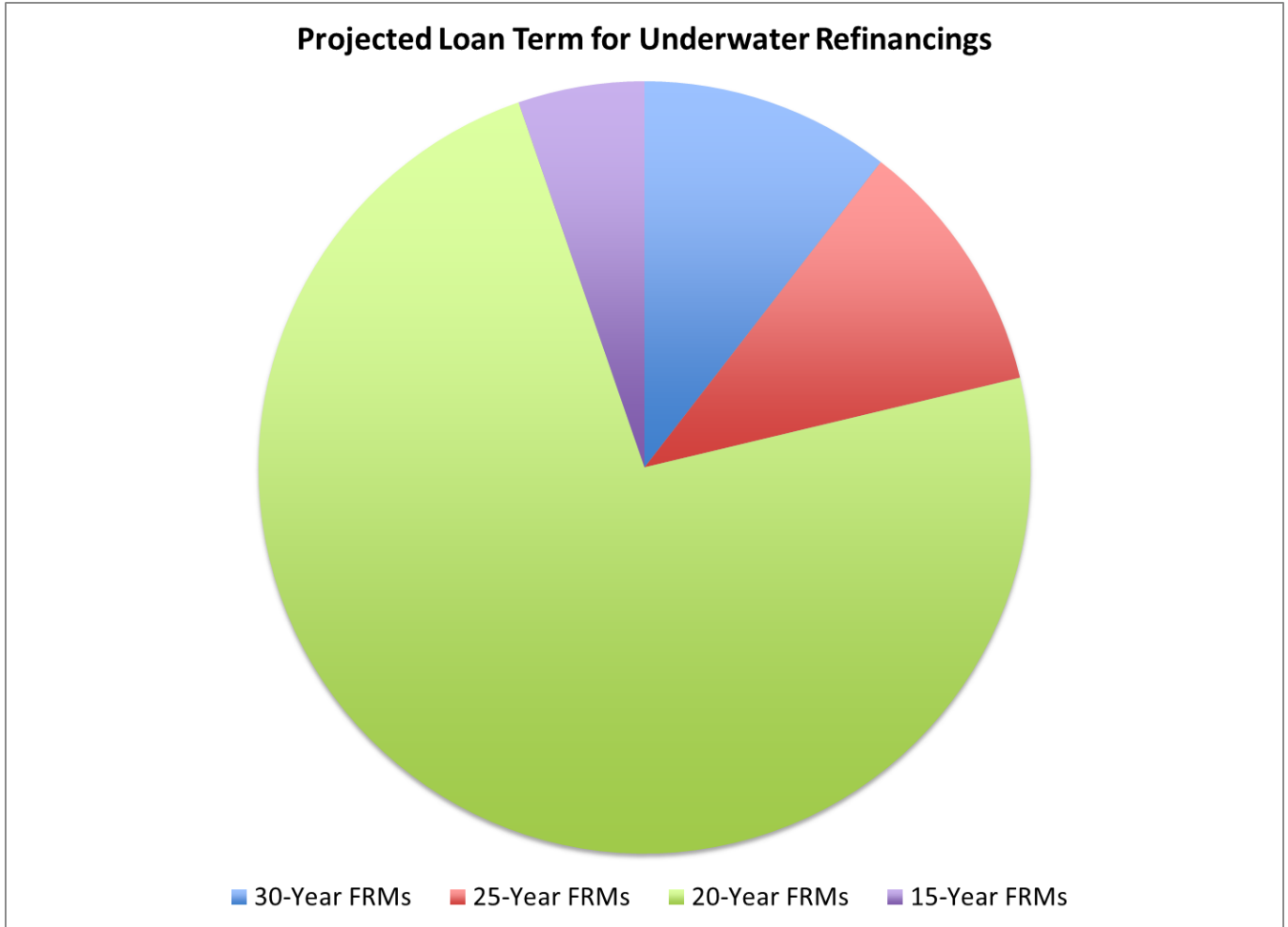
NOTE: The denominator for "% Becoming Delinquent" is a subset of the data explained above, restricted to loans that were not delinquent in the previous months.

Source: Lender Processing Services/McDash

Appendix Figures:

Appendix Figure 1

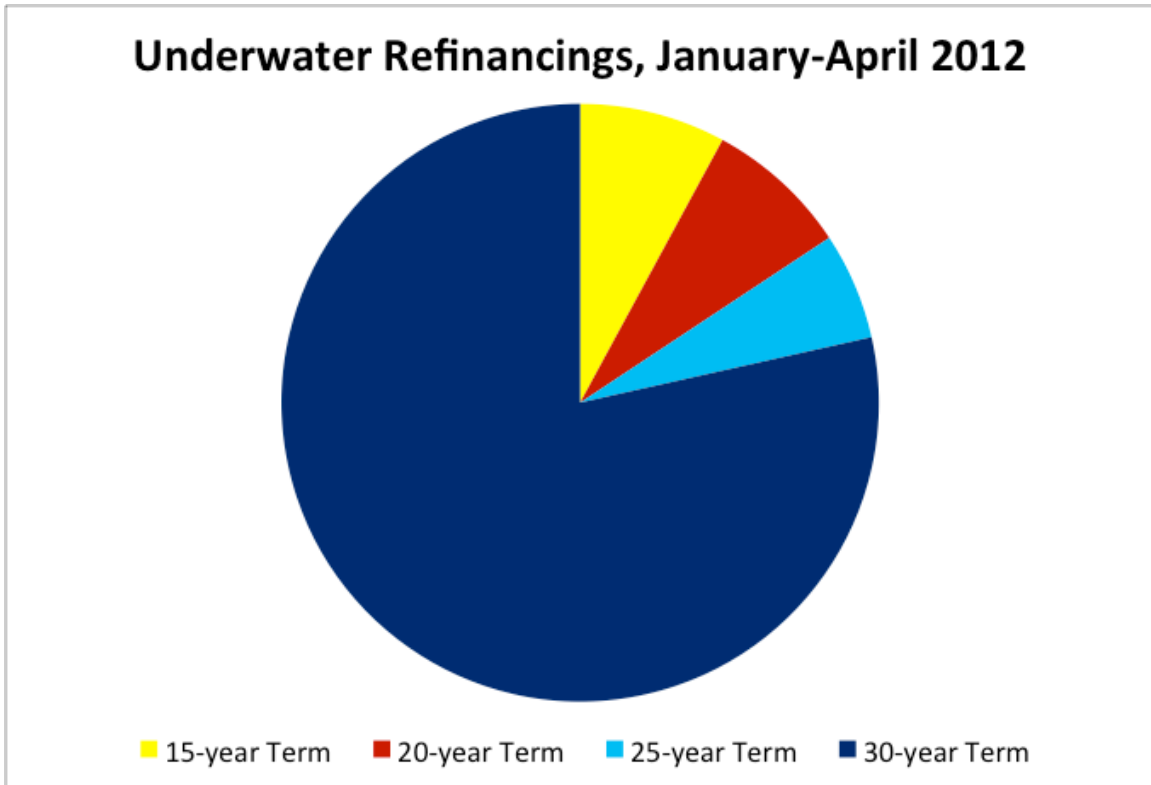
Projected Term Length for Refinancings of Underwater GSE-Guaranteed Mortgages,
with Government Amortization Incentive Program



Source: Authors' calculations using data from Lender Processing Services/McDash

Appendix Figure 2

Refinancings of Underwater Borrowers by Term Length, January-April 2012



Source: Lender Processing Services/McDash