



Corporate Headquarters
8200 Jones Branch Drive
McLean, VA 22102

Tel: (703) 903-2000
www.FreddieMac.com

We make home possible®

Estimates of Economic and Operational Effects of Increased HAMP Principal Reduction Incentives on Freddie Mac

Freddie Mac

April 2012

Prepared at the Request of the Federal Housing Finance Agency

Executive Summary

On February 1, 2012 the Administration announced a multifaceted plan to “help responsible homeowners and heal the housing market.” Part of this plan triples incentives for principal reduction (“PR”) available to investors and servicers under the Department of the Treasury’s Home Affordable Modification Program (“HAMP”). The Administration also announced that it would encourage the Federal Housing Finance Agency (“FHFA”) to allow Freddie Mac and Fannie Mae (“GSEs”) to make PR available to underwater GSE borrowers eligible for HAMP, and would pay the increased incentives to the GSEs. Treasury had previously announced the incentive increases in its Treasury Notes blog on January 27.

FHFA has asked Freddie Mac to evaluate whether the availability of incentives under the proposal could make principal reductions economically positive for the company, and operationally feasible at an acceptable cost and time.

Freddie Mac has not historically utilized PR as part of its modification programs (except in the context of short sales and deeds-in-lieu) because it believed that other forms of loan modifications were as effective and less risky in terms of inducing so-called strategic defaults.

We used the Treasury Net Present Value (“NPV”) model to test the effect of HAMP PR relative to a regular HAMP modification. The NPV model suggests that HAMP principal reductions are at least \$4,800 per loan more profitable to Freddie Mac on average than regular HAMP modifications. Since the incentives are only available to borrowers eligible for HAMP, and only a minority of eligible borrowers actually enters the program, we estimate that PR would be available to between 50,000 and 100,000 Freddie Mac borrowers, so that savings to Freddie Mac could range between \$240 and \$480 million.

We also used two other approaches (DEFCAP and market-based pricing) to test reasonableness of the NPV model outcomes and they were broadly consistent with the results of the Treasury NPV model.

We also estimate that implementation of the Treasury PR program would take about 12 months, at a cost of \$20 to \$25 million, and would involve changes to the company's operational, reporting and accounting systems.

These estimates are subject to significant qualifications. There are limited data on the current crisis from which to draw firm empirical conclusions. In particular, experience with the potential for strategic default to obtain PR among borrowers who are current is not well understood. In addition, our results are based on models that have a variety of simplifying assumptions and data limitations. The results are thus dependent on numerous assumptions that we consider reasonable but which may not bear out in practice. Actual results may be worse or better than predicted results. In addition, our operational time and cost estimates could change as program requirements evolve.

Because it might also require shifting resources away from other on-going projects, including those in FHFA's 2012 GSE Scorecard, FHFA would have to balance the trade-offs involved. Finally, there may also be significant implementation costs for servicers and other market participants that are outside of our analysis.

Background

Home Affordable Modification Program

In response to the recession and the housing crisis, in 2009 Treasury initiated its HAMP program to provide a framework for lenders and mortgage servicers to modify delinquent mortgages and help troubled homeowners stay in their homes. HAMP is voluntary for non-GSE servicers, but provides financial incentives for servicers to participate. At the direction of FHFA, however, Freddie Mac requires all of its servicers to evaluate all delinquent borrowers and current borrowers determined to be in risk of imminent default for eligibility for HAMP modifications, as well as to consider proprietary modifications in the event a borrower does not qualify for HAMP. Freddie Mac incurs all costs related to incentives under HAMP that it pays to servicers and to borrowers but does not receive the HAMP incentives that Treasury pays to non-GSE participants.

As of January 2012, Treasury reports that there were approximately 950,000 permanent HAMP first-lien modifications to date with approximately 769,000 modifications remaining active and approximately 76,000 active trial period plans. Since the inception of HAMP through December 31, 2011, Freddie Mac servicers have entered into more than more than 152,000 permanent HAMP first-lien modifications and, as of December 31, 2011, there were 12,802 HAMP active trial period plans with Freddie Mac

borrowers. In addition, during the same period Freddie Mac entered into approximately 180,000 non-HAMP modifications, for a total of about 333,000 modifications.

HAMP's decision tool is the HAMP NPV model, which assesses whether or not a loan modification (and associated incentive payments) will be beneficial from the investor's perspective.¹ If the result is "NPV positive," HAMP anticipates that the servicer will offer a modification to the borrower. Terms of the modification offer are determined along a "waterfall" of alternatives, beginning with capitalization of arrearages and reduced interest rates, extended loan terms and principal forbearance, and principal forgiveness as an additional option.

For the borrower, the primary goal of a HAMP modification is to reduce the monthly payment on the first mortgage to 31 percent of monthly income (31 percent "front-end" debt-to-income ratio, or DTI), which the program deems affordable and sustainable. It is achieved by moving down the HAMP waterfall of modifications until the 31 percent DTI is achieved.

Principal reduction, however, also raises the possibility that underwater borrowers who are current on their mortgage will strategically default in order to get their loan balance reduced, and that the costs of that conduct could exceed the economic benefits. HAMP already screens borrower eligibility along several dimensions:

- HAMP only applies to mortgages originated prior to January 1, 2009
- HAMP applies only to owner-occupied single-family homes
- Applicants' mortgage must be 60 days or more delinquent or at risk of imminent default
- Applicants must be able to demonstrate financial hardship

We do not know the effectiveness of such tests to mitigate strategic defaulters if principal reduction is undertaken.

In addition, borrowers can only enter into one "Tier 1" HAMP modification, even if the first modification fails. The program requires second liens be modified only if the servicer belongs to the Treasury 2MP program. It does not require that other debt be reduced or restructured.

¹ A modification is "NPV positive" when the total discounted value of expected cash flows for the modified loan is higher than those for the unmodified loan. The HAMP NPV model makes this assessment using a simple framework that weights the present value of cash-flows along four scenarios: the modified loan cures, the modified loan redefaults, the unmodified loan cures, and the unmodified loan proceeds through the foreclosure process. The present values of cash flows in each of the two paths associated with the modified loan are weighted by their probabilities to obtain a present value of the modified loan. The present values of the two paths associated with the non-modified loan are similarly weighed. The Net Present Value is the difference between the probability-weighted present values for the modified and non-modified mortgage.

Increased Incentives for Principal Reduction under HAMP

The Administration's determination to triple HAMP's incentives for investors aims to encourage more principal reduction for underwater borrowers. The program does not require servicers to reduce mortgage balances to any particular LTV or even offer PR, but does change the HAMP waterfall to make PR the first step in the modification waterfall after capitalizing arrears, with other options under the waterfall coming into play if PR alone does not achieve 31 percent DTI. All other HAMP eligibility requirements remain in effect. The new PR incentives apply to the current "Tier 1" HAMP program, and our analysis does not consider the expanded "Tier 2" HAMP that will go into effect later this year.

Specifically, the plan provides:

- For borrowers delinquent six months or less in the previous twelve months, incentives are increased from \$0.06 to \$0.21 per dollar of reduction to \$0.18 to \$0.63, depending on how much the servicer decreases the mortgage's LTV; the incentive increases the more the LTV is reduced²
- For borrowers delinquent seven months or more in the previous twelve months, incentives are \$0.18 per dollar of reduction regardless of how much the investor decreases the mortgage's LTV
- Servicers must consider borrowers with a current loan-to-value ("CLTV") greater than 115 percent for PR, but can consider PR for borrowers whose CLTV is lower
- Principal reduction will initially be implemented as forbearance. Forbearance will be converted to forgiveness in three equal annual installments on the anniversary of the modification as long as the borrower is never 90-days delinquent in that period. Once the borrower becomes 90-days delinquent, neither the borrower nor the investor are eligible for additional PR incentives
- Second-lien holders must write down the second lien balance proportionately to the first lien.

Freddie Mac Has Not Used Principal Reduction as a Loss Mitigation Technique

Historically, Freddie Mac has not generally viewed principal reduction as a cost-effective way of managing delinquencies compared with other forms of modifications. Principal forgiveness, when deemed appropriate (*e.g.*, for underwater borrowers who need to relocate), could be provided through short sales or deeds-in-lieu of foreclosure. Principal

² The plan increases incentives for more aggressive reductions. The investor receives \$0.30 for every dollar of principal reduction that reduces LTV to 140; \$0.45 for reductions from 140 to 115 LTV; and \$0.63 for every dollar of reduction between LTVs of 115 – 105.

reduction posed two main concerns to management. First, management was concerned that principal reductions would cause some material proportion of underwater borrowers who have remained current to default strategically to receive principal reductions, and that that cost would outweigh the benefits of reduced defaults. Second, it believed that other forms of loan modifications that provided payment relief would be as effective and less risky in terms of potential strategic defaults.

Treasury HAMP NPV Model

The Treasury NPV model – described in footnote 1 above – is the decisioning model developed to determine which HAMP applicants receive a modification. We applied the current production HAMP NPV model (Version 4) to ask whether (1) is PR NPV positive considering the increased incentives? and (2) does PR with the increased incentives produce a better economic result for Freddie Mac compared to a non-PR HAMP modification?

The model estimates that a HAMP modification with PR would save Freddie Mac about \$4,800 relative to a non-PR HAMP modification, based on the current mix of Freddie Mac HAMP applicants.³ This estimate of the incremental value of PR over regular HAMP modifications is likely a lower bound because the estimated present value of regular HAMP modifications includes the present value of incentives from Treasury that are not actually paid to Freddie Mac. This estimate assumes that the modification reduces the loan balance for all borrowers to a CLTV of 105, which maximizes the value to Freddie Mac.

Estimate of HAMP Eligible Borrowers

At year-end 2011, Freddie Mac guaranteed about 11.6 million mortgages, of which about 2.3 million were underwater, meaning that we estimated the mortgage has a CLTV greater than 100. Of these, about 12.8 percent (about 300,000 based on average loan balance) are seriously delinquent or in foreclosure. Some underwater borrowers who are now current on their mortgages will become delinquent in the future.

Against this background, we estimate that about 420,000 Freddie Mac borrowers could meet the criteria for the new Treasury HAMP PR program. This number is an upper bound, as it does not take into account other HAMP eligibility criteria based on borrower information that is unavailable for typical portfolio loans. Based on past experience of the HAMP program, we estimate about 50,000 - 100,000 of these borrowers would

³ This estimate is based on about 10,000 recent Freddie Mac HAMP applications that qualify for PR. These applications have an average UPB of \$241,000 and 130 CLTV.

eventually receive PR modifications. These estimates could change if program parameters are altered.

To reach the 420,000 estimate, we identified Freddie Mac mortgages with a CLTV greater than 105 (the minimum to be eligible for HAMP PR) and origination DTI greater than 31 percent. Origination DTI served as a proxy for current DTI, because we do not have current DTI information.⁴ For the number of borrowers likely to be helped, we provided a range because forecasting the expected volume for a new program is always uncertain. The 50,000 PR modification estimate is based primarily on existing expected HAMP forecast modification volume converting regular HAMP modifications to PR modifications, with some additional new modification volume attracted to the program by the PR offering. The 100,000 PR modification estimate is based on higher baseline forecast of regular HAMP modification volume and a greater number of borrowers attracted to the program because of the PR offering. We know from experience, however, that many borrowers who appear to be eligible for HAMP do not take advantage of the program because they do not actually qualify or are unaware of the program and/or do not apply.

Economic Impact on Freddie Mac

FHFA has also asked us to estimate the economic impact of the new HAMP PR incentives on Freddie Mac. We did three separate analyses of the potential effect of new HAMP incentives, which together suggest that PR could lead to savings for Freddie Mac. An important caution is that these estimates are model-based and thus highly sensitive to model assumptions.

Table 1 shows estimated savings to Freddie Mac from PR on a per loan basis by the Treasury HAMP NPV model suggests average savings of about \$4,800 per loan relative to regular HAMP modification. The valuation of regular HAMP modifications includes incentives that Freddie Mac does not receive, so actual savings would be larger.⁵ Based on the Treasury NPV analysis, estimated total savings from providing HAMP PR modifications to 100,000 borrowers are \$480 million savings relative to providing those borrowers regular HAMP modifications.

⁴ This assumption introduces an element of model risk into the calculation, because it is possible that origination DTI is not a good proxy for current DTI, and that current information might raise or lower the estimate of borrowers receiving PR.

⁵ The \$4,800 average savings is low because the Treasury NPV model assumes that Freddie Mac receives HAMP incentive payments (about 3 percent of loan amount) for HAMP modifications without PR when in fact it does not.

Table 1

Treasury NPV Model Views on Regular and PRA HAMP
Modification

	Averages Per Loan (\$thousands)	Per 100k Loans (\$mm)
Savings equals NPV_{PRA} less NPV_{Reg}	\$4.8	\$482
NPV_{Reg}	\$16.3	\$1,628
NPV_{PRA}	\$21.1	\$2,110
Principal Reduction (PRA)	\$46.4	\$4,639
Subsidy for PRA	\$15.6	\$1,564
UPB	\$241.2	\$24,122

These forecasted financial results assume that all HAMP applications receive either PR or standard modifications. Overall, 86 percent of applicants have higher NPVs under HAMP principal reduction, compared to a HAMP standard modification. Within the distribution of sample applicants, the positive NPV outcome ranges from over 90 percent for 60-days-or-more delinquent or more borrowers to 52 percent for borrowers who are current.

Strategic defaults could affect these profitability findings if a sufficiently large volume of current borrowers for whom principal reduction is NPV negative were induced into 60-day delinquency to qualify for the program. The HAMP NPV model would treat such borrowers' default behavior as captured by the 60-day delinquency default model and so could assign a positive NPV when the actual behavior of the borrower would imply a negative NPV. This analysis assumes that the HAMP eligibility screens will prevent or materially reduce this effect.

We used two other approaches (DEFCAP and market-based pricing) to test reasonableness of NPV model outcomes

The HAMP NPV model is the basic decisioning tool that determines whether a borrower actually qualifies for a modification under the program. To test the reasonableness of our results under that model, we used two other approaches – one based on our internal DEFCAP model and another using indicative dealer bids – to test how PR would affect loan valuation.

Stylized NPV Model Using Proprietary DEFCAP Model Lifetime Default Probabilities

DEFCAP is an internal empirically based cash-flow model that is used throughout Freddie Mac's business, including for guarantee fee costing and pricing, ex-ante profitability assessments, and portfolio valuation. It can also be used estimate lifetime

default probabilities.⁶ In this case, we used the model to project loan terminations, including those that result in a loss, along future house price and interest rate scenarios. DEFCAP forecasts the lifetime defaults for Freddie Mac's portfolio by delinquency status and LTV. This allows us to estimate the impact on lifetime default rates from reducing LTV.⁷

Table 2

DEFCAP View of Savings from Principal Reduction Modification to 105% LTV for a Single Loan (Including Subsidy Payments)*

Pre-Mod LTV	CUR	D30	D60	D90	FCL
175%	\$1,891	\$19,473	\$9,531	\$9,693	\$7,959
150%	\$2,644	\$19,916	\$11,222	\$11,564	\$8,861
125%	\$1,330	\$11,651	\$6,140	\$8,388	\$6,759

DEFCAP View of Savings from Principal Reduction Modification to 105% LTV for a Single Loan (Without Subsidy Payments)*

Pre-Mod LTV	CUR	D30	D60	D90	FCL
175%	-\$33,044	-\$6,667	-\$180	\$3,196	\$2,800
150%	-\$27,216	-\$2,426	\$3,938	\$6,692	\$4,992
125%	-\$17,501	-\$2,440	\$2,255	\$5,789	\$4,696

*Savings estimates assume UPB of \$241k (the average UPB of recent HAMP applicants).

As shown in Table 2, estimates using our proprietary DEFCAP costing model suggest savings of \$6,000-\$11,500 per loan relative to no modification.⁸ The DEFCAP test shows that in general that principal reduction is financially more favorable to Freddie Mac as delinquency status worsens, and risk of loss increases. For delinquent borrowers, the Treasury incentives produce substantial savings over borrowers without incentives when there is PR. DEFCAP also suggests that the Treasury incentives may compensate for economic losses from strategic defaults. As the lower table above indicates, principal reductions for current borrowers have large negative NPVs, which become positive as delinquency status worsens. This is consistent with the view that strategic defaults can result in large losses to investors. With PR incentives (upper table), however, the risk of

⁶ In the approach using DEFCAP lifetime default probabilities, it examined a prototype HAMP PRA - eligible loan with an average HAMP UPB of \$241,000, PR to 105 LTV, a 50 percent default recovery rate, and a haircut to the incentive that depends on expected default to account for 'good standing' requirement for payment of incentives.

⁷ This analysis is based on DEFCAP default rate reductions from lowering LTV only; it does not take into account the effects of reducing payment. Ignoring the effects of payment reduction imply the savings estimates here are a lower bound.

⁸ This contrasts with the HAMP NPV model, which compared HAMP PR modification to standard HAMP modifications. Adapting the DEFCAP model to reflect the HAMP waterfall was too complex to be feasible at a reasonable cost or time.

loss disappears and even for current borrowers NPV becomes mildly positive, compensating for the economic risks of strategic default.

Employing Dealer Bids

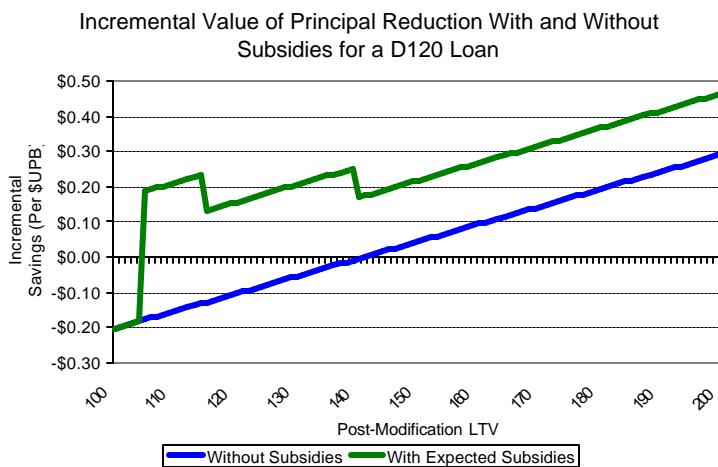
A second reasonableness test uses indicative dealer bids on whole loans delinquent for 120 days or more to estimate the effect of on loan price from reducing the LTV of an underwater loan with and without the Treasury incentive.⁹ Analysis of dealer bid data on loans delinquent by 120 days or more suggests about \$11,000 savings per loan relative to no modification. Generally, the analysis suggests that dealers would pay more for loan with principal reduction because it reduces the likelihood of default and thus improves the estimate of future cash flows.

[space intentionally left blank]

⁹ The dealer bids are collected as part of our accounting processes and are used in assessing the corporation's guarantee obligation. We use average indicative (theoretical) loan-level dealer bids on 120 days or more delinquent unmodified loans based on LTV from each of four dealers – in effect, a mark-to-market value for those loans – in connection with preparation of our financial statements.

Figure 1 below shows the change in value of a mortgage per dollar of principal reduction by LTV with and without the Treasury incentives. As long as the incremental value of principal reduction is positive, PR down to that level will increase the value of the loan. For a 200 LTV loan, the value of the cash flows increases by \$0.30 if a single dollar of principal is reduced without incentives. Without incentives, reducing principal down to 140 LTV maximizes savings.¹⁰ With incentives, Figure 1 shows, PR down to 105 LTV maximizes the value of the loan.

Figure 1



Operational Impacts

In addition to the financial impacts of the Treasury PR incentives, there would be costs associated with implementing the initiative. FHFA has requested that we provide an estimate of the level of effort (“LOE”) that it would take to put the initiative into operation. In preparing this LOE, we have drawn on our experience implementing HAMP and more recently the Freddie Mac/Fannie Mae Servicing Alignment Initiative.

Freddie Mac has identified 15 to 20 internal applications that will be affected by PR. These applications will need updates to store new data fields, run new logic, and generate

¹⁰ The impact of principal reduction on the value of a loan (without PR incentives) is evaluated using dealer bids. A linear regression model fit to the dealer bid data provides an estimate of the price per dollar UPB as function of LTV, denoted $P(LTV)$. Using this pricing function, the value of a whole loan with principal write-down, PR, can be written as:

$$V = P([UPB - PR]/H) * [UPB - PR]$$

Where P is the price as a function of LTV, H is the value of the home, and UPB is the pre-modification unpaid principal balance. The value of an incremental dollar PR is given by the derivative of loan value (V) with respect to PR:

$$dV/dPR|_{\text{modified-LTV}} = -P'([U-PR]/H) * [U - PR]/H - P([U-PR]/H)$$

new reporting. All application updates need to be thoroughly documented and tested before being implemented. Appropriate controls also need to be established and tested to ensure SOX compliance. Freddie Mac estimates this work will take about 12 months to accomplish, more than a hundred resources, and cost between \$20 and \$25 million.

Accounting Policy Impacts

We are still evaluating any accounting policy impacts. While the loan-level economic effects could be positive, there is a potential mismatch between recognition of the benefits of PR and the losses from reducing principal. Under the PR program's current design, we believe that GAAP would require us to take an immediate financial statement loss based on the principal reduction, and we could only recognize the incentives when received in later periods.

Opportunity Costs

Implementation of the Treasury PR incentives would also involve opportunity costs, as resources and management attention would be transferred to the PR program from other initiatives. On March 9, FHFA announced an ambitious strategic plan for the enterprises comprised of multiple projects to be accomplished in 2012. Although FHFA announced the strategic plan more than a month after the Administration's announcement, it did not include the increased HAMP PR incentives. If Freddie Mac is to implement the Treasury plan, FHFA will have to decide whether, and in what way, the strategic plan will have to be modified and where among the priorities already announced the PR initiative might fit.

Qualifications and limitations

These estimates are subject to serious qualifications and limitations:

- The analysis is model-based, and – given that there is limited data on PR on which to estimate models that predict actual borrower behavior – is subject to considerable model risk. The models have a variety of simplifying assumptions and data limitations. The results are thus dependent on numerous assumptions that we consider reasonable but which may not bear out in practice. Actual results may be worse (or better) than predicted results
- The analysis considers only the economic effect on Freddie Mac. It does not attempt to assess the program's broader financial or social impact on the overall market, its merits as social policy, or positive (*e.g.*, house price stabilization) or negative (*e.g.*, increased strategic defaults) externalities
- Although NPV analysis is positive for Freddie Mac overall, some segments of the eligible population could generate negative values
- Implementing HAMP PR would involve time and expense. For example, it would require modifications to technology, reporting and accounting systems, and training

for both Freddie Mac staff and servicers. These steps could take 12 months to accomplish and cost Freddie Mac an estimated \$20 to \$25 million. The project duration and cost may vary from these estimates as detailed requirements are documented

- The analysis does not consider PR implementation costs and timelines for servicers and other industry participants. The capacity of the industry to implement new programs is limited
- The analysis does not take into effect opportunity costs. Implementation could require FHFA to make trade-offs with other priorities, including those described on its Conservatorship Scorecard announced March 9.

###