Comparing the Performance of Home Affordable Modification Program (HAMP) Modifications and Non-HAMP Modifications: Early Results [1]

EXECUTIVE SUMMARY

I. INTRODUCTION

Since the inception of the Making Home Affordable Program (MHA), more than 1.3 million borrowers have had their mortgages permanently modified through MHA's Home Affordable Modification Program (HAMP). This paper analyzes the performance of HAMP modifications to better understand the key factors affecting their performance.

In the first part of this paper, single-variable analysis and program-to-date data for all HAMP modifications are used to identify correlations between various HAMP modification characteristics and modification performance.

The most significant factors driving HAMP modification performance are the amount of monthly payment reduction relative to the borrower's pre-modification payment, the length of the borrower's delinquency at time of modification, and, to a slightly lesser extent, credit score at time of modification. Post-modification mark-to-market loan-to-value (MTMLTV) ratio appears to have some influence on HAMP modification performance for certain segments of the HAMP population. Other criteria, such as the borrower's "back-end" debt-to-income (DTI) ratio[2] and geography have less influence on HAMP modification performance.

In the second part, econometric analysis (regression testing) is used to isolate the key factors affecting HAMP modification performance and to compare the performance of loans modified through HAMP with other similarly delinquent loans. The innovation in this study comes from the merging of HAMP program data with a commercial loan performance database provided by CoreLogic,[3] which allows HAMP-modified loans to be compared directly with two alternate control groups consisting of loans that were modified outside of HAMP and loans that were similarly delinquent but never received a modification. The HAMP loans and the two control groups were restricted to loans that are part of private label mortgage-backed securities (PLS). The regression analysis generated the following results:

- Modified PLS loans – both HAMP and non-HAMP – perform significantly better than PLS loans receiving no modification.

[1] This analysis described in this paper was performed by Walter Scott, a Fannie Mae economic researcher working for Fannie Mae in its role as program administrator for Making Home Affordable (MHA), a program of the United States Department of the Treasury and the Department of Housing and Urban Development. Unless otherwise noted, the data points, figures, and tables reflected herein were sourced from Treasury's MHA system of record.

[2] "Back-end" DTI refers to the borrower's DTI taking into account all of the borrower's monthly debt obligations, not just the obligations under the mortgage loan.

[3] CoreLogic's Loan Performance subprime database provides origination and performance history for approximately 90 percent of all subprime and Alt-A residential mortgages that were bundled into private label mortgage-backed securities and active in the 2010-2011 timeframe.

- Payment reduction and delinquency at the start of the modification are initially the two most significant factors driving the performance of both HAMP and non-HAMP modifications. However, the significance is found to be time sensitive: the importance of delinquency at time of modification decreases as the modification ages, while the importance of payment reduction increases. Other factors contributing to performance include post-modification MTMLTV, credit score at the time of loan origination, and geography.

- HAMP modifications of PLS loans perform better than non-HAMP modifications of PLS loans. This is true even when controlling for modification terms, including payment reduction. For example, a HAMP modification of a PLS loan with a 10 to 20 percent payment reduction performs better than a non-HAMP modification of a similar PLS loan also with a 10 to 20 percent payment reduction.

- The act of resetting a borrower's delinquency level was proven to have a major initial impact on the borrower's post-modification performance. This "delinquency reset effect" is also time sensitive and diminishes significantly as the modification ages.

While confined to a subset of loans (i.e., PLS loans), these conclusions suggest that borrowers in HAMP modifications may be significantly less likely to experience redefault than borrowers receiving no modification at all or a modification outside of HAMP. The importance of this issue to struggling borrowers, oversight bodies, lawmakers, and other housing policymakers underscores the importance of further research on this topic and replication of this analysis on a broader set of loan data.

II. SINGLE-VARIABLE ANALYSIS OF FACTORS DRIVING PERFORMANCE USING DATA FOR ALL HAMP MODIFICATIONS

As of March 2014, over 945,000 permanent HAMP modifications were performing and in good standing within the MHA program. More than 380,000 or 28 percent had been disqualified from the program because the borrower missed three consecutive monthly payments on the modified loan. Through February 2014, HAMP modifications were experiencing overall redefault rates[4] of 5.2 percent, 13.4 percent, 20.3 percent, and 26.1 percent by months 6, 12, 18, and 24, respectively.

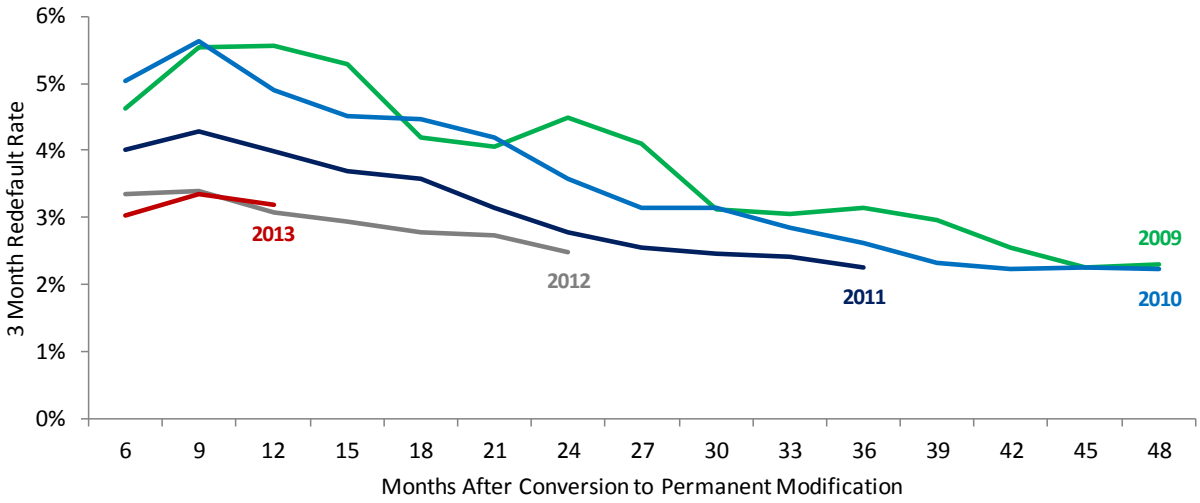
The data also indicate that the performance of HAMP modifications has gradually improved over time, with more recent vintages of modifications generally performing better than older vintages at any given seasoning point. For example, for modifications in effect for one year, 20.5 percent of modifications started in the third quarter of 2009 have disqualified, compared to 9.5 percent of modifications started in the first quarter of 2013.

In addition, as seen in Figure 1, the data show that the growth rate of redefaults on HAMP modifications is declining. Thus, while the cumulative redefault rate for each annual vintage of

[4] Unless otherwise noted, this paper defines a redefault as a modification that becomes 90 or more days delinquent following modification.

modifications grows over time, the redefault rate for each successive three-month period generally declines.

Figure 1: HAMP Three-Month Conditional Redefault Rates by Modification Year[5]



Single-variable analysis of Treasury data collected as part of the HAMP modification process helps to shed light on the characteristics that most influence modification performance. The results of this analysis are limited by both the inherent limitations of single-variable analysis and potential unobserved factors not found in the Treasury data. For example, while income level is collected as part of the modification process, post-modification fluctuations in levels of income are unknown and may have a significant impact on performance.

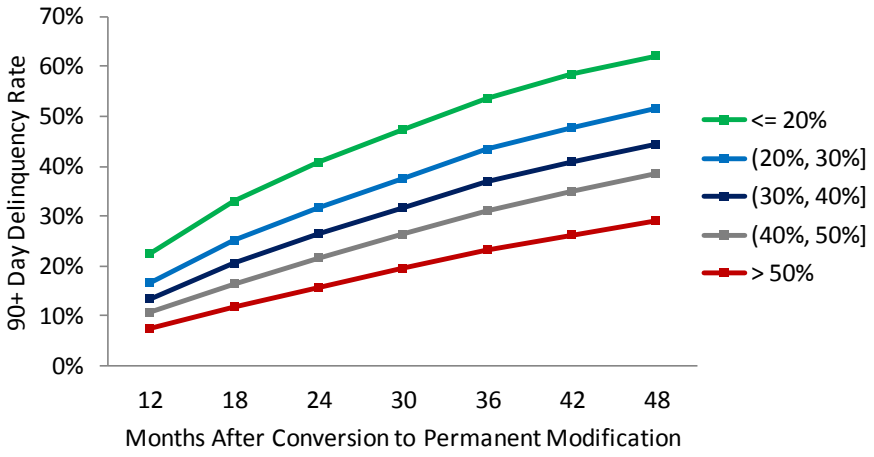
Payment Reduction: Most HAMP modifications result in significant mortgage payment reductions, with half of the population receiving a monthly payment reduction of approximately $500, or over a third of the median monthly payment before modification.[6]

As seen in Figure 2, single-variable analysis shows that the amount of payment reduction has a significant impact on performance. Modifications with larger payment reductions consistently outperform those modifications with smaller reductions. This is true across all vintages and seasoning points. Over time, the gap in performance among payment reduction cohorts increases significantly. For example, 41 percent of HAMP borrowers with modifications that reduce the monthly payment by 20 percent or less became 90 or more days delinquent within 24 months of modification, compared to only 16 percent of borrowers with a monthly payment reduction of greater than 50 percent.

[5] The three-month redefault rate was calculated as the number of permanent modifications disqualified within the three-month period divided by the number of permanent modifications remaining active at *month(T – 3)* and if still active at *month T*. Permanent modifications remaining active at *month(T—3)* excludes those permanent modifications that have paid off or disqualified by *month(T – 3)*.

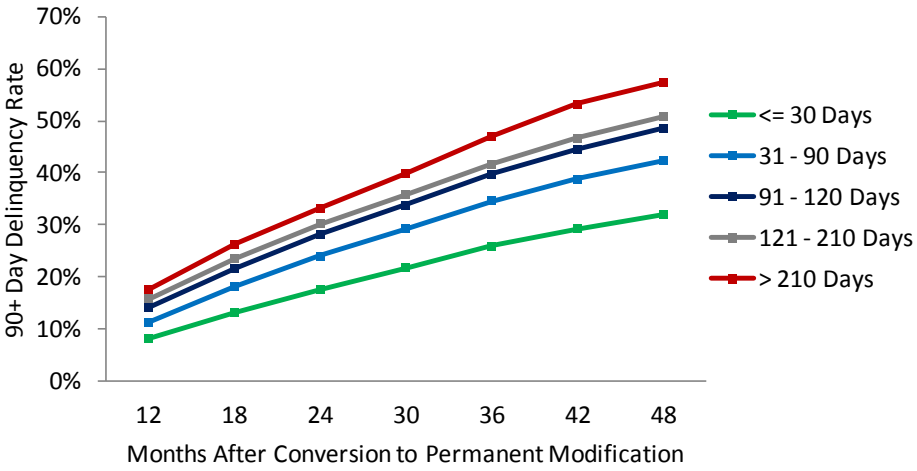
[6] March 2014 Making Home Affordable Program Performance Report.

Figure 2: Performance by Percent Reduction in Monthly Mortgage Payment



Delinquency at Time of Modification: The single-variable analysis also indicates that performance of the modification is influenced by the length of delinquency of the loan at the start of the modification. Borrowers who were 31 to 90 days delinquent at the start of the HAMP modification experienced a 24 percent redefault rate in the subsequent 24 months, compared to a rate of 30 percent for borrowers whose delinquency was between 121 and 210 days at trial start.

Figure 3: Performance by Delinquency at Time of Modification

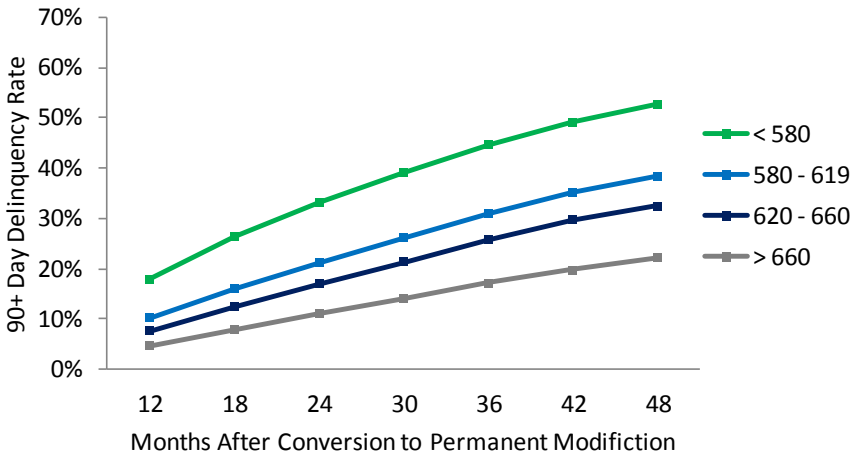


Credit Score: The single-variable analysis also indicates that credit score at the time of modification also has a significant impact on performance.[7] For example, borrowers with credit

[7] Treasury's program data contain information on the borrower's credit score at the time of ***modification***. The data show a correlation between degree of delinquency at the time of modification and credit score at the time of modification. Borrowers who were more delinquent at the time of modification tended to have lower credit scores,

scores below 580 at the time of modification experienced a 33 percent redefault rate in the subsequent 24 months, compared to a rate of 11 percent for borrowers whose credit scores were above 660.

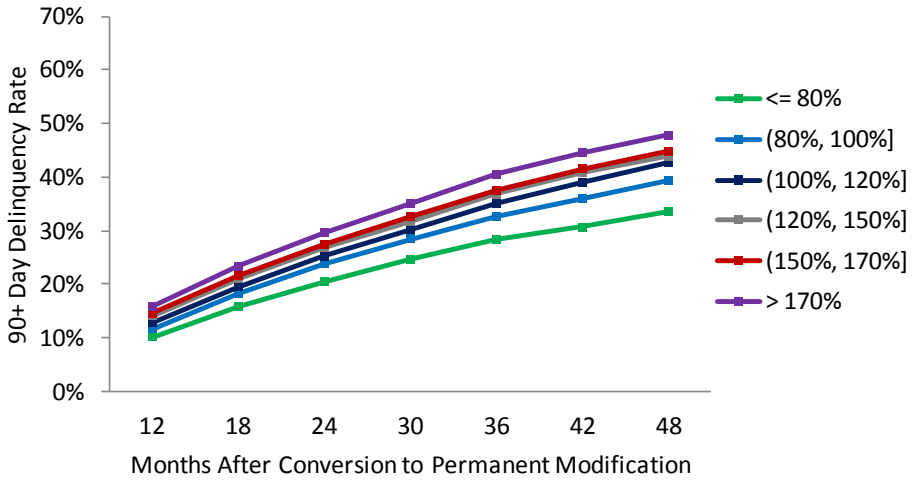
Figure 4: Cumulative Redefault Rate by Credit Score at Time of Modification



Post-Modification MTMLTV: Single-variable analysis of HAMP data indicates that post-modification MTMLTV has an impact on redefault rates but to a lesser degree than the factors discussed above. For example, as seen in Figure 5, the difference in 24-month redefault rates between borrowers with an MTMLTV of 80 percent or less and those with an MTMLTV of greater than 170 percent is about 9 percentage points. In contrast, borrower outcomes do not vary greatly for MTMLTV between 80 and 170 percent.

which is logical since delinquency on the mortgage has a significant impact on credit score. Note that Treasury's program data do not include the borrower's credit score at the time of *loan origination*, making it impossible to analyze the potential impact of this factor on modification performance in the single-variable analysis.

Figure 5: Cumulative Redefault Rate by Post-Modification MTMLTV



III. REGRESSION ANALYSIS OF THE EFFECTIVENESS OF HAMP AND NON-HAMP MODIFICATIONS FOR PLS LOANS

To gain greater insight into the factors driving modification performance and the effectiveness of both HAMP and non-HAMP modifications, this study uses regression analysis to look at three populations of similarly delinquent PLS loans:

- Loans modified under HAMP;
- Loans modified outside of HAMP (proprietary modifications); and,
- Loans that were not modified.

The study population of HAMP loans was derived by matching data from the CoreLogic commercial loan performance database for PLS loans against the subset of HAMP modifications of PLS. In addition, the loans from this commercial database were restricted to loans that became at least 30 days delinquent during the timeframe of the HAMP program.

The performance of modified loans was measured in terms of the loan's status after a fixed time interval (ranging from six to 36 months) from the date the modification became permanent. The loan was considered to have an adverse outcome (redefault) if by the end of a time interval it had: a) become 90 or more days delinquent; b) been liquidated at a loss; or c) required an additional modification. Loans that became delinquent but were not modified were examined over the same time interval. In this control group a loan was considered to have an adverse outcome if by the end of the time interval it had: a) become 90 or more days delinquent; b) been liquidated; or c) been subsequently modified.

This regression analysis allows for the separation of the true treatment effects of a modification from possible selection effects. Modification effectiveness is measured as the selection-bias-adjusted average treatment effect on the modified loan (also known as the average treatment

effect on the treated or ATET). This is estimated from an econometric model that simulates random assignment of loans to the modification program. The ATET is the average difference between a loan's expected probability of an adverse outcome (defined as becoming 90 or more days delinquent) over a fixed period of time depending on whether the loan was modified under HAMP, modified outside of HAMP, or not modified at all. For example, if the average loan has a 60 percent chance of an adverse outcome without modification but a 40 percent chance when modified, then the ATET is 20 percentage points.[8]

The analysis examined a series of hypotheses about modification effectiveness and the factors driving modification performance.

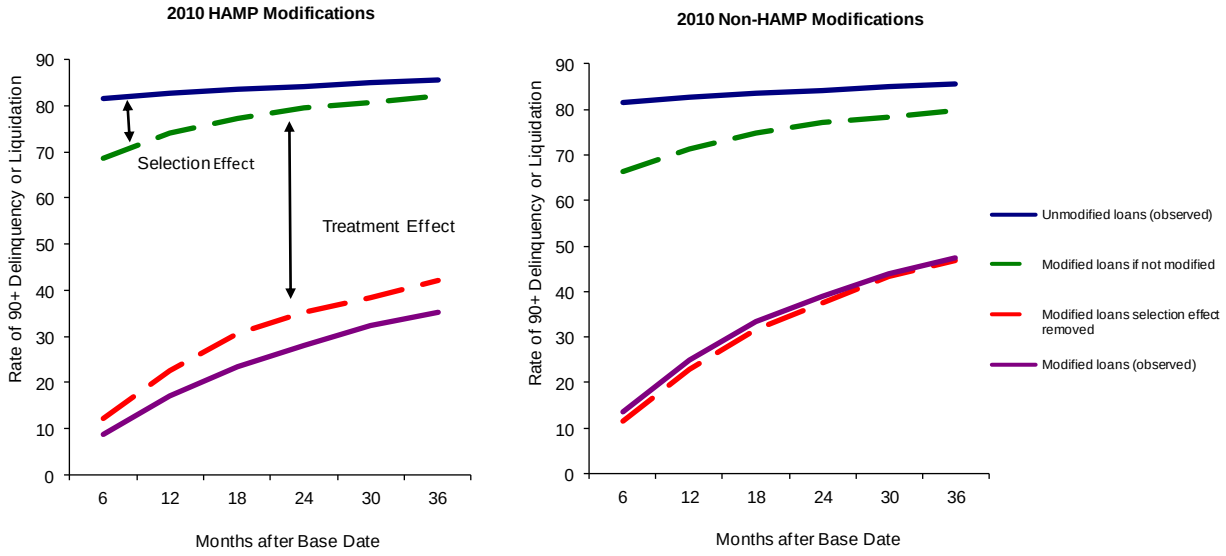
Hypothesis 1: Modifying a loan has a significant effect on borrower performance outcomes, even when controlling for borrower and loan characteristics.

This was strongly confirmed. While selection bias is a significant factor, typically accounting for 13 to 33 percent of the observed modification effects, there is a substantial modification treatment effect. A typical PLS loan receiving a HAMP modification in 2010, for example, had its likelihood of redefault reduced by about 40 percentage points, even 36 months after the date of modification.

A breakdown of HAMP and non-HAMP observed effects, selection effects, and treatment effects is shown in Figure 6. Note that the selection effects depicted in Figure 6 act in opposite directions on the HAMP and non-HAMP populations. The regression analysis predicts that if loans had been randomly assigned to modification programs, expected overall HAMP performance would be worse, but expected non-HAMP performance would be better. This implies that a number of the loans that fell out of the HAMP pipeline but then received proprietary modifications during this time period had higher-than-average risk characteristics.

[8] As with the single-variable analysis, the results may be influenced by variables that are unobservable due to limitations in the data set. For example, the commercial database employed by the study does not clearly indicate which modifications received principal forgiveness or forbearance, making it difficult to isolate their potential effects on modification performance. Similarly, data limitations made it impossible to test the effects of the back-end DTI or the borrower's credit score at the time of modification. Note that unlike the Treasury data used for the single-variable analysis, the data used for the regression analysis do include the borrower's credit score at the time of loan origination.

Figure 6: Breakdown of Estimated Selection and Treatment Effects of 2010 HAMP and Non-HAMP Loans



Hypothesis 2: HAMP modifications perform better than non-HAMP modifications, even when controlling for borrower and loan characteristics.

This was also confirmed but more strongly for loans receiving a HAMP modification in 2011 than in 2010. Even when looking only at modifications that reduced borrowers' payments, borrowers receiving a HAMP modification in 2011 have on average a 18 percentage point lower redefault rate after 24 months than those receiving non-HAMP modifications. Borrowers receiving a HAMP modification in 2010 perform better (7 percentage points lower redefault rate) than those receiving non-HAMP modifications through month 36. These differences in performance are likely the result of the more generous payment reductions typically offered by HAMP modifications versus non-HAMP modifications. Table 1 below compares treatment effects of HAMP and non-HAMP modifications across both modification vintages at various points in time since modification.

Table 1: Average Treatment Effect on the Treated (Modified) Population, with Sample Selection Effects Removed (Numbers Show Percentage Point Decrease in Likelihood of Redefault)

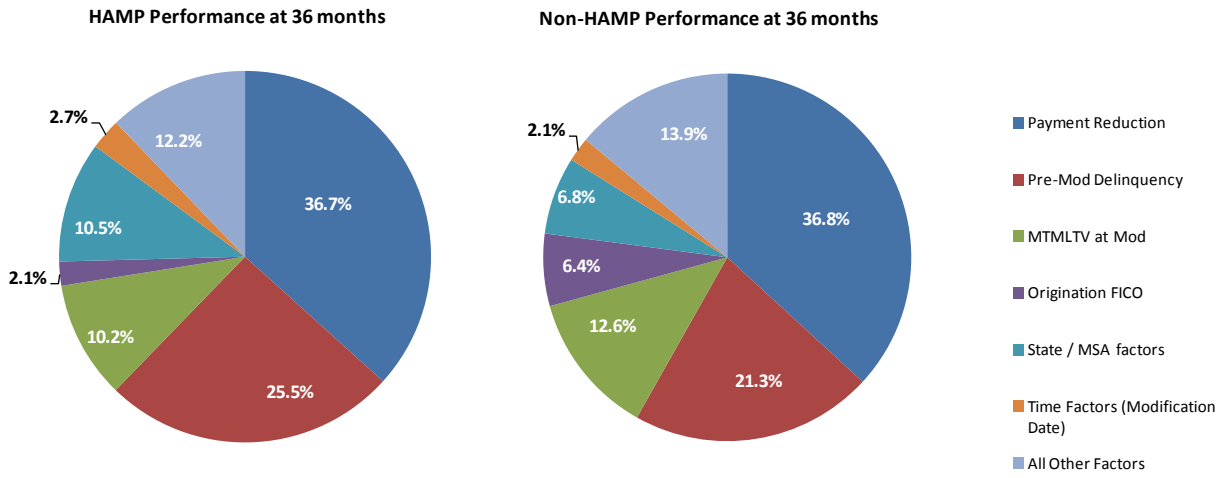
Modification Vintage	Months Post Modification					
	6	12	18	24	30	36
2010 HAMP	56	51	47	44	42	40
2010 Non-HAMP	55	48	43	40	35	33
2011 HAMP	64	60	55	51		
2011 Non-HAMP	54	43	37	33		

Hypothesis 3: Controlling for borrower and loan characteristics, payment reduction is the most significant factor driving modification performance.

The results from testing this hypothesis are time-dependent. Initially, the borrower's level of delinquency at the time of modification is the most important factor determining performance, with level of payment reduction slightly less important. As time passes, however, payment reduction becomes relatively more significant, and by two-or-more years post-modification it becomes the most important performance driver.

Figure 7 shows that by 36 months after modification payment reduction is the most important factor driving modification performance.

Figure 7: Relative Impact of Factors on Modification Performance at 36 Months, 2010 HAMP and Non-HAMP Modifications

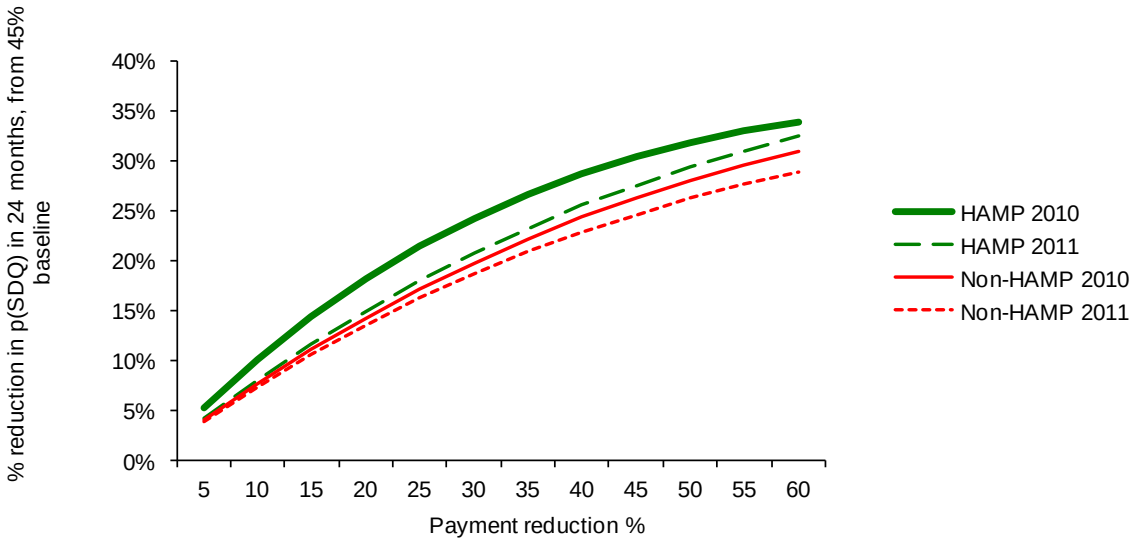


Hypothesis 4: HAMP modifications perform better than non-HAMP modifications, even when controlling for borrower and loan characteristics *and* the changes in loan terms.

This hypothesis was confirmed with qualifications. To assess this hypothesis, the performance of a modification with *no payment reduction* was used as a baseline,[9] from which the performance of a HAMP and non-HAMP modification across different levels of payment reduction could be compared. As shown in Figure 8, there appears to be a persistent performance advantage for HAMP modifications, independent of the changes in loan terms. At the same time, loans with HAMP modifications have shown a stronger response to payment reductions, while non-HAMP modifications have had a relatively larger effect for borrowers who were extremely delinquent (12 months or more) prior to the modification.

[9] For comparison purposes, the analysis assumed a redefault rate of 45 percent at 18 months post-modification.

Figure 8: Reduction in Redefault Probability 24 Months Post-Modification by Payment Reduction Percentage



Hypothesis 5: Modifying a loan has a positive impact on loan performance, even when controlling for borrower and loan characteristics *and* the changes in loan terms.

Finally, the analysis also sought to test whether a modification has a positive impact even in cases where it did not reduce the borrower's payments or principal balance but simply reset the borrower's delinquency status to "current." In other words, does the process of bringing a delinquent borrower current, by itself, change the borrower's payment behavior?

This appears to be true primarily in the short term. The act of resetting a delinquent borrower to current status has a significant effect on loan performance, but this effect diminishes significantly over time and is mostly absent by 36 months after the modification for borrowers that were less than or equal to six months delinquent at the time of modification. While still trending downward, a residual effect remains 36 months after modification, specifically for the non-HAMP population more than six months delinquent. This is shown graphically in Figures 9 and 10.

Note that in both Figures 9 and 10 the effect of delinquency at time of modification is initially strong but decreases significantly over time. This is shown by the convergence of reduction of redefault probability across delinquency buckets over time. This further confirms the results from testing Hypothesis 3 (that payment reduction is the most significant factor driving modification performance).

Figure 9: Treatment Effect for 2010 HAMP Modifications by Delinquency at Time of Modification

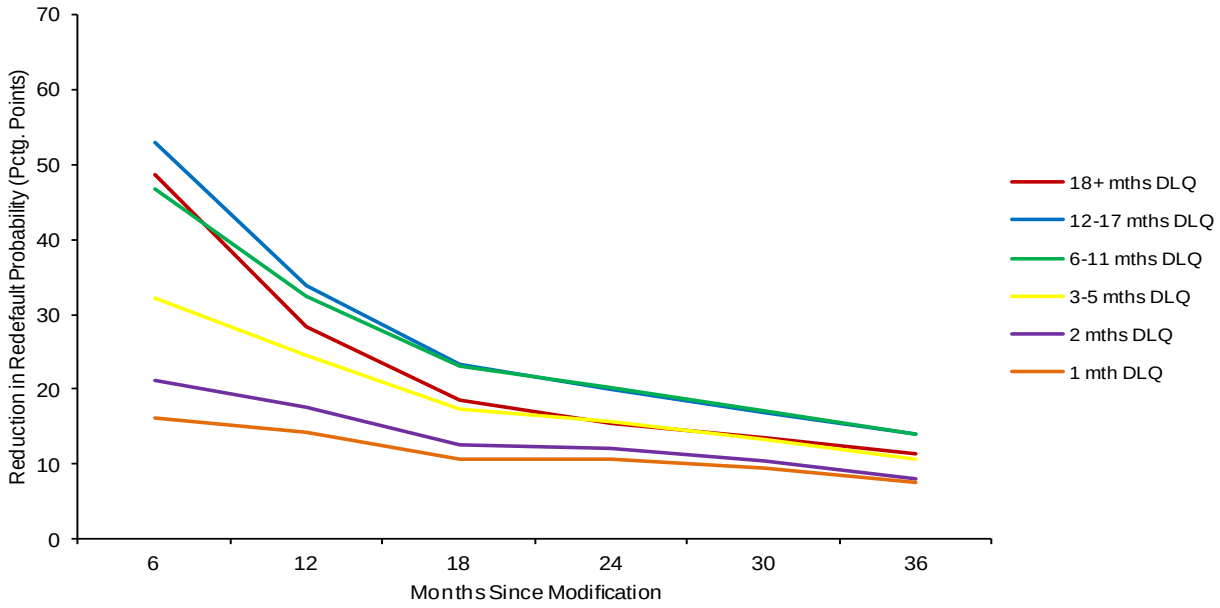
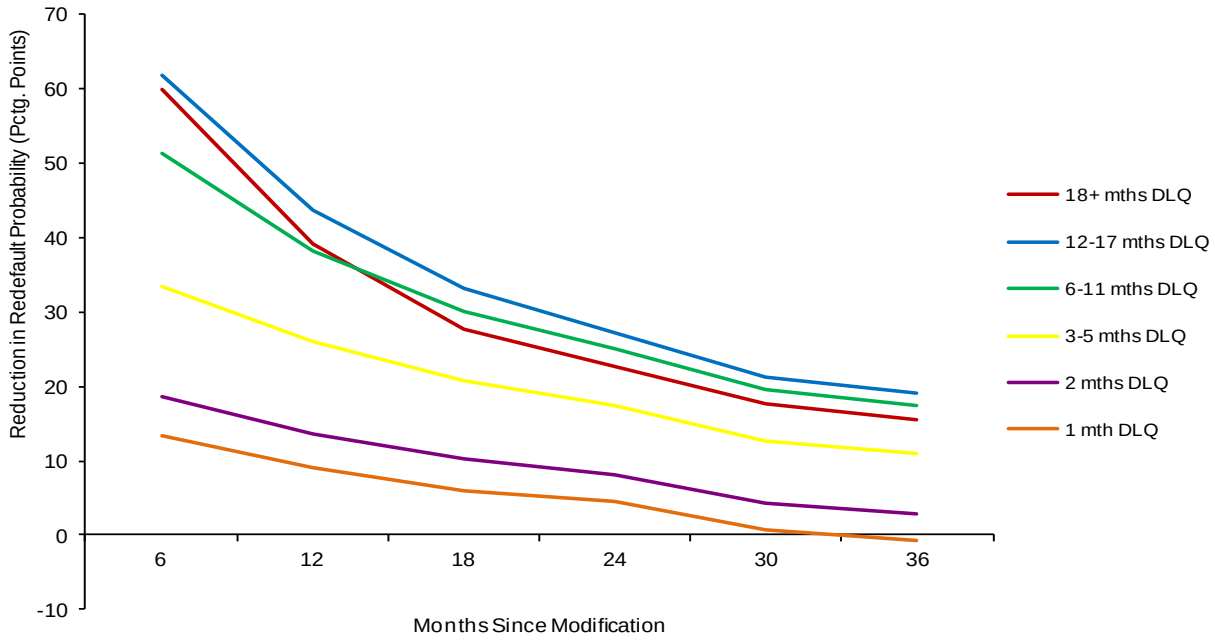


Figure 10: Treatment Effect for 2010 Non-HAMP Modifications by Delinquency at Time of Modification



IV. CONCLUSION

While based on only a few years of performance data, both the single-variable analysis of all HAMP program data and the regression analysis on modifications to PLS loans support the intuitive proposition that payment reduction and length of delinquency at the time of modification are the most critical drivers of modification performance. Other factors, including post-modification MTMLTV, the borrower's credit score at origination, and geography, appear to be significant under the regression analysis but less important than payment reduction and delinquency status.

The regression analysis – while confined to the PLS population – also supports the proposition that HAMP modifications have a better probability of success than similar loans that are either not modified or modified outside of HAMP. While the higher success rate of HAMP modifications is partly attributable to their greater amount of payment reduction, the analysis found that HAMP modifications still perform better even after controlling for modification terms, including payment reduction. Additionally, the analysis found that even modifications that simply bring a delinquent borrower current may have a positive impact on payment behavior.

This analysis is based on early results, and it will be important to update this research as HAMP and non-HAMP modifications build longer performance records. It is also Treasury's hope that this study spurs further research that will seek to apply the regression technique used here on a broader population of loans.