

National Foreclosure Mitigation Counseling Program Evaluation

Preliminary Analysis of Program Effects

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EXECUTIVE SUMMARY

The National Foreclosure Mitigation Counseling (NFMC) program is a special federal appropriation, administered by NeighborWorks® (NW) America, that is designed to support a rapid expansion of foreclosure intervention counseling in response to the nationwide foreclosure crisis. As this is a federal appropriation, NW America must inform Congress and other entities of the NFMC program's progress. The Urban Institute (UI) was selected by NW America to undertake a two-year evaluation of the NFMC program.

This report presents the results of preliminary analyses that attempt to measure the effects of the NFMC program on counseled homeowners. We conducted a multivariate statistical analysis on a sample of close to 61,000 loans to answer the following questions about the NFMC program's performance through December 2008.

- Did the NFMC program help homeowners avoid foreclosure?
- Did the NFMC program help homeowners cure an existing foreclosure?
- Did the NFMC program help homeowners receive loan modifications that resulted in lower monthly payments than they would have otherwise received without counseling?

This preliminary evaluation of program effects indicates that the initial answer to these three questions is "Yes," although the magnitude of the effects varies depending on the particular outcome. As detailed further in this report:

- The NFMC program somewhat reduced the likelihood that counseled homeowners would end up in foreclosure. We estimated that the NFMC program helped approximately 880 clients avoid going into foreclosure through December 2008. That is, the number of homeowners who were moderately delinquent (2 or 3 months) and experienced a foreclosure would have been 4,975 compared to the 4,095 actual foreclosures estimated. By helping to avoid these foreclosures, the NFMC program created potential cost-savings of \$33 million between January and December 2008.
- The NFMC program was even more effective at helping homeowners cure an existing foreclosure. Many NFMC clients entered counseling already in foreclosure (22 percent), or entered foreclosure after starting counseling (11 percent). During the first year of the program, counseled homeowners were about 1.6 times as likely to



get out of foreclosure, and avoid a foreclosure completion, than they would have been had they not received NFMC counseling.

- Loan modifications received by NFMC clients resulted in significantly lower mortgage payments than would have been received without the help of the program. Lower monthly payments may help reduce the likelihood of a subsequent recurrence of borrower mortgage problems. On average, we estimated that NFMC clients who received loan modifications reduced their monthly payments by \$454 more than they would have without NFMC counseling.

Overall, our analysis of the NFMC program suggests that the program is having its intended effect of helping homeowners facing loss of their homes through foreclosure. In subsequent analyses, to be presented in the evaluation final report, we will estimate the program's impact on clients who received counseling services in 2009 and also observe loan performance over a longer period of time, which will allow for a better measurement of the overall impact of the NFMC program.



INTRODUCTION

The National Foreclosure Mitigation Counseling (NFMC) program is a special federal appropriation, administered by NeighborWorks® (NW) America, that is designed to support a rapid expansion of foreclosure intervention counseling in response to the nationwide foreclosure crisis. The NFMC program seeks to help homeowners facing foreclosure by providing them with much needed foreclosure prevention and loss mitigation counseling. NW America distributes funds to competitively selected Grantee organizations, who in turn provide the counseling services, either directly or through Subgrantee organizations.

As this is a federal appropriation, NW America must inform Congress and other entities of the NFMC program's progress. The Urban Institute (UI) was selected by NW America to undertake a two-year evaluation of Round 1 of the NFMC program.

This report presents the results of preliminary analyses that attempt to measure the effects of the NFMC program on counseled homeowners. In previous analyses undertaken as part of this evaluation, we reported, along with descriptive information on the characteristics of homeowners and their mortgages, data on particular loan outcomes for persons served by the NFMC program. These previously reported outcomes included (1) the share of NFMC clients who received a loan modification and, for clients who received a loan modification, the type of modification and (2) the last observed status for clients' loans. These data indicated that about 11 percent of NFMC clients served through May 2009 received a loan modification, and that 27 percent of all NFMC clients had, as their loan status of May 2009, either entered or completed the foreclosure process.

While these descriptive statistics provide useful information about what happens to counseled homeowners, they do not answer the question that is of real interest from an evaluation perspective: What would have happened to NFMC clients had they not used the services offered by the program's Grantees? If the NFMC program did not exist, presumably some NFMC clients would have not taken any action to avoid foreclosure. Others might have (1) attempted to self-cure their delinquency, (2) contacted their mortgage servicer to negotiate a loan modification on their own, or (3) used the services of other counseling agencies not funded by the NFMC program. Some persons would have been successful in avoiding foreclosure, while others would not.

Furthermore, even with NFMC-provided counseling, it is not reasonable to expect that all foreclosures could be avoided. For instance, some homeowners are in homes that they simply



cannot afford. While counselors may be able to help some of these clients negotiate better outcomes than foreclosure, some foreclosures are likely inevitable in such cases.

Therefore, the supposition of this evaluation is that *the NFMC program has a positive effect if it results in better outcomes for clients than would have been achieved without the availability of services provided by NFMC Grantees*. The NFMC program's major objective is to help homeowners avoid foreclosure. To evaluate the effectiveness of the program, we conducted analyses to determine the following:

- Did the NFMC program help homeowners avoid foreclosure?
- Did the NFMC program help homeowners cure an existing foreclosure?
- Did the NFMC program help homeowners receive loan modifications that resulted in lower monthly payments than they would have otherwise received without counseling?

To answer these questions, we used a series of multivariate models to determine the impact of counseling in each of the cases listed above. The models were estimated on a representative sample of the approximately 300,000 homeowners who received NFMC counseling during the first twelve months of the program (January through December 2008) and a comparison sample of non-NFMC counseled homeowners. Our data included detailed characteristics of the mortgage loans and borrowers, which were used to control for differences between the two samples, as well as information on the performance of mortgage loans (foreclosure and delinquency status) through December 2008. The size of the NFMC analysis sample is approximately 61,000 loans.

This preliminary evaluation of program effects indicates that the initial answer to each of these questions is "Yes," although the magnitude of the effects varies depending on the particular outcome. As detailed further in this report:

- The NFMC program somewhat reduced the likelihood that counseled homeowners would end up in foreclosure. We estimated that the NFMC program helped 880 clients avoid going into foreclosure through December 2008. That is, the number of homeowners who were moderately delinquent (2 or 3 months) and experienced a foreclosure would have been 4,975 compared to the 4,095 actual foreclosures estimated. By helping to prevent these foreclosures, the program created potential cost-savings of \$33 million in foreclosure avoidance between January and December 2008.
- The NFMC program was much more effective at helping homeowners cure an existing foreclosure. Many NFMC clients entered counseling already in foreclosure (22 percent), or entered foreclosure after starting counseling (11 percent). During the first year of the program, counseled homeowners were about 1.6 times as likely to



get out of foreclosure, and avoid a foreclosure completion, than they would have been had they not received NFMC counseling.

- Loan modifications received by NFMC Grantee clients resulted in significantly lower mortgage payments than would have been received without the help of the program. Lower monthly payments may help reduce the likelihood of a subsequent recurrence of borrower mortgage problems. On average, we estimated that NFMC clients who received loan modifications reduced their monthly payments by \$454 more than they would have without NFMC counseling.

In the following sections of this report we discuss the results from models that estimate the NFMC program's effects on the three program objectives listed above: preventing foreclosures, curing foreclosures, and payment reductions from loan modifications. This is followed by an explanation of the methodology used, including the data and how the control group was created; a discussion of the methodological challenges inherent in a statistical study of this nature, how we compensated for these challenges and the possible implications for our results. The report concludes with a brief overview of the preliminary policy conclusions that might be drawn from our findings.

We emphasize again that these results are preliminary, based on an initial analysis of data for only the first program year. The final analysis, to be presented in June 2010, will include estimates of program effects for all homeowners counseled in Round 1 of the NFMC program and will track outcomes over a longer period of time.





DATA USED IN THE ANALYSIS

Three main data sources were used in the outcomes modeling analysis that is described in this report. These sources include administrative data collected by NW America from NFMC program Grantees on counseled homeowners, as well as two national data sources on mortgage loans and borrowers in the U.S. In this section, we describe these three data sources and explain how they were used to create a sample of NFMC counseled homeowners and a comparison sample of non-counseled homeowners for our multivariate analysis. We also describe the three outcome variables (time to foreclosure, foreclosure cure, and monthly payment reduction from loan modification) and the other control variables used in our models, including an explanation of how they were constructed using the available data.

NFMC Program Production Data

NFMC program Grantees are required to provide client-level data (referred to as *production data*), along with quarterly reports on aggregate activity toward overall goals established under the grant award. The production data are submitted by Grantees on an ongoing basis through an electronic submission system. Production data consist of a record for each “counseling unit” provided by the Grantee or Subgrantee to an individual homeowner. Since an individual homeowner may receive both Level 1 and Level 2 counseling, these sessions are counted and referred to as “units” of produced counseling.¹

The production data provide the list of homeowners who have received NFMC program counseling in some form and, therefore, constitute the *treatment group* for our analysis of program impacts. The data consist of information on the counseled homeowner, including identifying data (name, address), demographic characteristics, and household income; information on the client’s mortgage loan, including the current servicer, loan terms, and current default status; and information on the type and amount of foreclosure mitigation counseling received.

¹ The NFMC program recognizes three distinct levels of counseling services. In Level 1 counseling, the NFMC Grantee or Subgrantee conducts a client intake process and develops a budget and a written action plan for the client. After Level 1 counseling is completed, it is up to the client to follow through with any activities on the action plan. In Level 2 counseling, the Grantee or Subgrantee verifies the client's budget and takes additional steps to obtain solutions outlined by the action plan. Level 3 counseling is when Level 1 and Level 2 counseling are completed in succession by the same Grantee or Subgrantee.



Grantees also can report outcomes for each counseling unit, although outcome reporting is not required for all counseling units in the production data. As discussed in a previous report on the NFMC program, 28 percent of Level 1 counseling units in the first three months of the program did not have a further reported outcome (Mayer et al. 2008: 46). Even for Level 2 and 3 counseling units, the Grantee-reported outcome might be “initiated forbearance agreement” (12 percent of first quarter counseling units) or “counseled and referred to another agency” (11 percent), which still leaves open the question as to whether the forbearance agreement was sufficient to avoid foreclosure.

Given these limitations on Grantee-reported outcomes, to model the impacts of the NFMC program on key outcomes of interest we needed to match the homeowners from the production data with external data on mortgage performance. In addition, to model the “what if” case of households who did not receive counseling, we needed an additional sample of loans for non-NFMC program participants, including their outcomes regarding foreclosure. We used data from LPS Applied Analytics, Inc. and from the Home Mortgage Disclosure Act, therefore, to supplement the production data.

LPS Applied Analytics Loan Performance Data

LPS Applied Analytics, Inc., (LPS) is a commercial company that compiles home mortgage performance data from large loan-servicing organizations. These data were originally compiled by McDash Analytics, Inc., but that company was acquired by LPS in 2008. As of December 2008, the LPS database covered nearly 60 percent of the active residential mortgages in the United States. LPS compiles loan-level data from mortgage servicers, including nine of the ten largest servicers in the U.S., and tracks several aspects of loan performance for active mortgage loans. NW America has negotiated an agreement to purchase LPS’s loan level database, which has approximately 30 million mortgage loan records, for use in this study.

The LPS data include numerous characteristics of each mortgage loan, including the borrower’s FICO score at loan origination, the original loan amount, the current interest rate of the loan, the loan type (fixed rate, adjustable rate, option ARM), and the ZIP code of the mortgaged property. The data also track various loan performance indicators, including when a borrower defaulted on a loan and whether the loan has gone into foreclosure. The LPS loan performance data are updated monthly, which permits tracking of delinquency and foreclosure status on a month-to-month basis.

Home Mortgage Disclosure Act Data

The Home Mortgage Disclosure Act (HMDA), enacted in 1975, requires most lending institutions to report detailed data on mortgage application outcomes and approved loans to the Federal Financial Institutions Examination Council. HMDA data are routinely used to determine



if housing credit needs are being met in particular neighborhoods and to identify discriminatory lending patterns. HMDA data are released publicly on an annual basis and the public data include the fields such as the race, sex, and income of the borrower; the loan amount and type; and the census tract of the mortgaged property. For this analysis, we had access to national loan-level HMDA data from 2002 through 2007.

We used the HMDA data to link additional borrower characteristics with the LPS data. Furthermore, since census tract is reported on the HMDA data, by combining LPS and HMDA records we were able to link additional census tract information for both counseled and non-counseled loans. These census tract characteristics allowed us to control for neighborhood effects in our models.

NFMC Analysis Sample

Data for this analysis was drawn from 300,685 NFMC “counseling unit” records reported to NW America, as of February 9, 2009, for clients who received counseling services between January and December 2008. A counseling unit refers to a client who received one or more counseling sessions at a given level of service from the same Grantee. It is possible, however, for a person to receive counseling at different levels from the same Grantee or to receive counseling from different Grantees. These would be reported in the NFMC program production data as separate counseling units. We were able to filter out multiple instances of counseling provided to the same homeowner, however, through our match with the LPS database.²

The NFMC counseling unit records were matched to the LPS database by the loan servicer name and the servicer’s loan identification number. While these two pieces of information are included in the data reported by NFMC Grantees, they are not included in the data provided by LPS for the NFMC evaluation. LPS does, however, maintain this information in its internal database. Therefore, LPS was able to match the loan servicer and loan identification number reported by the NFMC Grantees to the corresponding fields in their database and provide the internal loan identification number for those loans. This information was used to append the LPS loan information to the NFMC counseling records.

The match between the NFMC and LPS databases was not 100 percent successful. First, the LPS database covers about 60 percent of U.S. mortgages, so some NFMC-counseled loans may simply not be in the database. In addition, some loans in the LPS database do not contain real servicer loan identification numbers, but rather an internal number generated by the servicer solely for LPS reporting purposes. These loans could not, therefore, be matched.³ In

² About 10 percent of the matched LPS loans corresponded to two different NFMC-reported counseling units; less than 0.3 percent to three or four counseling units.

³ The lack of real loan identification numbers for particular servicers is a possible source of selection bias in our sampling methods. This is discussed further in the Potential Modeling Issues section (p. 21).



addition, errors in reporting or recording data in either the LPS or NFMC databases would result in match failures. While all of these issues likely affected the ability to match loans between the NFMC and LPS databases, it is not possible to determine accurately how much each factor contributed to lowering the overall match success rate.

The matching process resulted in 72,251 unique LPS loans matched to NFMC counseling units, a match rate of 24 percent.⁴ Although not randomly selected, a comparison of the NFMC-LPS matched loans with the NFMC population revealed that, based on key observable characteristics such as borrower age, borrower income, type of mortgage, amount of monthly payment, loan delinquency status, and level of counseling provided, the matched loans constitute a representative sample of all the NFMC clients counseled in the first twelve months of the program (Mayer et al. 2009: appendix D).

As noted earlier, HMDA data were also used in the analysis to add consistent race, ethnicity, and census tract characteristics to the loan records. Since these variables were seen as potentially key predictors of the foreclosure outcomes that we were studying, we felt that it was important to include them in our models. Since our HMDA data only included loans originated between 2002 and 2007, we were limited to matching HMDA characteristics to NFMC counseled loans of this vintage. Fortunately, the vast majority of NFMC-counseled mortgages (95 percent) were originated between 2002 and 2007.

The methodology for matching the loan records to the HMDA data is described in Appendix A. Because there were no unique identifiers that could be used to match data directly between the two sources, we matched on several loan characteristics, including ZIP code, origination year, and original loan amount. Because our analysis required an exact match, we excluded any loans where the matching was ambiguous; that is, where there was more than one HMDA loan that met the match criteria for a given NFMC/LPS loan. Despite these stringent matching requirements, a much higher match rate was achieved than with the LPS match. Out of the original 72,251 LPS-matched loans, 60,892 were successfully matched to HMDA records and were therefore available for use in the multivariate analysis as the NFMC analysis sample.

Non-NFMC Analysis Sample

As noted in the introduction, the performance of the NFMC program should be assessed relative to what would have happened had counseling services provided by NFMC not been available. To make this comparison, we selected a group of non-counseled homeowners

⁴ In a very small number of cases (15) the same NFMC counseling unit matched against multiple LPS loan records. These counseling units were deleted from the analysis. In a larger share (15,446 counseling units), the same LPS loan was matched to multiple counseling unit records. In these cases, the counseling unit with the highest level of counseling service provided was retained. In cases where two or more units had the same highest level of counseling, the record with the latest counseling intake date was kept.



against which performance of loans for NFMC-counseled homeowners can be compared. The method we used to draw the comparison sample attempted to match selected characteristics of loans in the NFMC sample. In addition, we used multivariate analysis to control for any differences between the two sets of loans that might affect the outcomes of interest.

The “gold standard” for evaluation analysis is an experimental design with random assignment of treatment. In this study design, homeowners seeking counseling services would be randomly assigned to two groups – one that would receive counseling services and one that would not. The two groups would then be followed and any differences in outcomes between the two could reasonably be attributed to the effect of the counseling.

The virtue of the experimental design is that, if done properly, the two groups should be indistinguishable from each other in both observable and unobservable characteristics, except for the fact that one group received counseling. The NFMC program was not set up as an experimental design, however, so differences between the counseled homeowners and the comparison group of non-counseled homeowners must be controlled for using statistical methods. In this analysis, therefore, we used three different multivariate modeling techniques (proportional hazard models, logistic regression, and ordinary least squares regression), which allowed us to control for differences in characteristics between the counseled and non-counseled loans.

For the purposes of modeling program effects, we selected a group of mortgage loans that did not receive NFMC counseling to serve as a “comparison sample” in our model estimations. One possible method for selecting the comparison sample would have been to choose randomly a portion of loans among those LPS database records that were not matched to NFMC loans. We chose not to use this approach because NFMC clients have characteristics that are very different from the overall population of residential mortgages. For one, NFMC clients are much more likely to be delinquent on their loans than homeowners in general. Close to 75 percent of NFMC clients were delinquent on their mortgage when they enter into foreclosure prevention counseling, compared to an overall delinquency rate of 9.73 percent for all mortgages as of December 31, 2008 (LPS 2009). As a consequence, a randomly chosen sample of all U.S. mortgages that did not receive NFMC counseling would almost certainly yield a group of loans that was quite different from the NFMC-counseled population in a number of important respects.

While many of these variations between the NFMC loans and a random sample of non-NFMC loans could have been controlled for in the subsequent modeling, the large differences in the distributions of the control variables would reduce the efficiency of the model estimates, as well as possibly increase the impact of selection bias. We discuss the issue of selection bias in the Potential Modeling Issues section later in this report (p. 21). The issue of efficiency of the model estimates can be described as follows: Suppose that almost all of the NFMC loans were adjustable rate mortgages and almost all of the non-NFMC loans were fixed rate. It would be



very difficult (if not impossible) to separate statistically the effect of the NFMC program on foreclosures from the effect of the mortgage type on foreclosures since there would be very few loans of the same type that were in different treatment groups. The problem, therefore, is not that we would get the *wrong* answer regarding NFMC impacts, but rather that we would get *no answer at all*. By having NFMC and non-NFMC samples that are relatively similar on observable borrower and loan characteristics, our models will be more likely to separate program effects from other statistical “noise.”

Therefore, instead of a random sample, we chose a comparison sample by implementing a “propensity scoring model” to match the characteristics of the NFMC and non-NFMC samples as closely as possible on several important dimensions. A propensity scoring model is a technique for drawing matched data samples based on a set of common characteristics.⁵ For each loan in the NFMC sample, the propensity scoring model found the closest match among the non-NFMC loans in the database. The propensity scoring model matched NFMC and non-NFMC samples using the following characteristics as of January 2008, the start of the NFMC program observation period:

- Year of loan origination.
- Current interest rate.
- Whether the loan was fixed or adjustable rate.
- Months delinquent.
- Whether the loan was in foreclosure.
- Whether the loan was in the portfolio of Fannie Mae or Freddie Mac; was held in a private portfolio; was a private securitized loan; or was owned by another entity.
- State where the mortgaged property was located.

The propensity scoring model was run against the 60,892 NFMC analysis sample and 149,263 LPS loans originated between 2002 and 2007 that were not matched to NFMC records but that were matched to HMDA (using the methods described in Appendix A). The 149,263 LPS loans were presumed *not* to have received NFMC counseling. Nonetheless, we must acknowledge that some of these homeowners may have received foreclosure counseling from some other program. It is also possible that some may have received counseling from the NFMC program itself but could not be matched to the LPS database because they were not in the LPS universe of loans, because they were in the portfolio of a servicer that did not report loan identification numbers to LPS, or because of data errors in the matching variables.

⁵ We used a version of the propensity scoring match algorithm implemented as a SAS macro by Parsons (no date) to select our comparison sample.



As shown in tables 1 and 2, the NFMC sample and the non-NFMC sample selected by the propensity scoring model match very well on many of the selected characteristics. The largest discrepancies are in the shares of adjustable rate loans and private securitized loans and in the current interest rate, which are all higher in the NFMC sample. We controlled for differences in these characteristics in the multivariate analysis. The foreclosure and delinquency statuses of the two sets of loans as of January 2008 were quite similar, however, which indicates that the two samples match well on the extent to which borrowers were in difficulty prior to the start of the NFMC program.

We emphasize, however, that the success of our modeling does not depend on the NFMC and non-NFMC samples matching exactly. To the extent that we are controlling for characteristics that affect our foreclosure outcomes, differences between the two samples should not bias our modeling results. There are, nonetheless, some possible sources of bias in our data that we address in the Potential Modeling Issues section of this report (p. 21).



Table 1: Comparison of NFMC and Non-NFMC Analysis Samples by Loan Characteristics as of January 2008

	NFMC Sample	Non-NFMC Sample
Number of loans	60,892	60,892
<i>Percent by loan origination year</i>		
2002	2.7	2.7
2003	6.0	5.8
2004	9.0	8.9
2005	22.1	22.3
2006	37.1	37.5
2007	23.1	22.9
Average interest rate (%)	7.4	6.7
Percent of adjustable rate loans	47.6	28.1
<i>Percent by investor</i>		
Fannie Mae/Freddie Mac	29.6	24.9
Private securitized	48.9	32.0
Private portfolio	10.9	14.3
Other	10.6	28.8
<i>Percent by delinquency status</i>		
Current	62.7	62.5
1 month	13.3	13.3
2 months	7.0	6.9
3 months	4.1	4.2
4+ months	12.8	13.1
Percent in foreclosure	5.3	5.7

Source: Authors' calculations from NFMC program data and LPS loan performance data for Jan. 2008.



Table 2: Comparison of NFMC and Non-NFMC Analysis Samples by State

	NFMC Sample	Non-NFMC Sample
Number of loans	60,892	60,892
Percent by state		
Alabama	0.7	0.7
Alaska	0.1	0.1
Arizona	3.1	3.2
Arkansas	0.3	0.3
California	18.5	18.6
Colorado	2.9	2.7
Connecticut	1.3	1.1
Delaware	0.5	0.4
District of Columbia	0.4	0.4
Florida	7.5	7.9
Georgia	4.2	4.3
Hawaii	0.1	0.1
Idaho	0.1	0.1
Illinois	5.0	5.0
Indiana	1.1	1.1
Iowa	0.8	0.8
Kansas	0.4	0.4
Kentucky	1.0	1.0
Louisiana	0.4	0.5
Maine	0.2	0.2
Maryland	5.1	5.0
Massachusetts	2.4	2.3
Michigan	4.7	5.0
Minnesota	1.7	1.6
Mississippi	0.6	0.7
Missouri	2.3	2.3
Montana	0.1	0.1
Nebraska	0.2	0.2
Nevada	2.5	2.6
New Hampshire	0.3	0.3
New Jersey	2.1	2.2
New Mexico	0.3	0.3
New York	2.8	2.8
North Carolina	2.5	2.5
North Dakota	0.0	0.1
Ohio	5.4	5.1
Oklahoma	0.5	0.6
Oregon	0.6	0.5
Pennsylvania	4.0	3.8
Rhode Island	0.8	0.8
South Carolina	1.1	1.1
South Dakota	0.2	0.2
Tennessee	2.0	2.0
Texas	3.6	3.6
Utah	0.3	0.3
Vermont	0.0	0.0
Virginia	2.5	2.6
Washington	1.1	1.1
West Virginia	0.2	0.2
Wisconsin	1.3	1.3
Wyoming	0.0	0.0



Outcome Variables

Our preliminary analysis of the effects of the NFMC program focused on three key outcomes of interest:

- Did the NFMC program help homeowners avoid foreclosure?
- Did the NFMC program help homeowners cure an existing foreclosure?
- Did the NFMC program help homeowners receive loan modifications that resulted in lower monthly payments than they would have otherwise received without counseling?

To measure these effects, we used the data sources described above to construct outcome variables corresponding to each of the above questions for both the NFMC and non-NFMC loan samples.

Foreclosure avoidance

Foreclosure is a common outcome in modeling loan performance (Coulton, et al. 2008; Elmer and Seelig 1998; Gardner and Mills 1989; Newberger 2006; Quercia, McCarthy, and Stegman 1995; Quercia, Stegman, and Davis 2005). Foreclosure can be a drawn out process, often lasting several months or more, by which a lender seeks to sell a mortgaged property to recover an unpaid debt obligation. The foreclosure process usually is initiated by the loan servicer when the homeowner is three months behind, or more, on monthly mortgage payments, but individual servicers and lenders have different procedures for deciding when to start a foreclosure process in particular circumstances. In addition, states and localities have differing laws and regulations covering the foreclosure process, which affect the initiation, duration, and completion of a foreclosure.

Our first foreclosure outcome of interest is foreclosure avoidance; that is, successfully avoiding the start of the foreclosure process by the loan servicer. Homeowners who were current on their mortgage payments, or delinquent but not sufficiently so to have received a foreclosure notice, were the eligible population for foreclosure avoidance in this analysis. Using the loan performance data from LPS for all homeowners in the analysis samples who were not in foreclosure as of January 2008, we tracked whether a foreclosure start was recorded between January and December 2008. Homeowners who did not have a foreclosure start were deemed to have avoided foreclosure during the twelve month observation period.

If a foreclosure start was reported, we measured the number of days from the start of the observation period (January 1, 2008) to the date when the foreclosure was initiated. For the foreclosure avoidance analysis, we modeled the “time to foreclosure” (in days) as the outcome of interest. The NFMC program would be deemed to have a positive effect on this outcome if



counseled homeowners experienced a longer average time to foreclosure than non-counseled homeowners.

Foreclosure cure

A second key outcome of interest is whether, once a foreclosure process has started, NFMC counseling was effective in helping homeowners avoid losing their home to a foreclosure sale. We refer to this outcome as a “foreclosure cure.” In ideal circumstances, the homeowner would be able to remain in the home by becoming current on their loan, possibly through a loan modification or refinancing. We also counted as a foreclosure cure, however, cases where the homeowner lost the home through a property sale, including a short sale, because this outcome is considered, in general, more advantageous to the client than a foreclosure sale, which would have a severely negative impact on the borrower’s credit score.

The population of loans eligible for a foreclosure cure in this analysis were all those that were in the foreclosure process sometime between January and December 2008, including those whose foreclosure may have started prior to January 2008. For NFMC clients, this included both loans that entered foreclosure prior to the homeowner seeking counseling and those that entered foreclosure after starting counseling. In each month from the foreclosure start, we track the LPS data to see if the loan exited foreclosure *without* ending up in foreclosure sale or as a real estate owned (REO) property. As noted above, cases where the loan is paid in full through a refinancing or property sale are also counted as a foreclosure cure. (The LPS data do not permit allow one to distinguish between full price sales, short sales, and mortgage refinancings.) To account for variation in the length of current foreclosure spells, we also measured the number of months that the loan had been in foreclosure and included this as an explanatory variable in our models of foreclosure cure.

Reduction in monthly payment from loan modifications

Previous analyses of outcome data for the NFMC program have highlighted the importance of loan modifications in achieving successful outcomes for troubled homeowners. NFMC-counseled homeowners who received loan modifications were less likely to either have their loan go into foreclosure or to have a foreclosure completed after the start of counseling, compared to NFMC clients who did not receive a loan modification (Mayer, Temkin, and Tatian 2009). Other research on loan performance has also highlighted a positive relationship between better mortgage outcomes (such as foreclosure avoidance and reduced delinquency recidivism) and significant reductions in monthly loan payments (Office of the Comptroller of the Currency and Office of Thrift Supervision 2009). Therefore, to the extent that NFMC Grantees were able to help homeowners obtain more beneficial loan modifications from lenders, one would expect to see improved client outcomes, making payment reduction a potentially important intermediate outcome of the NFMC program.



While the LPS data track several characteristics of the mortgage loan, including current monthly payment⁶ and interest rate, there is no specific flag in the database to indicate a loan modification. Based on our analysis of the LPS data, we created a series of criteria to identify loan modifications based on changes in the monthly loan characteristics.

1. **Mortgage modified by lowering interest rate only:** For fixed rate mortgages, if the interest rate was *reduced* from one month to the next, by any amount, this was identified as a lower interest rate modification.

If the loan was an adjustable rate mortgage (ARM), we determined whether the reduction in interest rate between one month and the next exceeded a pre-determined threshold and, if so, identified this as a lower interest rate modification:⁷

- For ARMs with one-month reset periods where the next payment due date was one month after the previous payment due date (that is, where the borrower either remained current or stayed the same number of months delinquent as they were previously), the threshold was 100 basis points.
 - For ARMs using the COFI index (San Francisco Eleventh District Cost of Funds⁸), the threshold was 200 basis points.
 - For all other ARMs, the threshold was 300 basis points.
2. **Mortgage modified by increasing loan term only:** Remaining term of the loan increased from one month to the next.
 3. **Mortgage modified by lowering loan principal only:** If the difference between the previous principal balance and the current principal balance was at least \$5,000 greater than the maximum possible change in principal balance within the loan's terms, the loan was flagged as a lower loan principal modification. Only loans that were not paid in full and did not have a foreclosure completed in the month of the principal drop were flagged as a lowered-principal modification.

⁶ Monthly payment includes amounts paid by the homeowner to the loan servicer for mortgage principle, interest, taxes, and insurance.

⁷ The LPS data do not provide enough information to determine, with certainty, when an ARM should reset and how much the reset payment should be. Therefore, some observed ARM rate reductions may result from the index declining from its previous reset period and not from a loan modification. Because of this, to identify interest rate modifications we used a conservatively large threshold, represented by the maximum decline in an index between January 2008 (when the first NFMC client was reported into the system) and February 2009.

⁸ The COFI is a common index used to adjust the interest rates of ARMS. It reflects the weighted-average interest rate paid by 11th Federal Home Loan Bank District (Arizona, California, and Nevada) savings institutions for savings and checking accounts, advances from the Federal Home Loan Bank, and other sources of funds.



4. Mortgage modified with a combination of lower interest rate, longer term and/or lower principal: Any combination of the three modifications above.

If none of the above changes were observed, those loans were flagged as not having been modified in that month. Because we were only interested in identifying modifications that would likely lower the probability of a foreclosure, we deliberately set thresholds for loan modifications that were likely to result in *lower monthly payments* for homeowners. Indeed, applying these criteria to the NFMC-counseled loans showed that over 80 percent of the above-identified modifications resulted in a lower monthly mortgage payment.

Control Variables

Many factors, apart from counseling, potentially have an impact on whether a home ends up in foreclosure. The more we are able to measure and include such factors in our analysis, the better our models would be able to isolate and estimate the impact of counseling in particular. The existing literature on loan performance and the impacts of counseling helps identify many of the likely factors. Our own early reconnaissance and initial look at NFMC quarterly report material further filled in and refined the list (Mayer et al. 2008). The data available to us, of course, limits the variables we can actually employ.

In initial modeling attempts, we used a list of some 85 characteristics, including the state of residence, as control variables in our models. Based on initial model runs, many of these characteristics proved to have no statistically significant impact on foreclosure outcomes. This extensive list of controls also challenged the capacity of our computer hardware and software and, because combinations of them could be closely correlated with each other, made it difficult to obtain reliable estimates of the model parameters. For these reasons we filtered down our variable list to those that proved statistically significant in many, if not all, of the model alternatives. These variables are listed in table 3. (Summary descriptive statistics for these variables are provided in appendix B.)

Most of these explanatory variables are standard borrower and mortgage characteristics that are often included in models of loan performance. A few deserve some explanation, however. A series of *status at intake* variables were used to control for the fact that, while the NFMC and non-NFMC samples were initially matched based on delinquency status as of January 2008, the performance of these loans turned out to be quite different in later months. For example, while the share of NFMC and non-NFMC sample loans that were current on their mortgage payments as of January 2008 were virtually identical (63 percent each), by June only 51 percent of the NFMC loans that had not yet entered counseling were current, compared to 69 percent of the non-NFMC loans. By December, the share of NFMC loans that were current had dropped to 29 percent, while the non-NFMC loans had held steady at 65 percent.

This was somewhat unexpected, given that we initially thought that matching on delinquency status at the beginning of the year would yield two samples of loans with



reasonably similar performance profiles. To control for these differences, we included variables in the model that represented whether the loan was one, two, three, or four or more months delinquent as of the month when the NFMC loan entered counseling. For the non-NFMC loans, the status variable was based on the month during which that loan's matched NFMC pair (selected from the propensity scoring model) entered counseling.⁹

To control for surrounding community effects on foreclosures, we included two measures of *neighborhood quality*, both derived from HMDA data for 2006 and 2007: the home mortgage approval rate and the median value of new home purchase mortgages. Both of these variables were identified as key measures of neighborhood quality by Galster, Hayes, and Johnson (2005).

We also included a control variable for *mortgages with a loan-to-value (LTV) ratio at origination not equal to 80 percent*. This variable is included because the LTV may not reflect all mortgages originated to a property's owner. In particular, owners may finance a purchase with both a first lien mortgage and a second lien or piggyback loan. Unfortunately, it is not possible in the LPS database to match first lien mortgages with corresponding second liens, so secondary financing cannot be observed directly. As noted in Foote, et al. (2009), however, a large number of loans in the LPS database have LTV at origination equal to 80 percent, which strongly suggests that these loans were accompanied by a second mortgage. To control for the impact of second liens on loan performance outcomes, the "LTV not equal to 80 percent" dummy variable estimates any decrease in risk for homes purchased without piggyback loans.

We had initially planned to use the income data from HMDA so that household income could be used as a control in our NFMC vs. non-NFMC models. We had a large number of observations with missing income data, however, among our HMDA-matched records. Our initial analysis suggested that the absence of the income variable did not affect our results, so we omitted this variable rather than delete large numbers of observations from our analysis sample.

⁹ For the final modeling analysis, we are considering revising our comparison sample selection procedure so that we match the non-NFMC and NFMC loans based on the loan status during the month that the NFMC loan entered counseling, rather than at a fixed point in time.



Table 3: Explanatory Variables Used in Models

Variable Label	Description
Status at intake	Number of months delinquent (1, 2, 3, 4 or more). For NFMC loans, the status is as of the month when client entered counseling; for non-NFMC loans, the status is as of the month when the loan's matched NFMC pair entered counseling.
Black borrower	Equals 1 if client is African-American.*
Hispanic borrower	Equals 1 if client is Hispanic/Latino.*
Asian/PI borrower	Equals 1 if client is Asian or Pacific Islander.*
Other race borrower	Equals 1 if client is other race.*
FICO/Credit Score – Original	Client's FICO score at origination.
Current Interest Rate	Current interest rate of client's loan (%).
Grade B/C mortgage	Equals 1 if loan is subprime (grade B or C as reported by mortgage servicer in LPS data).
ARM loan	Equals 1 if loan is an ARM.
Option ARM loan	Equals 1 if loan is an Option ARM.
Agency loan	Equals 1 if loan is a Fannie Mae or Freddie Mac loan.
Jumbo loan	Equals 1 if client's loan was a jumbo loan at origination.
Portfolio	Equals 1 is loan is held in portfolio by the originator.
Government	Equals 1 is loan is government insured.
Home mortgage approval rate (%), 2006-07	Percentage of loan applications that were approved between 2006 and 2007 in census tract in which client's home is located.
Mortgage Originations Median Amount Home Purchase - In Thousands	Median purchase loan amount for mortgages originated in a client home's census tract between 2006 and 2007.
Monthly unemployment rate (%) for MSA	Unemployment rate reported by the Bureau of Labor Statistics for the MSA or state in which the client's home is located.
Change in unemployment. rate since Jan. 08	Ratio of the current month's unemployment rate to the January 2008 rate, multiplied by 100. (A value of less than 100 means that unemployment declined during the period.)
Quarterly housing price index	The Federal Housing Finance Agency (FHFA) quarterly house price index for the MSA or state in which the client's home is located.
Change in HPI since Q1-08	Ratio of the current quarter's FHFA house price index to the first quarter 2008 index value, multiplied by 100. (A value of less than 100 means that housing prices declined during the period.)
Year Originated	Dummy variables for loans originated in 2003, 2003, 2004, 2005, 2006 or 2007. (2002 is the reference category.)



Variable Label	Description
Loan-to-value ratio	The loan-to-value ratio at origination, as a percentage.
Dummy for LTV not = 80	Equals 1 if loan-to-value ratio at origination is not 80 percent.
Original loan amount	Amount of the original mortgage loan (\$). (This variable is used in the loan modification model to control for the size of the loan relative to the reduction amount.)

Note: *Whites were the omitted race category in the models, that is, the values of the parameter estimates for blacks, Hispanics, etc. are relative to white clients.



MODELS OF PROGRAM EFFECTS

This section describes the multivariate models that we used to estimate the effects of the NFMC program on counseled homeowners, using the data sources presented in the previous section. We begin with a discussion of key issues that might affect the accuracy of our model estimates, including the problem of selection bias into the NFMC program, the inability to control for potential differences in behaviors of servicers, and other issues. We discuss how we attempted to address any potential modeling issues and conclude by presenting a description of the models that we estimated for each of the three outcomes.

Potential Modeling Issues

Program Selection and Omitted Variable Bias

A key challenge presented in evaluating the effects of the NFMC program is a common problem in most multivariate analyses, that of *selection bias*. Put simply, people who are more likely to seek counseling from NFMC Grantees are also more likely to be in some sort of financial distress, compared with the overall population of homeowners and, therefore, are more likely to end up in foreclosure. The analysis sample of 60,870 loans originated to NFMC clients who received counseling in 2008 indicated that 32 percent were in foreclosure at some point between January and December 2008 (table 4).¹⁰ This was much higher than the U.S. average of 2.5 percent of all mortgages in foreclosure as of December 2008 (LPS 2009).

Furthermore, many NFMC clients sought counseling after their loans had already entered foreclosure. Twenty-two percent of clients served by NFMC Grantees through December 2008 were in foreclosure before they entered counseling and 5 percent of NFMC clients' loans were in foreclosure even before NFMC program Grantees started providing services in January.

¹⁰ Note that the share of NFMC clients who experienced a foreclosure is higher than the share of NFMC clients whose last observed loan status is in foreclosure. The reason is that NFMC clients can enter into foreclosure, but then, through curing the loan by themselves or through a loan modification, can leave foreclosure. These foreclosure cures were analyzed as an outcome later in the report.



Table 4: NFMC Loans In Foreclosure Between January and December 2008

	Loans	% of Loans	% of Foreclosed Loans
Total sample loans originated to NFMC clients served through Dec. 2008	60,870	100.0	n/a
Total loans in foreclosure at some point between Jan. and Dec. 2008	19,680	32.3	100.0
Foreclosure start prior to Jan. 2008	2,988	4.9	15.2
Foreclosure start prior to counseling	10,144	16.7	52.5
Foreclosure start after counseling	6,548	10.8	33.3
No foreclosure between Jan. and Dec. 2008	41,190	67.7	n/a

Source: Authors' calculations from NFMC program data for Jan. to Dec. 2008 and LPS loan performance data through Dec. 2008.

Note: Twenty-five percent of foreclosures that occur subsequent to entry into counseling occur one month after intake. These foreclosures, due to possible lags in LPS recording foreclosure dates, may actually have occurred prior to intake.

In theory, we can control for factors that would explain whether a person is more likely to go into foreclosure and, therefore, would be more likely to enter counseling. In practice, however, we do not have the data that may be necessary to control for all of these external factors. For example, while LPS data contain several characteristics that help to predict loan performance over time (such as a borrower's credit score), they do not provide information that can be used to predict the likelihood of a borrower experiencing a trigger event (such as a job loss or unexpected medical expenses). According to information provided by Grantees, 49 percent of NFMC clients indicated that a reduction or loss of income was the primary reason for their default. Personal reasons, such as medical issues, a divorce or separation, a death of a family member or poor budgeting skills were cited by another 20 percent of NFMC clients as the primary reason for their loan default.

Such trigger events can create financial distress and lead to mortgage delinquencies that would push people to seek NFMC counseling. If we do not have any information that can be used to predict the likelihood of adverse trigger events occurring, then we cannot control for a potentially important difference between the NFMC sample and the non-NFMC comparison sample. Consider the following example. Assume that 20 percent of a town's residents work for a particular firm and that firm goes out of business such that every person working for that company loses his/her job and perhaps seeks counseling. In this hypothetical case, the observable characteristics from the loan performance database would be identical for the homeowners who lost their jobs and the other residents in the town. Given that many counseling



clients are in financial distress, the foreclosure rate for these owners will be higher than the other residents. But, the data we have do not indicate whether or not a homeowner works for the company that closed, so an analysis of foreclosure rates between counseled residents and non-counseled residents will show higher rates of foreclosure among the counseled group of residents.

In summary, then, we cannot control for all of the relevant differences between the NFMC and non-NFMC samples because some information is unavailable to us. These unobservable differences (such as a job loss) might lead us to draw incorrect conclusions about the effect of the NFMC program on foreclosure outcomes. Because we are, by necessity, omitting information from our models, this problem is also referred to as *omitted variable bias*.

Econometricians have long recognized the problems of selection and omitted variable bias and have developed techniques to produce unbiased estimates when such problems are present. For example, a common method is to use instrumental variables which predict whether a person seeks treatment but do not influence the outcome of interest. Unfortunately, this approach does not work for us here as we do not have a set of indicators that would allow us to predict whether someone seeks counseling, but which would have no effect on a loan's time to foreclosure. Furthermore, the econometric literature offers limited support for an instrumental variables approach in the context of duration models which we use to estimate the effect of the NFMC program on foreclosure avoidance.

Since standard correction methods are unavailable to us, we chose an alternative approach to address the problem: we estimated a parallel set of models using *only* the NFMC-counseled loans. In these models, we compared the performance of the NFMC loans *before* counseling to their performance *after* counseling has started. In this way, the selection bias problem was largely avoided since we were not comparing the performance of the NFMC loans to the non-NFMC loans.¹¹

In regards to the NFMC and non-NFMC comparison models, we make one final observation which is that, given the relatively poorer performance of counseled vs. non-counseled loans, the direction of any selection bias would most likely *disfavor* finding positive effects of the NFMC program. The difference is illustrated in figure 1, which shows the deterioration in performance of the NFMC loans over the observation period. As can be seen, although both the NFMC and non-NFMC samples started off with equal levels of delinquency in January 2008, the share of NFMC loans that had not yet been counseled and were current continued to decline steadily, falling to 29 percent by December. The non-NFMC sample,

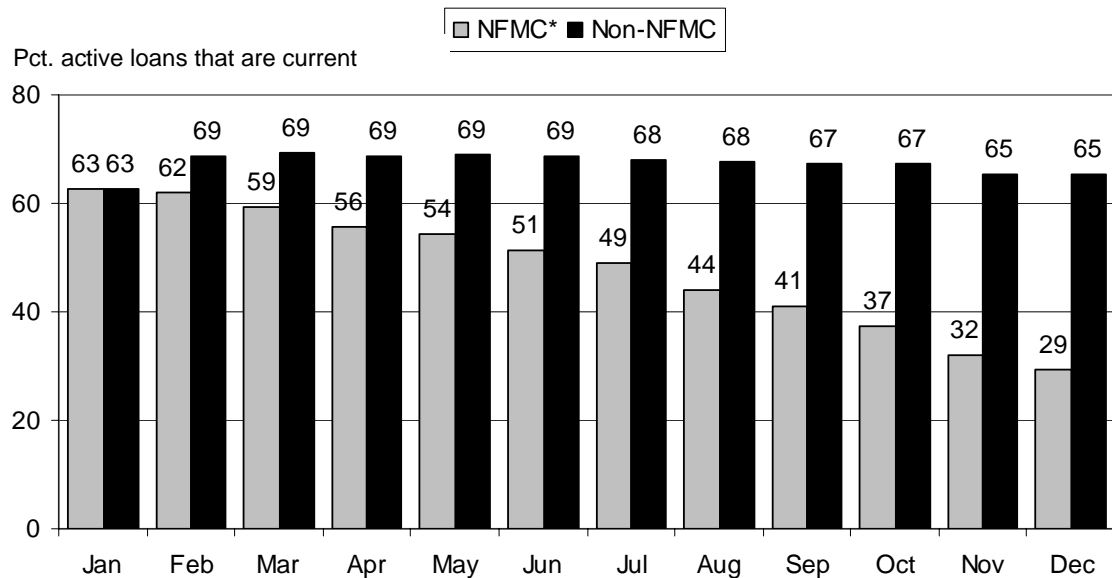
¹¹ The NFMC-only modeling approach does not completely eliminate the problem of selection bias, as there may still be unobservable differences among NFMC clients that cause some to start counseling sooner than others. These differences might also lead to different foreclosure outcomes that would not properly be attributed to the effect of counseling itself. Nonetheless, we believe that the selection bias problem has largely to do with the decision to enter counseling or not, rather than the timing of the start of counseling.



however, maintained a relatively constant share of loans that were current, between 60 and 70 percent, throughout the year.

Therefore, any unobservable differences between the two groups that, independent of the effect of counseling, lead to worse foreclosure outcomes for the NFMC homeowners, might be incorrectly interpreted as a negative program effect in the models. As a result, any positive program effect has the added burden of needing to overcome this selection bias for it to be discernable in our model estimates. For this reason, any impact of selection bias in this case would tend to result in *underestimates* of actual positive effects of the NFMC program on counseled homeowners.

Figure 1: Percentage of Loans Not in Counseling that are Current, NFMC and Non-NFMC Samples, January to December 2008



Source: Authors' calculations from NFMC program data and LPS loan performance data.

Note: *The NFMC loans in each month exclude those that began counseling in a prior month.

Loan Servicer Omission Bias

The data received from LPS for the NFMC evaluation, which are the basis for our measures of foreclosure outcomes, do not include any identification of the mortgage servicer. Furthermore, the licensing agreement with LPS covering the use of these data specifically prohibits any analysis that would differentiate among individual mortgage lenders or servicers. The limitation on analysis involving individual servicers leads to two potential problems with our model estimates of program effects.



First, as noted earlier, the LPS loan database includes data from many, but not all, mortgage servicers in the country. In addition, some servicers do not report actual loan identification numbers to LPS, so these servicers' loans cannot be matched to NFMC loans. Since we can only construct outcomes for loans that were matched to the LPS database, the performance of NFMC client loans that are served by certain servicers will not be represented in our results. This means that to the extent that the effect of the NFMC program on foreclosure outcomes may vary by servicer, our findings will not be generalizable to the entire population of NFMC-counseled homeowners.

Second, our method of adding the LPS-derived outcomes to the NFMC loans may be biasing our results by having different servicers represented in the NFMC and non-NFMC loan samples. As described earlier, we matched the LPS and NFMC data by the servicer name and loan number and, since some servicers do not provide actual loan numbers to LPS, loans from these servicers cannot be matched to the NFMC data. These servicers would still be represented in the entire population of loans in the LPS database, however, and may have been included in the comparison sample of non-NFMC loans. As a result, the non-NFMC comparison loans may include servicers who were not included in the NFMC sample.

The extent to which the lack of information on specific servicers may have biased our modeling results depends upon whether servicers exhibit different behaviors toward delinquent borrowers, conditional upon the characteristics of the loan, the borrower, and the housing market. For example, a borrower whose loan is held by lenient servicer "A" might have a greater likelihood of obtaining a favorable loan modification, and thus avoiding foreclosure, than a nearby identical borrower with an identical mortgage held by less flexible servicer "B." Since we cannot control for differences in the distribution of servicers between our NFMC and non-NFMC samples, these servicer effects could bias our results. If, say, servicer "A" was systematically excluded from the NFMC sample because they did not provide loan numbers to LPS, but was present in the non-NFMC comparison sample, then our estimate of NFMC program effects might be biased toward worse outcomes. If, on the other hand, servicer "B" was excluded from the NFMC sample, the results would be biased toward better program outcomes.

While there is evidence that different servicers exhibit disparate behaviors when dealing with delinquent borrowers, current research cannot quantify the extent of these differences in a reliable way. One of the most careful analyses of the issue was conducted by Stegman et al. (2007), who found significant differences among servicers in 30-day delinquency cures, controlling for borrower and loan characteristics. The analysis demonstrated that four of the eight mortgage servicers represented in the data had a significantly lower probability of delinquency cure. Nonetheless, the overall predicted rate of cure for all servicers ranged from a low of 83 percent to a high of 90 percent, which is not an excessively wide range. Furthermore, this analysis was only conducted on a sample of about 28,000 Community Reinvestment Act loans made to low- and moderate-income borrowers and that were purchased by Self-Help, a leading community development financial institution, as part of a secondary mortgage market



demonstration project. The preponderance of these loans (40 percent) were to borrowers in North Carolina; another 21 percent were in rural areas. It is not clear, therefore, the extent to which these findings can be generalized to the larger mortgage market.

Similar analysis by Quercia, Ding, and Ratcliffe (2009) found differences in default rates among servicers for a national sample of private-label securitizations that underwent voluntary loan modifications. The loans were drawn from a sample of loans that were securitized in 2006 and that were largely originated between 2005 and 2006. The analysis used logistic regression to control for borrower, loan, and market characteristics. As noted in the study, however, “this sample of voluntary loan modifications may not be representative of loan modifications by portfolio lenders.”

Other analyses of differences in performance of loans by servicer (Dubitsky et al. 2008; Goodman et al. 2009) have largely been descriptive, and consequently did not control for differences in the loan portfolios across servicers. This makes it impossible to attribute the differences in mortgage outcomes solely, or even largely, to variations in servicer behavior, as opposed to dissimilarities in the characteristics of loans held by different servicers.

Because we lack any information about servicers in the LPS data, and because we are contractually prohibited from doing any analysis based on NFMC Grantee-reported servicers linked to LPS data, it is not possible for us to determine whether any servicer bias exists or, if it does exist, to estimate the magnitude of the bias or the direction in which our results may be biased. We further do not know, since LPS considers the information to be proprietary, which servicers do not report real loan identification numbers or what share of loans in the LPS database lack such numbers.

One potential option for addressing this problem would be to change our method for matching the NFMC and LPS data so that, rather than relying on the loan identification number, we are using other loan characteristics common to the two data sources. Unfortunately, this proved not to be possible. Earlier in the study, we attempted to match records between the two databases using a variety of common loan characteristics, including the amount of the monthly payment, the property ZIP code, and the current interest rate. These attempts were unsuccessful because we did not have enough information to make unambiguous matches. For many NFMC loans, there were multiple loans in the LPS database that met the matching criteria and it was not possible to determine which loan was the true match.

To address the issue of potential bias from servicer omission in the matched NFMC sample, we used the same approach described for addressing the possible selection bias problem. We ran a set of models estimated only with NFMC loans. The issue of servicer bias is more likely to be a problem when comparing the performance of NFMC and non-NFMC loans because of the possibility of very different distributions of servicers being represented in the two respective samples. By only looking at the NFMC loans, therefore, we can lessen any effects of servicer bias since we are analyzing data only from one set of servicers. Examining just the



NFMC loans does not, of course, solve the problem that our analysis may omit some important servicers altogether. Nevertheless, in the NFMC-only models we would at least be comparing “apples to apples.” If the NFMC-only models yield results consistent with the comparison models, then we can reasonably conclude that our findings based on differences between the NFMC and non-NFMC loans have not been significantly biased.

In fact, as will be presented in the discussion of our findings, we found consistent, positive results for the NFMC vs. non-NFMC models and the NFMC-only models for our two strongest findings – the effect of the NFMC program on foreclosure cures and on reductions in monthly mortgage payments. (For foreclosure avoidance, we found no significant results when comparing the NFMC and non-NFMC samples, but we did find modest positive results when looking only at NFMC loans.) Based on these results, it seems unlikely that the servicers included in our NFMC sample somehow reflect an unrepresentative sample of organizations that have either too liberal or too restrictive policies toward troubled homeowners, relative to the non-NFMC loans.

Other Issues

A few other issues might also affect the accuracy and representativeness of the preliminary analysis of the NFMC program impacts presented in this report. One is that of program startup effects; that is, clients at the beginning of the NFMC program may have had a very different experience, and consequently different outcomes, than those who entered the program later. This is certainly a reasonable assertion, given that program Grantees needed to increase service capacity to accommodate the additional counseling volume under the NFMC program. Nonetheless, we did not believe that this issue needed to be addressed in this preliminary analysis, which only attempts to quantify the average effects of the program. Furthermore, we lack a sufficiently long observation period at this time to measure the effect on different cohorts of NFMC clients. For our final analysis of the program, we will explore analysis of separate cohorts of NFMC clients to see if any useful findings emerge.

Second, our requirement that all data used in the analysis be matched to HMDA records, so that we could include race and income in our models, resulted in a large number of potential NFMC and non-NFMC loans being eliminated from the sample. If the HMDA matching success could be deemed to be independent of factors that would affect our foreclosure outcomes, then this would not present a problem. It is possible, however, that certain types of loans or borrowers are more likely to match successfully to the LPS database than others, and that exclusion of the non-matching loans might bias our results. While we can see no reason why HMDA matching success should be correlated with our foreclosure outcomes, we were not able to assess whether this issue posed a problem in the analysis presented here. We plan to conduct some additional robustness tests to evaluate whether there is a potential bias problem and, if so, we may drop the HMDA matching requirement for our final analysis.



Modeling Approach

Our research approach was to analyze the NFMC program's effects on (1) reducing foreclosures for clients who did not enter counseling already in foreclosure; (2) the ability of clients to cure a foreclosure; and (3) the reduction in a client's monthly payment resulting from a loan modification. When analyzing these effects, we used different multivariate models, as was appropriate for each outcome being measured, to control for other factors that might also explain these outcomes, and thereby isolate the impact of the NFMC program.

We estimated two sets of models: one set comparing outcomes of NFMC-counseled loans to the comparison sample of non-NFMC loans, and another set estimating the effects using only the NFMC loans. Comparing the NFMC to non-NFMC loans was essential to addressing the central question of this analysis: "What would have been the foreclosure outcomes for NFMC clients had the services offered by NFMC Grantees not been available to them?" The benefit of further analyzing *only* the NFMC loans, however, was twofold. First, it allowed us to estimate the number of foreclosures prevented by the program based on different levels of treatment; namely, the level of counseling and the number of counseling hours provided to each client. Second, the NFMC-only analysis largely eliminates any selection bias issues related to selection into the program and unobservable differences between the NFMC and non-NFMC loan samples. Both sets of models, therefore, were essential to obtain a fuller understanding of the effects of the NFMC program.

Foreclosure Avoidance

For modeling the program's effect on reducing foreclosures for clients, we tested whether, controlling for loan and borrower characteristics, NFMC client loans would enter into foreclosure *more quickly* than the non-NFMC comparison group. Delaying foreclosure would likely increase the ability of the borrower to avoid foreclosure by allowing additional time for more favorable outcomes, including becoming current on the loan, selling the property, modifying the loan, or obtaining alternative financing. Therefore, a positive program effect is evident if the rate at which NFMC loans that enter into foreclosure is about the same or less than for the comparison group, or is lessened with a greater intensity of counseling services.

Because we were able to measure the time to foreclosure to the exact date, we estimated the impact of the NFMC program's effectiveness in delaying foreclosures with different forms of survival models.¹² Survival models are a class of multivariate models with three main characteristics that are relevant to our analysis:

1. The dependent variable is the waiting time until the occurrence of a well-defined event (in this case, the start of a foreclosure);

¹² For more on survival models, see Allison 1982.



2. Some of the events may not occur during the time period for which data are collected, and so observation of those events is considered to be “censored”; and
3. There are predictors, or explanatory variables, that have an effect on waiting times that are used as control variables in the models.

Regarding the second characteristic, in all survival models censoring refers to the fact that the event of interest (such as a foreclosure) may not occur during the period of observation. In other words, for this analysis, we were only able to observe the foreclosure status of counseled and non-counseled loans between January and December 2008. While we may not observe a foreclosure for a given loan during that period, it is entirely possible that this loan may enter foreclosure at some future date. Information about these future foreclosures would be considered “censored,” since we have no knowledge of them. Other standard model estimation techniques, such as an ordinary least squares (OLS) regression, would not properly account for censoring of future foreclosures. The structure of these models assumes that all information about foreclosures is known and that, if no foreclosure was observed, then none took place. As a result, an OLS model would produce inaccurate estimates of the waiting time to foreclosure.

In contrast, the underlying distribution of a survival model takes into account any censored observations and properly accounts for this when estimating the model function. Given that we were able to measure the waiting times to foreclosure with a very small unit of time (days), we can treat the waiting times as a continuous distribution. For a continuously measured dependent variable, the Cox proportional hazards model, a particular type of survival model, is appropriate for estimating the time to foreclosure.

Foreclosure Cure

We estimated models of foreclosure “cure” for NFMC client and non-NFMC comparison group loans. Our hypothesis is that unobservable characteristics (such as a job loss) make it more likely for NFMC clients to experience financial distress than non-NFMC homeowners. Because we cannot control for these unobservable events, however, it is more challenging to find positive program effects for an outcome like foreclosure avoidance because an unobservable (to us) future job loss may push a counseled homeowner into foreclosure, despite the best efforts of the housing counselor.

For foreclosure cure, however, we are looking only at loans that are *already* in foreclosure and we can therefore assume that the same factors that led to a foreclosure for a non-NFMC loan, whatever they may be, also created financial distress for the NFMC client. Consequently, the importance of unobservable events, like a job loss, is diminished as these events are likely to have already taken place for both the NFMC and non-NFMC homeowners. Furthermore, in the foreclosure cure models we control for the length of the current foreclosure spell and, therefore, are accounting for differences in outcomes between homeowners who may be experiencing longer periods of distress.



Foreclosure cures can only be observed monthly in the LPS data, so the outcome must be considered to be measured in *discrete time*. In other words, we have a relatively small number of observations (at most twelve) for each loan. In this situation, the appropriate modeling choice is a logistic regression model (LOGIT) that is used to measure the monthly probability of foreclosure cures (Allison 1982). This is the model that we have used to estimate the NFMC program's effect on foreclosure cures.

Monthly Payment Reductions

We compared the reductions in monthly payments between loan modifications to mortgages held by NFMC clients to those held by non-NFMC clients. Only loans that experienced a modification between January and December 2008 were used in this analysis. While we did not know if the demand for loan modifications was the same across the two groups of loans, we assumed that non-NFMC owners who sought a loan modification were in the same level of financial distress as NFMC owners who sought a loan modification and that, therefore, differences in the payment reductions between these two groups of loans were a result of the NFMC program.

For this outcome, the dependent variables were the amount of reduction in the monthly mortgage payment (payment increases were coded as a negative reduction), expressed as a dollar amount and as a percentage of the original monthly payment. Because we were dealing with a continuous variable as an outcome, we used a standard ordinary least squares regression to model these outcomes.



FINDINGS

As detailed below, our modeling results indicate that the NFMC program had favorable effects in helping homeowners who faced foreclosure. Homeowners who received services from NFMC Grantees in 2008 had a reduced risk of going into foreclosure, and counseled homeowners in foreclosure were more likely to come out successfully than homeowners in foreclosure who did not receive services from NFMC Grantees. In addition, NFMC clients received loan modifications that resulted in significantly larger reductions in monthly payments than loan modifications received by non-NFMC homeowners.

NFMC Program's Effect on Foreclosure Avoidance

Our analysis of foreclosure avoidance focused on homeowners who started counseling not already in foreclosure. Foreclosures after the start of counseling represented a relatively small portion of the total foreclosures experienced by NFMC clients in 2008. Of the 60,870 NFMC clients in our sample, 19,680, or 32 percent, were in the foreclosure process at some point in 2008. About two-thirds of these foreclosure episodes (67 percent) experienced by counseled homeowners started *prior* to any counseling services being rendered by an NFMC Grantee. Since counseling cannot help homeowners avoid a foreclosure that has already begun, these pre-counseling foreclosures were not included in our foreclosure avoidance analysis.

Of the 47,738 NFMC sample clients who were not in foreclosure when they entered counseling, 6,548 (14 percent) had a foreclosure start after beginning counseling (table 5). The share of NFMC clients whose foreclosure started after they began counseling was greater for owners whose loans were delinquent as of January 2008, when Grantees started offering NFMC-supported foreclosure prevention services. About a quarter (23 percent) of NFMC clients whose mortgage was delinquent as of January 2008 experienced a foreclosure after they started counseling. The share of NFMC clients whose loan went into foreclosure after receiving counseling services was greater for clients whose loan was delinquent for longer periods: 20 percent for those 1 month delinquent as of January 2008, 23 percent for 2 months delinquent, 26 percent for 3 months delinquent, 30 percent for 4 or more months delinquents. Conversely, only 10 percent of NFMC clients who were current on their mortgage as of the beginning of 2008 experienced a foreclosure after they started counseling.

Table 5: Descriptive Analysis of NFMC Loans Not In Foreclosure Prior to Counseling

	Loan status as of January 2008						
	All Loans	Current	Delinquent (Months)				Total Delinquent
			1	2	3	4+	
Total NFMC loans not in foreclosure prior to counseling	47,738	35,151	6,305	2,668	1,216	2,398	12,587
Loans with foreclosure start after counseling	6,548	3,648	1,248	623	319	710	2,900
Percent of loans	14%	10%	20%	23%	26%	30%	23%

Source: Authors' calculations from NFMC program data for Jan. to Dec. 2008 and LPS loan performance data through Dec. 2008.

Our analysis of foreclosure avoidance comparing NFMC and non-NFMC loans did not yield any significant estimates of positive program effects. It is highly likely that we lacked the necessary information, such as data on loss of income or unanticipated household expenses, that would allow us to control for all of the factors necessary to differentiate foreclosure outcomes between the NFMC and non-NFMC loans. Therefore, we focused our analysis on the NFMC-only models for this outcome.

For the NFMC-only modeling analysis, we used a single hazard model that compared the foreclosure experience of NFMC clients *before* they entered counseling with their experience *after* counseling began. The estimated program effect was represented by the change in a client's likelihood of entering foreclosure while receiving counseling services relative to their likelihood prior to counseling. Given the very different observed behavior of loans based on delinquency status, we estimated four separate models for clients who were current, one month, two months, three months, and four or more months delinquent on their mortgages, as of January 2008.

The summary of key results from these models is presented in table 6. The table shows only the impact of counseling for borrowers in the four different levels of mortgage delinquency. It does not report the impact of other control variables on foreclosure outcomes. The full set of modeling results may be found in appendix C.



Table 6: Hazard Model Estimates of Counseling Effects on Likelihood of Foreclosure, NFMC-Counseled Loans Only

Model:			
Months Delinquent as of January 2008	Parameter Estimate	Pr > ChiSq	Hazard Ratio
0 (Current)	0.39822	<.0001	1.489
1	0.09244	0.1968	1.097
2	-0.18266	0.0604	0.833
3	-0.21597	0.0864	0.806
4+	0.09511	0.2547	1.100

Source: Hazard model estimates from NFMC program data for Jan. to Dec. 2008 and LPS loan performance data through Dec. 2008.

The key statistics in table 6 are in the last column, labeled “Hazard Ratio.” This ratio represents the proportionate impact of counseling on the likelihood of foreclosure. A hazard ratio of 1 means that a homeowner, after entering counseling, has the same likelihood of a foreclosure start as before he/she entered counseling. In other words, this would indicate no program effect. A hazard ratio significantly greater than 1 would mean that the homeowner was *more* likely to start a foreclosure after counseling began; while a hazard ratio of less than 1 would mean that the homeowner was *less* likely to have a foreclosure start after entering counseling.

The column labeled “Parameter Estimate” contains the model coefficients which translate into the hazard ratios. The column labeled “Pr > ChiSq” reports statistical significance of the hazard ratios being different from 1.0 (i.e., no effect). Significance levels of 0.10 or smaller correspond to statistical confidence at the 90-percent level, which means that entry into counseling is statistically likely to have an impact on the outcome.

The model results indicate that NFMC-counseled homeowners who were two or three months delinquent on their mortgages as of January 2008 were significantly less likely to enter foreclosure after the start of counseling. Homeowners who were two months delinquent would be only 83 percent as likely to suffer a foreclosure once counseling had begun, as opposed to before counseling. The percentage of foreclosures prevented by counseling is, therefore, 17 percent (100 minus 83) of those who entered counseling and who were not yet in foreclosure. Similarly, NFMC-counseled homeowners who were three months delinquent on their mortgages as of January 2008 were 81 percent as likely to start foreclosure as they were prior to counseling.



The only other result that was statistically significant was for homeowners who were current on their loans as of January 2008. These homeowners were 1.5 times more likely to start a foreclosure after entering counseling than they were prior to counseling. We consider this to be a spurious finding, however, as it does not seem reasonable to attribute such a detrimental effect to the counseling program itself. One possible explanation might be that certain people who were still current on their mortgages at the start of the year, but who later suffered a serious unanticipated problem (such as a job loss), might proactively enter counseling shortly before foreclosure is imminent. Since it would be highly unlikely at that point for the homeowner to avoid a foreclosure start, counseling might appear to be correlated with higher foreclosure rates for these homeowners, even though counseling was not the cause of the problem.

The impact of counseling is not statistically significant for those borrowers either one month delinquent or four or more months delinquent at the start of the year. That we could not find a significant counseling impact for clients with severe delinquencies is consistent with our early field work information and review of the literature, in which counseling agencies report the greatest likelihood of success for people who come into counseling fairly soon after their problems arise. The impact of counseling in those cases may be more to cure foreclosures after they occur than to avoid a foreclosure start. (We analyze counseling's impact on such cures in the next section.)

Using the hazard ratios, we estimated the number of foreclosures avoided by the NFMC program through December 31, 2008. The estimate was based only on the statistically significant hazard ratios for NFMC clients who were 2 months or 3 months delinquent on their mortgage as of January 2008. Overall, about 260,000 clients were served in calendar year 2008, of which 7 percent (18,200 clients) were 2 month delinquent as of January 2008 and 4 percent (10,400) were 3 months delinquent. Based on our sample of loans with performance information, we estimate that 2,708 loans that were 2 months delinquent went into foreclosure during 2008 and 1,387 loans that were 3 months delinquent went into foreclosure during the same period. Without the NFMC program, we estimate that a total of 880 additional loans (555 that were 2 months delinquent in January 2008 and 325 that were 3 months delinquent as of January 2008) would have gone into foreclosure during 2008.

A recent report estimates that foreclosures create costs that average about \$37,300 per foreclosed loan.¹³ Therefore, we roughly estimate that the NFMC program, by preventing 880 foreclosures, created potential savings of about \$33 million between January and December 2008 (assuming that all of these foreclosures would have been completed at some time in the future). This estimate does not include the impact of NFMC counseling on the ability of clients to

¹³ McFarlane, Alistair, Edward Szymanoski Kurt Usowski. 2009. *The Impact of the HOPE for Homeowners Program Rule*. Washington, DC: US Department of Housing and Urban Development.



cure their foreclosures (discussed next), which creates similar savings as foreclosures avoided. Moreover, the above estimate does not include differences in payments from loan modifications that NFMC clients received compared to modifications they would have received without the help of NFMC counseling, which we also examined.

We also used the same NFMC-only foreclosure avoidance model to analyze the differential impact of levels of counseling provided to homeowners (Levels 1, 2, and 3) and the number of hours of individual counseling. We found no consistent positive or negative effect, however, of the differing levels compared to each other. On a preliminary basis, we think that there is a major obstacle in observing impacts using these measures of counseling quantity. It is likely that more counseling signals a combination of borrowers having more severe problems and/or difficult servicers with whom to work, together with counselors providing more extensive help. There is no reason to expect necessarily better or worse outcomes for cases with higher levels of counseling, and the findings therefore do not provide additional information about the impact of level of counseling service on foreclosures avoided.

NFMC Program's Effect on Foreclosure Cures

Receiving a foreclosure notice does not mean that a homeowner will lose his/her home. Homeowners may be able to cure a foreclosure by paying all or part of the outstanding amount owed, by negotiating a forbearance agreement or new loan terms with the lender, or by some combination of both payment and negotiation. Some homeowners may be able to cure their foreclosure through their own efforts, while others may need the services of a housing counselor to avoid a foreclosure sale.

For this outcome, we estimated whether homeowners in foreclosure were more likely to cure their foreclosure, and thereby reduce the likelihood of losing their home if they made use of counseling services provided by NFMC Grantees. Based on our analysis of the NFMC and LPS data, 32 percent of counseled homeowners in our loan sample were in foreclosure sometime in 2008, compared to 17 percent of the non-NFMC group.¹⁴ We observed each of these loans to determine whether a foreclosure cure occurred after the start of the current foreclosure episode, but before January 2009. In some cases, homeowners who eventually sought NFMC counseling cured their foreclosure prior to the start of counseling (about one third of the NFMC foreclosures). We did not count these pre-counseling cures as an effect of the program; we only included cures that occurred *after* the start of counseling as a program effect.

As with the other outcomes, we estimated the NFMC program's effect on a client's likelihood of curing a foreclosure with two types of models. The first used both NFMC and non-NFMC loans and the second used only loans for NFMC clients. For the latter, we estimated two

¹⁴ Some of these foreclosures started prior to January 2008. They were still considered a foreclosure episode for this analysis if the episode continued into 2008.



versions of the model, one with a simple counseling effect and another to estimate the effects of different levels of counseling service provided.

The estimates from all models showed statistically significant, positive effects of the NFMC program (table 7; full model results may be found in appendices D and E). Clients who received services from NFMC Grantees were about *1.6 times more likely* to cure their foreclosure than homeowners who did not receive such services from NFMC Grantees. The estimated impact was nearly identical when NFMC clients were compared to non-NFMC clients (the NFMC vs. non-NFMC model) and when we compared the NFMC clients pre- and post-counseling experiences (NFMC-only models).

Table 7: LOGIT Model Odds Ratio Estimates for Counseling Effects on Likelihood of Foreclosure Cure

	Odds Ratio Estimates for Foreclosure Cure		
	Point Estimate	95 Percent Confidence Interval	
<i>NFMC vs. Non-NFMC Model</i>			
Effect of Counseling	1.6	1.56	1.72
<i>NFMC-Only Model #1 (Simple Counseling Effect)</i>			
Effect of Counseling	1.6	1.49	1.68
<i>NFMC-Only Model #2 (Counseling Level Effects)</i>			
Counseling Level 1	1.5	1.40	1.62
Counseling Level 2	1.5	1.39	1.67
Counseling Level 3	1.8	1.64	1.91
Hours of counseling	1.0	0.99	1.00

Source: LOGIT model estimates from NFMC program data for Jan. to Dec. 2008 and LPS loan performance data through Dec. 2008.

As noted earlier, one potential issue with our analysis is that all servicers are not represented in our NFMC sample, whereas it is likely that non-NFMC loans are serviced by a representative sample of all servicers that report information to LPS. Nonetheless, the estimated program effect on the likelihood of foreclosure cures was the same whether we compared NFMC and non-NFMC loans or we examined only NFMC loans. Based on these results, it seems unlikely that the servicers included in our NFMC sample somehow reflect an



unrepresentative sample of organizations that have either too liberal or too restrictive policies toward foreclosure cures, relative to the non-NFMC loan sample.

The positive program effect on foreclosure cures was about the same regardless of the level of treatment received by a client. Compared to receiving no counseling, recipients of Level 1, Level 2 and Level 3 counseling services all had a 1.5 to 1.8 times greater likelihood of curing a foreclosure. The differences across counseling levels were not statistically significant, however, meaning that we could not discern any differential effect based on the level of counseling service provided. Furthermore, after controlling for counseling level, the number of hours spent counseling the client did not significantly impact, positively or negatively, the likelihood of a foreclosure cure (i.e., the odds ratio for hours of counseling provided was not statistically different from 1.0). This may be because the counseling level, by itself, adequately captures the variation in counseling services being provided. In addition, spending a larger number of hours with clients may reflect the greater complexity of these cases, which in turn makes it more difficult to achieve a successful outcome.

NFMC Program's Effect on Loan Modifications

Based on information we collected from Grantees during our case study site visits, an important service provided by NFMC counselors is to call a client's loan servicer to discuss the possibility of modifying the mortgage to make it more affordable to the homeowner. Before contacting the servicer, NFMC counselors use the expense and income information provided by the client to determine what type of loan modification would result in a new monthly payment that would be affordable to the homeowner. Non-NFMC homeowners, of course, can contact loan servicers themselves and request loan modifications. For this analysis, we estimated whether loan modifications received for counseled clients were more beneficial to those homeowners than modifications negotiated outside of the NFMC program.

As described earlier, the LPS data allowed us to identify loan modifications, although not with absolute precision. Our method for identifying modifications was based on observed changes in loan terms that were most likely to have reduced the monthly payments for the homeowner. Using this methodology, we identified modified loans within both the NFMC and non-NFMC samples. We also calculated the reduction in monthly mortgage payment (for principle, interest, taxes, and insurance) that resulted from the modification, both as an absolute dollar amount and a percentage change from the previous payment level.

Approximately 18 percent of NFMC-counseled loans and 11 percent of non-NFMC loans in our sample received a loan modification between January and December 2008. About one quarter of NFMC clients received their loan modification prior to the start of counseling services. As was the case with the other outcomes we examined, we did not count these pre-counseling modifications as a program effect.



To determine the effect of the NFMC program on a client's loan modification, we ran ordinary least squares (OLS) regression models that estimated the payment reduction while controlling for other factors that might affect the amount that the monthly payment was lowered. We used the same control variables as in our previous models, but also added the original loan amount to control for the size of the loan, since larger loans would tend to have larger monthly payments and therefore might be expected to receive larger payment reductions. As with the other outcomes, we estimated a model comparing NFMC with non-NFMC loans, as well as models measuring counseling effects for only the NFMC loans.

All models yielded consistent, statistically-significant results indicating that NFMC-counseled homeowners received much more favorable loan modification terms from their servicers than homeowners who received modifications without the benefit of NFMC counseling (tables 8 and 9; full model results may be found in appendices F and G). NFMC client loans that were modified had a resulting monthly payment that was *\$454 less*, on average, than the non-NFMC-counseled loans that received a modification. This corresponds to an average payment that was 17 percent less than would have been the case without counseling.

Results from the models estimated with only NFMC loans found similar positive program effects. The overall counseling effect from the NFMC-only model (model #1) was virtually identical to the NFMC vs. non-NFMC model, with an average additional payment reduction of \$456 or 19 percent. Model #2 looked at the effects of different levels of counseling on payment reductions. The results from NFMC-only model #2 showed that all three levels of counseling service provided comparable benefits to counseled homeowners, with average additional payment reductions between \$357 and \$523, for Levels 2 and 3 counseling, respectively.

As we noted in the discussion of the foreclosure cure results, the robustness and consistency of our findings of a positive program effect for this outcome would seem to minimize the concern that differences in the servicer representation between our NFMC and non-NFMC loan samples are biasing our modeling analysis.

The number of individual counseling hours provided to the client had a small, although statistically significant, impact on the amount of payment reduction received from the loan modification. Each additional hour of counseling services provided reduced the amount the payment reduction by \$2.50 or 0.09 percent. It is likely that this result reflects the additional time required to counsel more difficult cases which, for reasons beyond the control of the counselor, may in turn make it less likely for the homeowner to receive a better loan modification.

That NFMC-counseled homeowners received more favorable loan modifications than non-counseled homeowners is a potentially very significant finding regarding the longer-term impacts of the program. As noted earlier, research on loan performance has highlighted a positive relationship between better mortgage outcomes (such as foreclosure avoidance and reduced delinquency recidivism) and significant reductions in monthly loan payments. Therefore, to the extent that NFMC Grantees were able to help homeowners obtain more



beneficial loan modifications from servicers and lenders, one would expect to see improved client outcomes. In future analyses, we will examine directly the extent to which recipients of loan modifications were able to keep current on their mortgages subsequent to having their payment reduced.

Table 8: OLS Regression Model Estimates for Counseling Effects on Dollar Reduction in Monthly Payment Resulting from Loan Modifications

	Average Additional Reduction (\$) in Monthly Payment		
	Parameter Estimate	95 Percent Confidence Interval	
<i>NFMC vs. Non-NFMC Model</i>			
Effect of Counseling	454	424	484
<i>NFMC-Only Model #1 (Simple Counseling Effect)</i>			
Effect of Counseling	456	425	486
<i>NFMC-Only Model #2 (Counseling Level Effects)</i>			
Counseling Level 1	453	418	487
Counseling Level 2	357	312	403
Counseling Level 3	523	486	560
Hours of counseling	-2.5	-4.9	0.0

Source: OLS model estimates from NFMC program data for Jan. to Dec. 2008 and LPS loan performance data through Dec. 2008.



Table 9: OLS Regression Model Estimates for Counseling Effects on Percentage Reduction in Monthly Payment Resulting from Loan Modifications

	Average Additional Reduction (%) in Monthly Payment		
	Parameter Estimate	95 Percent Confidence Interval	
<i>NFMC vs. Non-NFMC Model</i>			
Effect of Counseling	17	16.5	17.9
<i>NFMC-Only Model #1 (Simple Counseling Effect)</i>			
Effect of Counseling	19	17.8	19.6
<i>NFMC-Only Model #2 (Counseling Level Effects)</i>			
Counseling Level 1	19	17.9	19.8
Counseling Level 2	16	14.8	17.4
Counseling Level 3	20	19.3	21.4
Hours of counseling	-0.09	-0.16	-0.02

Source: OLS model estimates from NFMC program data for Jan. to Dec. 2008 and LPS loan performance data through Dec. 2008.



CONCLUSION

Round 1 of the NFMC program served over 300,000 clients through December 2008. An overwhelming share of the program's clients were in financial distress, most likely due to a loss or reduction in their income. About 75 percent of NFMC clients were delinquent on their mortgage when they started counseling, including 22 percent of clients who received a foreclosure notice before they obtained counseling services.

Although NFMC clients were frequently in a perilous financial situation, our preliminary analysis showed that counselors employed by the program's Grantees were able to achieve better results, for several key client outcomes, than would have been the case had the client not used NFMC-funded services. Based on analyses of loan performance information, NFMC program counselors helped 880 clients avoid foreclosure through the end of December 2008. We estimated that this created a potential cost-savings of \$33 million in foreclosure avoidance between January and December 2008.

About two-thirds of the foreclosures among NFMC clients started before the homeowner began counseling. The NFMC program, of course, could not help prevent such foreclosures. Nonetheless, NFMC counselors made it more likely that such clients (as well as clients who received foreclosure notices after they started counseling) would be able to cure their foreclosure. Compared to non-NFMC homeowners who received foreclosure notices, NFMC clients were about 1.6 times more likely to cure their foreclosure in 2008.

Finally, NFMC clients received loan modifications that resulted in lower monthly payments, as compared to non-NFMC clients. We estimated that NFMC clients, without counseling, would have received a loan modification with a monthly payment \$454 higher than the modification they actually received. Lower monthly payments should increase the likelihood that NFMC clients remain current on their modified mortgage.

In conclusion, our preliminary analysis of the NFMC program, using data on clients and loan performance through December 2008, suggests that the program is having its intended effect of helping homeowners who are facing loss of their homes through foreclosure. In subsequent analyses, we will be able to estimate the program's impact on clients who received counseling services in 2009. We will also observe loan performance over a longer period of time, which will allow for a better measurement of the overall impact of the NFMC program.

Indeed, as we only observed data through 2008 in this preliminary analysis, we may find more foreclosures avoided as we extend the time period for which we observe loan



performance and analyze data for more clients. Our analysis to date has suggested that receiving good loan modifications – ones that are likely to reduce the amount of the homeowner’s monthly payment to an affordable level – greatly improves client outcomes. These findings are consistent with other research (OCC and OTS 2009). The period for this analysis (January through December 2008) was one in which loan modifications were reportedly more difficult to obtain than currently. For example, the federal government introduced the *Making Home Affordable* program in 2009, which is intended to help more homeowners obtain sustainable loan modifications by offering financial incentives to lenders. If we do, in fact, see more NFMC clients obtaining loan modifications in the second program year, then we would hope to observe better outcomes for these homeowners as well.



REFERENCES

- Allison, Paul D. 1982. "Discrete-Time Methods for the Analysis of Time Histories." *Sociological Methods*, 13, 61-98.
- Ambrose, Brent W. and Charles A. Capone. 1998. "Modeling the Conditional Probability of Foreclosure in the Context of Single-Family Mortgage Default Resolutions." *Real Estate Economics*, 26(3), 391-429.
- Coulton, Claudia, Tsui Chan, Michael Schramm, and Kristen Mikelbank. 2008. "Pathways to Foreclosure: A Longitudinal Study of Mortgage Loans, Cleveland and Cuyahoga County, 2005-2008." Case Western Reserve University, Center on Urban Poverty and Community Development, Cleveland, OH.
- Dubitsky, Rod, Larry Yang, Stevan Stevanovic, Thomas Suehr. 2008. *Subprime Loan Modifications Update*. Credit Suisse. October 1.
- Elmer, Peter J. and Steven A. Seelig. 1998. "The Rising Long-Term Trend of Single-Family Mortgage Foreclosure Rates." FDIC Working Paper 98-2. Washington, DC: Federal Deposit Insurance Corporation.
- Foote, Christopher L., Kristopher S. Gerardi, Lorenz Goette, and Paul S. Willen. 2009. *Reducing Foreclosures*. Boston, MA: Federal Reserve Bank of Boston. Public Policy Discussion Papers. No. 09-2.
- Galster, George, Chris Hayes, and Jennifer Johnson. 2005. "Identifying Robust, Parsimonious Neighborhood Indicators." *Journal of Planning Education and Research* 24, 265-280.
- Gardner, Mona J. and Dixie L. Mills. 1989. "Evaluating the Likelihood of Default on Delinquent Loans." *Financial Management*, 18(4), 55-63.
- Goodman, Laurie, Roger Ashworth, Brian Landy, and Ke Yin. *Everything You Always Wanted To Know About Modification But Were Afraid To Ask*. Amherst Mortgage Insight. June 23.
- Hartarska, Valentina and Claudio Gonzalez-Vega. 2005. "Credit Counseling and Mortgage Termination by Low-Income Households." *Journal of Real Estate Finance and Economics*, 30 (3), 227-43.



- Hirad, Abdighani and Peter M. Zorn. 2001. "A Little Knowledge is a Good Thing: Empirical Evidence of the Effectiveness of Pre-Purchase Homeownership Counseling." McLean, VA: Freddie Mac.
- LPS Applied Analytics. 2009. *Mortgage Monitor: December 31, 2008 Performance Data Prepared as of January 20, 2009.*
- Mayer, Neil, Peter A. Tatian, Kenneth Temkin, and Mark Benson. 2009. *National Foreclosure Mitigation Counseling Program Evaluation: Interim Report #2.* Washington, D.C.: The Urban Institute. Prepared for NeighborWorks® America. May 12.
- Mayer, Neil, Peter A. Tatian, Kenneth Temkin, Elizabeth Guernsey, and Leah Hendey. 2008. *National Foreclosure Mitigation Counseling Program Evaluation: Interim Report #1.* Washington, D.C.: The Urban Institute. Prepared for NeighborWorks® America. December 19.
- Office of the Comptroller of the Currency and Office of Thrift Supervision. 2009. *OCC and OTS Mortgage Metrics Report: Second Quarter 2009.* Washington, D.C.: U.S. Department of the Treasury. September.
- Quercia, Roberto G., Lei Ding, and Janneke Ratcliffe. 2009. *Loan Modification and Redefault Risk.* Chapel Hill, NC: Center for Community Capital, University of North Carolina. Working paper. March.
- Quercia, Roberto G., George W. McCarthy, and Michael A. Stegman. 1995. "Mortgage Default among Rural, Low-Income Borrowers." *Journal of Housing Research*, 6(2): 349-369.
- Quercia, Roberto G., Michael A. Stegman, and Walter R. Davis. 2005. "The Impact of Predatory Loan Terms on Subprime Foreclosures: The Special Case of Prepayment Penalties and Balloon Payments." The University of North Carolina at Chapel Hill, Center for Community Capitalism, Chapel Hill, NC.
- Stegman, Michael A., Roberto G. Quercia, Janneke Ratcliffe, Lei Ding, and Walter R. Davis. "Preventive Servicing Is Good for Business and Affordable Homeownership Policy." *Housing Policy Debate*. 18(2). 243-278.



Appendix A: HMDA Matching Methodology





HMDA loan application records (LARs) for mortgages originated between 2002 and 2007 were match merged with LPS loan records for mortgages active as of January 2008 and originated since 2002. The objective was to attain a sufficient number of exact loan matches to generate a comparison sample of LPS loan records containing information on race, gender, ethnicity, and Census tract location obtained from the matching HMDA loan records.

The matching procedure included the following steps:

1. Prepared LPS loan records from January 2008 for matching within counties by assigning LPS 5-digit ZIP codes to 5-digit FIPS state-county codes using commercially available ZIP-to-county conversion data.
2. Prepared extracts of HMDA LARs for originated mortgages for all years from 2002 to 2007 (HMDA data for 2008 will not be released until September 2009). HMDA LARs include information on Census tract, and 5-digit FIPS state-county codes.
3. Develop additional common matching variables for both LPS and HMDA loan records, including:
 - FIPS 5-digit State-County Code
 - Origination Year
 - Original Loan Amount
 - Lien Status
 - Loan Type (Conventional, FHA, VA, Other)
 - Loan Purpose (Purchase, Home Improvement, Refinance)
 - Property Type (Single Family, Manufactured, Multi-Family)
 - High Interest Rate Loan
4. The HMDA and LPS loan records were matched by successively loading each year of HMDA data and match merging all LPS loans present in the January 2008 LPS extract and originated in the same year.
5. Lien status, property type, and ethnicity were included in HMDA only since 2004, so these variables were not used in matching for HMDA years 2002 and 2003. The high-interest-rate loan indicator was excluded from the final matching algorithm due to limitations on the available data in HMDA (reported as yield spread only when exceeding yield on corresponding Treasury maturity by specified margins).
6. The resulting candidate matches were retained only if there was a unique match within loan subgroups defined by unique combinations of the variables used for



matching. That is, a matched pair of HMDA and LPS loans is considered to be an exact match only if it is unique within its county, origination year, loan amount, lien status, loan type, loan purpose, and property type combination.

7. Matching loan records for each HMDA year were then combined into a single matched-loan file representing loans active (present in the LPS extract) as of January 2008. These loan records included LPS loan IDs and additional variables from HMDA for race, gender, ethnicity, and Census tract location.



Appendix B: Descriptive Statistics for Model Explanatory Variables





Descriptive Statistics for Model Explanatory Variables

Variable	Mean	Minimum	Maximum
CurrentIntRate	6.77605	1.12500	16.37500
IntTypeARM	0.36785	0	1.00000
OptionARM	0.12498	0	1.00000
InvAgency	0.48563	0	1.00000
Jumbo	0.24855	0	1.00000
ApprovalRateHomePurch_06_07	61.67627	19.04762	100.00000
MrtgOrigMedAmt_thou	245.36079	24.75000	3104
unemp_chg_pct	110.36223	39.66942	301.88679
Hpi_chg_pct	92.86785	57.31754	107.73391
LTV	77.22714	2.06250	406.84138
LTVnot80	0.84685	0	1.00000
MrtGrdBC	0.10970	0	1.00000
FICOOrg	684.31527	300.00000	832.00000
Unemp	6.16705	2.20000	27.20000
black	0.13191	0	1.00000
asian	0.03900	0	1.00000
hispanic	0.16135	0	1.00000
othrace	0.03250	0	1.00000





Appendix C: Parameter Estimates for Hazard Models of Time to Foreclosure – NFMC Only





**Hazard Model of Time to Foreclosure - NFMC Only, Simple Program Effect:
 Loans Current as of January 2008**

Model Fit Statistics

Criterion	Without Covariates	With Covariates
-2 LOG L	41267.905	40602.221
AIC	41267.905	40650.221
SBC	41267.905	40786.930

Testing Global Null Hypothesis: BETA=0

Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	665.6842	24	<.0001
Score	636.0120	24	<.0001
Wald	687.6475	24	<.0001



Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Chi-Square	Pr > ChiSq	Hazard Ratio	Variable Label
Entered_counseling	1	0.39822	0.05038	62.4809	<.0001	1.489	Client entered counseling
black	1	-0.34510	0.06427	28.8287	<.0001	0.708	Black borrower
asian	1	0.08219	0.10936	0.5649	0.4523	1.086	Asian/PI borrower
othrace	1	0.07542	0.09082	0.6896	0.4063	1.078	Other race borrower
hispanic	1	-0.01365	0.05708	0.0572	0.8110	0.986	Hispanic borrower
income_thou	1	-0.00511	0.0007472	46.7739	<.0001	0.995	NFMC-reported income (\$ thousands)
FICOOrg	1	-0.00203	0.0004040	25.2502	<.0001	0.998	FICO/Credit Score – Original
CurrentIntRate	1	0.13634	0.01966	48.1000	<.0001	1.146	Current Interest Rate
MrtGrdBC	1	-0.53540	0.06619	65.4306	<.0001	0.585	Grade B/C mortgage
IntTypeARM	1	0.18749	0.05521	11.5306	0.0007	1.206	ARM loan
IntTypeOth	1	-0.37448	0.18344	4.1672	0.0412	0.688	Other interest type loan
OptionARM	1	-0.43206	0.07622	32.1338	<.0001	0.649	Option ARM loan
InvAgency	1	-0.13446	0.06247	4.6334	0.0314	0.874	Agency loan
InvGov	1	-0.22407	0.45284	0.2448	0.6207	0.799	Government loan
InvPortfolio	1	-0.31372	0.08226	14.5443	0.0001	0.731	Portfolio loan
Jumbo	1	0.20634	0.07895	6.8316	0.0090	1.229	Jumbo loan
ApprovalRateHomePurch_06_07	1	-0.00745	0.00230	10.4536	0.0012	0.993	Home mortgage approval rate (%), 2006-07
MrtgOrigMedAmt_thou	1	-0.0005879	0.0003057	3.6981	0.0545	0.999	Median amount home purchase mortgages (\$ thousands)
Unemp	1	-0.14909	0.01674	79.2916	<.0001	0.861	Monthly unemployment rate (%)
Unemp_chg_pct	1	-0.01840	0.00142	167.1203	<.0001	0.982	Pct change in unemp. rate since 1/08
Hpi	1	0.0002246	0.0004546	0.2441	0.6213	1.000	Quarterly housing price index
Hpi_chg_pct	1	-0.04471	0.00394	128.7224	<.0001	0.956	Pct change in HPI since 1/08
LTV	1	0.01354	0.00169	64.4306	<.0001	1.014	Loan-to-value ratio
LTVnot80	1	0.13124	0.05561	5.5700	0.0183	1.140	Dummy for LTV not = 80



**Hazard Model of Time to Foreclosure - NFMC Only, Counseling Level Effects:
 Loans Current as of January 2008**

Model Fit Statistics

Criterion	Without Covariates	With Covariates
-2 LOG L	41267.905	40590.822
AIC	41267.905	40644.822
SBC	41267.905	40798.619

Testing Global Null Hypothesis: BETA=0

Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	677.0837	27	<.0001
Score	652.4132	27	<.0001
Wald	702.9539	27	<.0001



Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Chi-Square	Pr > ChiSq	Hazard Ratio	Variable Label
level_1_intk	1	0.38153	0.05725	44.4076	<.0001	1.465	Received level 1 counseling
level_2_intk	1	0.50340	0.08167	37.9961	<.0001	1.654	Received level 2 counseling
level_3_intk	1	0.26636	0.07257	13.4727	0.0002	1.305	Received level 3 counseling
counseling_hours	1	0.01154	0.00437	6.9858	0.0082	1.012	Tot indiv counseling hours received
black	1	-0.33289	0.06471	26.4652	<.0001	0.717	Black borrower
asian	1	0.09118	0.10941	0.6945	0.4046	1.095	Asian/PI borrower
othrace	1	0.08419	0.09086	0.8586	0.3541	1.088	Other race borrower
hispanic	1	-0.00953	0.05732	0.0277	0.8679	0.991	Hispanic borrower
income_thou	1	-0.00506	0.0007477	45.8752	<.0001	0.995	NFMC-reported income (\$ thousands)
FICOOrg	1	-0.00201	0.0004042	24.8414	<.0001	0.998	FICO/Credit Score – Original
CurrentIntRate	1	0.13577	0.01968	47.5734	<.0001	1.145	Current Interest Rate
MrtGrdBC	1	-0.53280	0.06616	64.8442	<.0001	0.587	Grade B/C mortgage
IntTypeARM	1	0.18772	0.05521	11.5613	0.0007	1.206	ARM loan
IntTypeOth	1	-0.36881	0.18346	4.0416	0.0444	0.692	Other interest type loan
OptionARM	1	-0.43349	0.07626	32.3156	<.0001	0.648	Option ARM loan
InvAgency	1	-0.13423	0.06250	4.6126	0.0317	0.874	Agency loan
InvGov	1	-0.24181	0.45302	0.2849	0.5935	0.785	Government loan
InvPortfolio	1	-0.31595	0.08229	14.7427	0.0001	0.729	Portfolio loan
Jumbo	1	0.20218	0.07894	6.5593	0.0104	1.224	Jumbo loan
ApprovalRateHomePurch_06_07	1	-0.00718	0.00231	9.6801	0.0019	0.993	Home mortgage approval rate (%), 2006-07
MrtgOrigMedAmt_thou	1	-0.0005758	0.0003054	3.5549	0.0594	0.999	Median amount home purchase mortgages (\$ thousands)
Unemp	1	-0.15073	0.01677	80.7778	<.0001	0.860	Monthly unemployment rate (%)
Unemp_chg_pct	1	-0.01858	0.00142	170.7749	<.0001	0.982	Pct change in unemp. rate since 1/08
Hpi	1	0.0002282	0.0004551	0.2515	0.6160	1.000	Quarterly housing price index
Hpi_chg_pct	1	-0.04500	0.00394	130.2138	<.0001	0.956	Pct change in HPI since 1/08



Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Chi-Square	Pr > ChiSq	Hazard Ratio	Variable Label
LTV	1	0.01358	0.00169	64.2078	<.0001	1.014	Loan-to-value ratio
LTVnot80	1	0.13257	0.05561	5.6824	0.0171	1.142	Dummy for LTV not = 80



**Hazard Model of Time to Foreclosure - NFMC Only, Simple Program Effect:
 Loans 1 Month Delinquent as of Jan. 2008**

Model Fit Statistics

Criterion	Without Covariates	With Covariates
-2 LOG L	17479.701	17269.607
AIC	17479.701	17317.607
SBC	17479.701	17438.156

Testing Global Null Hypothesis: BETA=0

Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	210.0939	24	<.0001
Score	205.6702	24	<.0001
Wald	211.4519	24	<.0001



Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Chi-Square	Pr > ChiSq	Hazard Ratio	Variable Label
Entered_counseling	1	0.09244	0.07161	1.6662	0.1968	1.097	Client entered counseling
black	1	-0.18232	0.08115	5.0478	0.0247	0.833	Black borrower
asian	1	0.09355	0.19383	0.2329	0.6294	1.098	Asian/PI borrower
othrace	1	-0.02701	0.13168	0.0421	0.8375	0.973	Other race borrower
hispanic	1	-0.03664	0.08850	0.1714	0.6789	0.964	Hispanic borrower
income_thou	1	-0.00339	0.00103	10.7650	0.0010	0.997	NFMC-reported income (\$ thousands)
FICOOrg	1	0.00153	0.0005907	6.7375	0.0094	1.002	FICO/Credit Score – Original
CurrentIntRate	1	0.06179	0.02525	5.9862	0.0144	1.064	Current Interest Rate
MrtGrdBC	1	-0.39663	0.08373	22.4398	<.0001	0.673	Grade B/C mortgage
IntTypeARM	1	0.21296	0.07993	7.0983	0.0077	1.237	ARM loan
IntTypeOth	1	-0.22756	0.30615	0.5525	0.4573	0.796	Other interest type loan
OptionARM	1	-0.00584	0.11778	0.0025	0.9604	0.994	Option ARM loan
InvAgency	1	-0.33770	0.08825	14.6415	0.0001	0.713	Agency loan
InvGov	1	-0.34963	0.41797	0.6997	0.4029	0.705	Government loan
InvPortfolio	1	-0.29336	0.11144	6.9292	0.0085	0.746	Portfolio loan
Jumbo	1	0.16716	0.13840	1.4588	0.2271	1.182	Jumbo loan
ApprovalRateHomePurch_06_07	1	-0.00395	0.00303	1.6982	0.1925	0.996	Home mortgage approval rate (%), 2006-07
MrtgOrigMedAmt_thou	1	0.0000986	0.0004386	0.0506	0.8220	1.000	Median amount home purchase mortgages (\$ thousands)
Unemp	1	-0.00631	0.02471	0.0652	0.7985	0.994	Monthly unemployment rate (%)
Unemp_chg_pct	1	-0.02680	0.00276	93.9815	<.0001	0.974	Pct change in unemp. rate since 1/08
Hpi	1	0.0004286	0.0005537	0.5991	0.4389	1.000	Quarterly housing price index
Hpi_chg_pct	1	-0.00735	0.00819	0.8047	0.3697	0.993	Pct change in HPI since 1/08
LTV	1	0.00224	0.00112	4.0521	0.0441	1.002	Loan-to-value ratio
LTVnot80	1	0.05391	0.08465	0.4056	0.5242	1.055	Dummy for LTV not = 80



**Hazard Model of Time to Foreclosure - NFMC Only, Counseling Level Effects:
Loans 1 Month Delinquent as of Jan. 2008**

Model Fit Statistics

Criterion	Without Covariates	With Covariates
-2 LOG L	17479.701	17263.657
AIC	17479.701	17317.657
SBC	17479.701	17453.274

Testing Global Null Hypothesis: BETA=0

Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	216.0447	27	<.0001
Score	213.3764	27	<.0001
Wald	219.0457	27	<.0001



Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Chi-Square	Pr > ChiSq	Hazard Ratio	Variable Label
level_1_intk	1	0.07563	0.08717	0.7527	0.3856	1.079	Received level 1 counseling
level_2_intk	1	0.29003	0.11825	6.0161	0.0142	1.336	Received level 2 counseling
level_3_intk	1	-0.03895	0.10769	0.1308	0.7176	0.962	Received level 3 counseling
counseling_hours	1	0.00442	0.00812	0.2962	0.5862	1.004	Tot indiv counseling hours received
black	1	-0.18289	0.08156	5.0281	0.0249	0.833	Black borrower
asian	1	0.09232	0.19380	0.2269	0.6338	1.097	Asian/PI borrower
othrace	1	-0.02873	0.13202	0.0473	0.8278	0.972	Other race borrower
hispanic	1	-0.04077	0.08869	0.2114	0.6457	0.960	Hispanic borrower
income_thou	1	-0.00330	0.00103	10.2039	0.0014	0.997	NFMC-reported income (\$ thousands)
FICOOrg	1	0.00151	0.0005902	6.5422	0.0105	1.002	FICO/Credit Score – Original
CurrentIntRate	1	0.06171	0.02520	5.9968	0.0143	1.064	Current Interest Rate
MrtGrdBC	1	-0.39871	0.08374	22.6687	<.0001	0.671	Grade B/C mortgage
IntTypeARM	1	0.21507	0.07992	7.2424	0.0071	1.240	ARM loan
IntTypeOth	1	-0.23693	0.30620	0.5987	0.4391	0.789	Other interest type loan
OptionARM	1	-0.01025	0.11802	0.0075	0.9308	0.990	Option ARM loan
InvAgency	1	-0.33524	0.08832	14.4060	0.0001	0.715	Agency loan
InvGov	1	-0.34697	0.41797	0.6891	0.4065	0.707	Government loan
InvPortfolio	1	-0.29590	0.11156	7.0348	0.0080	0.744	Portfolio loan
Jumbo	1	0.16195	0.13869	1.3635	0.2429	1.176	Jumbo loan
ApprovalRateHomePurch_06_07	1	-0.00398	0.00303	1.7262	0.1889	0.996	Home mortgage approval rate (%), 2006-07
MrtgOrigMedAmt_thou	1	0.0001188	0.0004378	0.0737	0.7861	1.000	Median amount home purchase mortgages (\$ thousands)
Unemp	1	-0.00794	0.02483	0.1024	0.7490	0.992	Monthly unemployment rate (%)
Unemp_chg_pct	1	-0.02687	0.00276	94.6483	<.0001	0.973	Pct change in unemp. rate since 1/08
Hpi	1	0.0004178	0.0005543	0.5682	0.4510	1.000	Quarterly housing price index
Hpi_chg_pct	1	-0.00774	0.00820	0.8909	0.3452	0.992	Pct change in HPI since 1/08
LTV	1	0.00228	0.00112	4.1963	0.0405	1.002	Loan-to-value ratio



Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Chi-Square	Pr > ChiSq	Hazard Ratio	Variable Label
LTVnot80	1	0.05521	0.08476	0.4244	0.5148	1.057	Dummy for LTV not = 80



**Hazard Model of Time to Foreclosure - NFMC Only, Simple Program Effect:
 Loans 2 Months Delinquent as of Jan. 2008**

Model Fit Statistics

Criterion	Without Covariates	With Covariates
-2 LOG L	11075.804	10914.116
AIC	11075.804	10962.116
SBC	11075.804	11074.153

Testing Global Null Hypothesis: BETA=0

Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	161.6877	24	<.0001
Score	157.1078	24	<.0001
Wald	159.0210	24	<.0001



Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Chi-Square	Pr > ChiSq	Hazard Ratio	Variable Label
Entered_counseling	1	-0.18266	0.09729	3.5252	0.0604	0.833	Client entered counseling
black	1	-0.02122	0.09905	0.0459	0.8303	0.979	Black borrower
asian	1	-0.34776	0.29505	1.3892	0.2385	0.706	Asian/PI borrower
othrace	1	0.36513	0.15265	5.7216	0.0168	1.441	Other race borrower
hispanic	1	0.23258	0.10701	4.7238	0.0297	1.262	Hispanic borrower
income_thou	1	-0.00391	0.00135	8.4325	0.0037	0.996	NFMC-reported income (\$ thousands)
FICOOrg	1	0.00214	0.0007013	9.3470	0.0022	1.002	FICO/Credit Score – Original
CurrentIntRate	1	0.09949	0.03085	10.3995	0.0013	1.105	Current Interest Rate
MrtGrdBC	1	-0.34636	0.09843	12.3826	0.0004	0.707	Grade B/C mortgage
IntTypeARM	1	0.12575	0.09635	1.7034	0.1918	1.134	ARM loan
IntTypeOth	1	0.31185	0.32891	0.8989	0.3431	1.366	Other interest type loan
OptionARM	1	-0.17535	0.14324	1.4985	0.2209	0.839	Option ARM loan
InvAgency	1	0.02284	0.10817	0.0446	0.8328	1.023	Agency loan
InvGov	1	-0.62709	1.00941	0.3859	0.5344	0.534	Government loan
InvPortfolio	1	-0.03393	0.13892	0.0597	0.8070	0.967	Portfolio loan
Jumbo	1	0.20786	0.18151	1.3115	0.2521	1.231	Jumbo loan
ApprovalRateHomePurch_06_07	1	-0.00116	0.00355	0.1075	0.7431	0.999	Home mortgage approval rate (%), 2006-07
MrtgOrigMedAmt_thou	1	0.00226	0.0005198	18.9446	<.0001	1.002	Median amount home purchase mortgages (\$ thousands)
Unemp	1	0.09027	0.03199	7.9610	0.0048	1.094	Monthly unemployment rate (%)
Unemp_chg_pct	1	-0.02127	0.00372	32.6888	<.0001	0.979	Pct change in unemp. rate since 1/08
Hpi	1	9.21613E-6	0.0006928	0.0002	0.9894	1.000	Quarterly housing price index
Hpi_chg_pct	1	0.07738	0.01240	38.9501	<.0001	1.080	Pct change in HPI since 1/08
LTV	1	-0.00229	0.00274	0.6955	0.4043	0.998	Loan-to-value ratio
LTVnot80	1	-0.08244	0.10785	0.5844	0.4446	0.921	Dummy for LTV not = 80



**Hazard Model of Time to Foreclosure - NFMC Only, Counseling Level Effects:
 Loans 2 Months Delinquent as of Jan. 2008**

Model Fit Statistics

Criterion	Without Covariates	With Covariates
-2 LOG L	11075.804	10909.851
AIC	11075.804	10963.851
SBC	11075.804	11089.894

Testing Global Null Hypothesis: BETA=0

Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	165.9521	27	<.0001
Score	161.8373	27	<.0001
Wald	163.5938	27	<.0001



Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Chi-Square	Pr > ChiSq	Hazard Ratio	Variable Label
level_1_intk	1	-0.11712	0.13251	0.7812	0.3768	0.889	Received level 1 counseling
level_2_intk	1	-0.00184	0.15928	0.0001	0.9908	0.998	Received level 2 counseling
level_3_intk	1	-0.35541	0.16318	4.7438	0.0294	0.701	Received level 3 counseling
counseling_hours	1	-0.01073	0.02537	0.1788	0.6724	0.989	Tot indiv counseling hours received
black	1	-0.01986	0.09933	0.0400	0.8415	0.980	Black borrower
asian	1	-0.34615	0.29515	1.3754	0.2409	0.707	Asian/PI borrower
othrace	1	0.34785	0.15345	5.1389	0.0234	1.416	Other race borrower
hispanic	1	0.23477	0.10702	4.8124	0.0283	1.265	Hispanic borrower
income_thou	1	-0.00398	0.00135	8.7553	0.0031	0.996	NFMC-reported income (\$ thousands)
FICOOrg	1	0.00213	0.0007012	9.1914	0.0024	1.002	FICO/Credit Score – Original
CurrentIntRate	1	0.09932	0.03096	10.2907	0.0013	1.104	Current Interest Rate
MrtGrdBC	1	-0.34987	0.09842	12.6362	0.0004	0.705	Grade B/C mortgage
IntTypeARM	1	0.12944	0.09639	1.8031	0.1793	1.138	ARM loan
IntTypeOth	1	0.28522	0.32914	0.7509	0.3862	1.330	Other interest type loan
OptionARM	1	-0.16988	0.14332	1.4051	0.2359	0.844	Option ARM loan
InvAgency	1	0.01600	0.10826	0.0218	0.8825	1.016	Agency loan
InvGov	1	-0.67250	1.00962	0.4437	0.5054	0.510	Government loan
InvPortfolio	1	-0.03286	0.13884	0.0560	0.8129	0.968	Portfolio loan
Jumbo	1	0.21204	0.18157	1.3638	0.2429	1.236	Jumbo loan
ApprovalRateHomePurch_06_07	1	-0.0009745	0.00356	0.0749	0.7844	0.999	Home mortgage approval rate (%), 2006-07
MrtgOrigMedAmt_thou	1	0.00227	0.0005192	19.0828	<.0001	1.002	Median amount home purchase mortgages (\$ thousands)
Unemp	1	0.08843	0.03194	7.6631	0.0056	1.092	Monthly unemployment rate (%)
Unemp_chg_pct	1	-0.02139	0.00371	33.2992	<.0001	0.979	Pct change in unemp. rate since 1/08
Hpi	1	-0.0000152	0.0006929	0.0005	0.9825	1.000	Quarterly housing price index
Hpi_chg_pct	1	0.07748	0.01236	39.3220	<.0001	1.081	Pct change in HPI since 1/08



Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Chi-Square	Pr > ChiSq	Hazard Ratio	Variable Label
LTV	1	-0.00241	0.00273	0.7742	0.3789	0.998	Loan-to-value ratio
LTVnot80	1	-0.08221	0.10785	0.5810	0.4459	0.921	Dummy for LTV not = 80



**Hazard Model of Time to Foreclosure - NFMC Only, Simple Program Effect:
 Loans 3 Months Delinquent as of Jan. 2008**

Model Fit Statistics

Criterion	Without Covariates	With Covariates
-2 LOG L	7876.830	7714.140
AIC	7876.830	7762.140
SBC	7876.830	7868.102

Testing Global Null Hypothesis: BETA=0

Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	162.6901	24	<.0001
Score	153.5248	24	<.0001
Wald	158.4795	24	<.0001



Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Chi-Square	Pr > ChiSq	Hazard Ratio	Variable Label
Entered_counseling	1	-0.21597	0.12594	2.9406	0.0864	0.806	Client entered counseling
black	1	-0.30777	0.10899	7.9742	0.0047	0.735	Black borrower
asian	1	-0.13187	0.28718	0.2109	0.6461	0.876	Asian/PI borrower
othrace	1	0.16224	0.17171	0.8928	0.3447	1.176	Other race borrower
hispanic	1	0.05883	0.12092	0.2367	0.6266	1.061	Hispanic borrower
income_thou	1	-0.00150	0.00121	1.5432	0.2141	0.999	NFMC-reported income (\$ thousands)
FICOOrg	1	0.00192	0.0008293	5.3855	0.0203	1.002	FICO/Credit Score – Original
CurrentIntRate	1	0.01587	0.03449	0.2116	0.6455	1.016	Current Interest Rate
MrtGrdBC	1	-0.44502	0.11564	14.8100	0.0001	0.641	Grade B/C mortgage
IntTypeARM	1	0.40676	0.11177	13.2435	0.0003	1.502	ARM loan
IntTypeOth	1	-0.16888	0.36855	0.2100	0.6468	0.845	Other interest type loan
OptionARM	1	-0.38367	0.16426	5.4560	0.0195	0.681	Option ARM loan
InvAgency	1	-0.14911	0.12745	1.3688	0.2420	0.861	Agency loan
InvGov	1	0.72194	1.01539	0.5055	0.4771	2.058	Government loan
InvPortfolio	1	-0.29772	0.16945	3.0870	0.0789	0.743	Portfolio loan
Jumbo	1	0.22924	0.17533	1.7095	0.1910	1.258	Jumbo loan
ApprovalRateHomePurch_06_07	1	-0.00712	0.00412	2.9776	0.0844	0.993	Home mortgage approval rate (%), 2006-07
MrtgOrigMedAmt_thou	1	0.00122	0.0006092	3.9944	0.0457	1.001	Median amount home purchase mortgages (\$ thousands)
Unemp	1	0.03835	0.03516	1.1897	0.2754	1.039	Monthly unemployment rate (%)
Unemp_chg_pct	1	-0.01556	0.00504	9.5505	0.0020	0.985	Pct change in unemp. rate since 1/08
Hpi	1	0.00175	0.0006876	6.5063	0.0107	1.002	Quarterly housing price index
Hpi_chg_pct	1	0.13373	0.01815	54.2883	<.0001	1.143	Pct change in HPI since 1/08
LTV	1	-0.0004055	0.00295	0.0189	0.8907	1.000	Loan-to-value ratio
LTVnot80	1	0.03975	0.12147	0.1071	0.7435	1.041	Dummy for LTV not = 80



**Hazard Model of Time to Foreclosure - NFMC Only, Counseling Level Effects:
 Loans 3 Months Delinquent as of Jan. 2008**

Model Fit Statistics

Criterion	Without Covariates	With Covariates
-2 LOG L	7876.830	7707.838
AIC	7876.830	7761.838
SBC	7876.830	7881.045

Testing Global Null Hypothesis: BETA=0

Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	168.9926	27	<.0001
Score	160.1399	27	<.0001
Wald	163.8810	27	<.0001



Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Chi-Square	Pr > ChiSq	Hazard Ratio	Variable Label
level_1_intk	1	-0.06883	0.17142	0.1612	0.6880	0.933	Received level 1 counseling
level_2_intk	1	0.06741	0.22214	0.0921	0.7615	1.070	Received level 2 counseling
level_3_intk	1	-0.48250	0.21502	5.0356	0.0248	0.617	Received level 3 counseling
counseling_hours	1	-0.01761	0.03461	0.2590	0.6108	0.983	Tot indiv counseling hours received
black	1	-0.31969	0.10884	8.6269	0.0033	0.726	Black borrower
asian	1	-0.14868	0.28722	0.2680	0.6047	0.862	Asian/PI borrower
othrace	1	0.13232	0.17278	0.5865	0.4438	1.141	Other race borrower
hispanic	1	0.05226	0.12114	0.1861	0.6662	1.054	Hispanic borrower
income_thou	1	-0.00136	0.00121	1.2754	0.2588	0.999	NFMC-reported income (\$ thousands)
FICOOrg	1	0.00198	0.0008283	5.7150	0.0168	1.002	FICO/Credit Score – Original
CurrentIntRate	1	0.01525	0.03439	0.1966	0.6574	1.015	Current Interest Rate
MrtGrdBC	1	-0.43433	0.11534	14.1792	0.0002	0.648	Grade B/C mortgage
IntTypeARM	1	0.41052	0.11158	13.5365	0.0002	1.508	ARM loan
IntTypeOth	1	-0.14445	0.36883	0.1534	0.6953	0.865	Other interest type loan
OptionARM	1	-0.38110	0.16459	5.3610	0.0206	0.683	Option ARM loan
InvAgency	1	-0.14343	0.12713	1.2728	0.2592	0.866	Agency loan
InvGov	1	0.70627	1.01704	0.4822	0.4874	2.026	Government loan
InvPortfolio	1	-0.27909	0.16902	2.7265	0.0987	0.756	Portfolio loan
Jumbo	1	0.22611	0.17560	1.6580	0.1979	1.254	Jumbo loan
ApprovalRateHomePurch_06_07	1	-0.00723	0.00413	3.0669	0.0799	0.993	Home mortgage approval rate (%), 2006-07
MrtgOrigMedAmt_thou	1	0.00121	0.0006101	3.9138	0.0479	1.001	Median amount home purchase mortgages (\$ thousands)
Unemp	1	0.03339	0.03537	0.8915	0.3451	1.034	Monthly unemployment rate (%)
Unemp_chg_pct	1	-0.01519	0.00503	9.1062	0.0025	0.985	Pct change in unemp. rate since 1/08
Hpi	1	0.00170	0.0006880	6.1279	0.0133	1.002	Quarterly housing price index
Hpi_chg_pct	1	0.13351	0.01814	54.1506	<.0001	1.143	Pct change in HPI since 1/08



Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Chi-Square	Pr > ChiSq	Hazard Ratio	Variable Label
LTV	1	-0.0005270	0.00292	0.0325	0.8569	0.999	Loan-to-value ratio
LTVnot80	1	0.06027	0.12197	0.2441	0.6212	1.062	Dummy for LTV not = 80



**Hazard Model of Time to Foreclosure - NFMC Only, Simple Program Effect:
Loans 4+ Months Delinquent as of Jan. 2008**

Model Fit Statistics

Criterion	Without Covariates	With Covariates
-2 LOG L	17427.631	17280.315
AIC	17427.631	17328.315
SBC	17427.631	17451.011

Testing Global Null Hypothesis: BETA=0

Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	147.3159	24	<.0001
Score	148.3218	24	<.0001
Wald	149.5049	24	<.0001



Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Chi-Square	Pr > ChiSq	Hazard Ratio	Variable Label
Entered_counseling	1	0.09511	0.08350	1.2975	0.2547	1.100	Client entered counseling
black	1	-0.11110	0.07372	2.2709	0.1318	0.895	Black borrower
asian	1	0.14381	0.24465	0.3455	0.5567	1.155	Asian/PI borrower
othrace	1	-0.06007	0.13575	0.1958	0.6581	0.942	Other race borrower
hispanic	1	0.02162	0.09624	0.0505	0.8222	1.022	Hispanic borrower
income_thou	1	-0.00202	0.0009191	4.8328	0.0279	0.998	NFMC-reported income (\$ thousands)
FICOOrg	1	0.0007457	0.0005807	1.6490	0.1991	1.001	FICO/Credit Score – Original
CurrentIntRate	1	-0.00718	0.02268	0.1002	0.7516	0.993	Current Interest Rate
MrtGrdBC	1	-0.18701	0.07950	5.5329	0.0187	0.829	Grade B/C mortgage
IntTypeARM	1	0.18802	0.07236	6.7511	0.0094	1.207	ARM loan
IntTypeOth	1	0.27745	0.30632	0.8204	0.3651	1.320	Other interest type loan
OptionARM	1	0.26660	0.15261	3.0516	0.0807	1.306	Option ARM loan
InvAgency	1	-0.15139	0.08766	2.9826	0.0842	0.860	Agency loan
InvGov	1	0.07350	0.58739	0.0157	0.9004	1.076	Government loan
InvPortfolio	1	-0.06083	0.11941	0.2595	0.6105	0.941	Portfolio loan
Jumbo	1	-0.12202	0.14016	0.7579	0.3840	0.885	Jumbo loan
ApprovalRateHomePurch_06_07	1	-0.00146	0.00281	0.2685	0.6043	0.999	Home mortgage approval rate (%), 2006-07
MrtgOrigMedAmt_thou	1	0.00130	0.0004274	9.3120	0.0023	1.001	Median amount home purchase mortgages (\$ thousands)
Unemp	1	0.08700	0.02399	13.1475	0.0003	1.091	Monthly unemployment rate (%)
Unemp_chg_pct	1	-0.02304	0.00360	40.9810	<.0001	0.977	Pct change in unemp. rate since 1/08
Hpi	1	0.00201	0.0005007	16.1926	<.0001	1.002	Quarterly housing price index
Hpi_chg_pct	1	0.05352	0.01156	21.4412	<.0001	1.055	Pct change in HPI since 1/08
LTV	1	0.00429	0.00120	12.8072	0.0003	1.004	Loan-to-value ratio
LTVnot80	1	0.10527	0.09715	1.1743	0.2785	1.111	Dummy for LTV not = 80



**Hazard Model of Time to Foreclosure - NFMC Only, Counseling Level Effects:
 Loans 4+ Months Delinquent as of Jan. 2008**

Model Fit Statistics

Criterion	Without Covariates	With Covariates
-2 LOG L	17427.631	17276.669
AIC	17427.631	17330.669
SBC	17427.631	17468.702

Testing Global Null Hypothesis: BETA=0

Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	150.9618	27	<.0001
Score	152.9289	27	<.0001
Wald	153.9636	27	<.0001



Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Chi-Square	Pr > ChiSq	Hazard Ratio	Variable Label
level_1_intk	1	0.18663	0.10194	3.3516	0.0671	1.205	Received level 1 counseling
level_2_intk	1	0.01494	0.15350	0.0095	0.9225	1.015	Received level 2 counseling
level_3_intk	1	-0.05798	0.13133	0.1949	0.6589	0.944	Received level 3 counseling
counseling_hours	1	0.00539	0.00827	0.4245	0.5147	1.005	Tot indiv counseling hours received
black	1	-0.10095	0.07392	1.8647	0.1721	0.904	Black borrower
asian	1	0.12182	0.24507	0.2471	0.6191	1.130	Asian/PI borrower
othrace	1	-0.07653	0.13613	0.3161	0.5740	0.926	Other race borrower
hispanic	1	0.02312	0.09626	0.0577	0.8102	1.023	Hispanic borrower
income_thou	1	-0.00204	0.0009208	4.9290	0.0264	0.998	NFMC-reported income (\$ thousands)
FICOOrg	1	0.0007826	0.0005820	1.8080	0.1788	1.001	FICO/Credit Score – Original
CurrentIntRate	1	-0.00502	0.02268	0.0490	0.8249	0.995	Current Interest Rate
MrtGrdBC	1	-0.18584	0.07951	5.4636	0.0194	0.830	Grade B/C mortgage
IntTypeARM	1	0.18693	0.07236	6.6739	0.0098	1.206	ARM loan
IntTypeOth	1	0.26435	0.30641	0.7443	0.3883	1.303	Other interest type loan
OptionARM	1	0.26879	0.15270	3.0985	0.0784	1.308	Option ARM loan
InvAgency	1	-0.15280	0.08765	3.0391	0.0813	0.858	Agency loan
InvGov	1	0.05068	0.58766	0.0074	0.9313	1.052	Government loan
InvPortfolio	1	-0.05033	0.11963	0.1770	0.6740	0.951	Portfolio loan
Jumbo	1	-0.13531	0.14044	0.9283	0.3353	0.873	Jumbo loan
ApprovalRateHomePurch_06_07	1	-0.00146	0.00281	0.2683	0.6045	0.999	Home mortgage approval rate (%), 2006-07
MrtgOrigMedAmt_thou	1	0.00132	0.0004270	9.5502	0.0020	1.001	Median amount home purchase mortgages (\$ thousands)
Unemp	1	0.08698	0.02401	13.1278	0.0003	1.091	Monthly unemployment rate (%)
Unemp_chg_pct	1	-0.02299	0.00359	41.1328	<.0001	0.977	Pct change in unemp. rate since 1/08
Hpi	1	0.00200	0.0005008	16.0280	<.0001	1.002	Quarterly housing price index
Hpi_chg_pct	1	0.05388	0.01150	21.9396	<.0001	1.055	Pct change in HPI since 1/08
LTV	1	0.00435	0.00119	13.2737	0.0003	1.004	Loan-to-value ratio



Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Chi-Square	Pr > ChiSq	Hazard Ratio	Variable Label
LTVnot80	1	0.10655	0.09718	1.2021	0.2729	1.112	Dummy for LTV not = 80





Appendix D: Parameter Estimates for LOGIT Model of Foreclosure Cure – NFMC vs. Non-NFMC





LOGIT Model of Foreclosure Cure – NFMC vs. Non-NFMC

Model Fit Statistics		
Criterion	Intercept Only	Intercept and Covariates
AIC	64116.729	62010.229
SC	64126.364	62337.825
-2 Log L	64114.729	61942.229

Testing Global Null Hypothesis: BETA=0			
Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	2172.5000	33	<.0001
Score	2128.9673	33	<.0001
Wald	2044.1966	33	<.0001



Analysis of Maximum Likelihood Estimates

Parameter	DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
Intercept	1	-0.4417	0.3383	1.7051	0.1916
Entered_counseling	1	0.4912	0.0254	372.7518	<.0001
Months_foreclosure	1	-0.0137	0.00288	22.6011	<.0001
Delinqintk1	1	-0.5016	0.0784	40.9060	<.0001
Delinqintk2	1	-0.5731	0.0677	71.7421	<.0001
Delinqintk3	1	-0.6611	0.0631	109.6096	<.0001
Delinqintk4	1	-0.9281	0.0484	367.3387	<.0001
black	1	0.2275	0.0294	59.6906	<.0001
asian	1	-0.1477	0.0831	3.1617	0.0754
othrace	1	-0.0369	0.0553	0.4453	0.5046
hispanic	1	-0.1158	0.0347	11.1530	0.0008
year03	1	0.00897	0.0864	0.0108	0.9173
year04	1	0.00466	0.0773	0.0036	0.9519
year05	1	-0.0966	0.0739	1.7102	0.1910
year06	1	-0.1714	0.0727	5.5664	0.0183
year07	1	-0.2294	0.0750	9.3563	0.0022
FICOOrg	1	-0.00263	0.000201	170.8402	<.0001
CurrentIntRate	1	-0.00646	0.00965	0.4490	0.5028
MrtGrdBC	1	0.1138	0.0318	12.8422	0.0003
IntTypeARM	1	-0.0670	0.0299	5.0082	0.0252
IntTypeOth	1	-0.0411	0.1114	0.1362	0.7121
OptionARM	1	-0.2428	0.0448	29.3375	<.0001
InvAgency	1	0.0211	0.0343	0.3787	0.5383
InvGov	1	-0.3804	0.3039	1.5673	0.2106
InvPortfolio	1	0.1169	0.0402	8.4673	0.0036
Jumbo	1	-0.1390	0.0425	10.7187	0.0011
ApprovalRateHomePurc	1	0.00489	0.00111	19.4185	<.0001
MrtgOrigMedAmt_thou	1	0.000230	0.000123	3.4786	0.0622
Unemp	1	-0.0330	0.00851	15.0406	0.0001
Unemp_chg_pct	1	-0.00482	0.000785	37.7297	<.0001
Hpi	1	-0.00060	0.000171	12.4783	0.0004
Hpi_chg_pct	1	0.0131	0.00229	32.5775	<.0001
LTV	1	-0.00196	0.000598	10.6901	0.0011



Analysis of Maximum Likelihood Estimates

Parameter	DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
LTVnot80	1	0.0215	0.0342	0.3936	0.5304



Odds Ratio Estimates			
Effect	Point Estimate	95% Wald Confidence Limits	
Entered_counseling	1.634	1.555	1.718
Months_foreclosure	0.986	0.981	0.992
Delinqintk1	0.606	0.519	0.706
Delinqintk2	0.564	0.494	0.644
Delinqintk3	0.516	0.456	0.584
Delinqintk4	0.395	0.360	0.435
black	1.255	1.185	1.330
asian	0.863	0.733	1.015
othrace	0.964	0.865	1.074
hispanic	0.891	0.832	0.953
year03	1.009	0.852	1.195
year04	1.005	0.863	1.169
year05	0.908	0.785	1.049
year06	0.842	0.731	0.971
year07	0.795	0.686	0.921
FICOOrg	0.997	0.997	0.998
CurrentIntRate	0.994	0.975	1.013
MrtGrdBC	1.121	1.053	1.193
IntTypeARM	0.935	0.882	0.992
IntTypeOth	0.960	0.772	1.194
OptionARM	0.784	0.718	0.856
InvAgency	1.021	0.955	1.092
InvGov	0.684	0.377	1.240
InvPortfolio	1.124	1.039	1.216
Jumbo	0.870	0.801	0.946
ApprovalRateHomePurc	1.005	1.003	1.007
MrtgOrigMedAmt_thou	1.000	1.000	1.000
Unemp	0.968	0.952	0.984
Unemp_chg_pct	0.995	0.994	0.997
Hpi	0.999	0.999	1.000
Hpi_chg_pct	1.013	1.009	1.018
LTV	0.998	0.997	0.999
LTVnot80	1.022	0.955	1.093



Association of Predicted Probabilities and Observed Responses			
Percent Concordant	63.7	Somers' D	0.289
Percent Discordant	34.8	Gamma	0.293
Percent Tied	1.4	Tau-a	0.043
Pairs	961510446	c	0.644





Appendix E: Parameter Estimates for LOGIT Model of Foreclosure Cure – NFMC Only





LOGIT Model of Foreclosure Cure – NFMC Only, Simple Counseling Effect

Model Fit Statistics		
Criterion	Intercept Only	Intercept and Covariates
AIC	42787.184	42080.989
SC	42796.302	42363.662
-2 Log L	42785.184	42018.989

Testing Global Null Hypothesis: BETA=0			
Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	766.1950	30	<.0001
Score	733.3369	30	<.0001
Wald	719.1196	30	<.0001



Analysis of Maximum Likelihood Estimates

Parameter	DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
Intercept	1	-1.8627	0.4024	21.4314	<.0001
Months_foreclosure	1	-0.00026	0.00337	0.0059	0.9389
Entered_counseling	1	0.4575	0.0314	211.9508	<.0001
year03	1	0.00891	0.0862	0.0107	0.9177
year04	1	0.00247	0.0810	0.0009	0.9757
year05	1	-0.0677	0.0761	0.7912	0.3737
year06	1	-0.1108	0.0744	2.2208	0.1362
year07	1	-0.1678	0.0772	4.7210	0.0298
FICOOrg	1	-0.00209	0.000251	69.3734	<.0001
CurrentIntRate	1	-0.0226	0.0114	3.9761	0.0462
MrtGrdBC	1	0.1270	0.0355	12.7725	0.0004
IntTypeARM	1	-0.0234	0.0355	0.4369	0.5086
IntTypeOth	1	-0.0619	0.1332	0.2162	0.6420
OptionARM	1	-0.1696	0.0578	8.6202	0.0033
InvAgency	1	0.0211	0.0414	0.2585	0.6111
InvGov	1	-0.3472	0.3188	1.1866	0.2760
InvPortfolio	1	0.0775	0.0522	2.2023	0.1378
Jumbo	1	-0.0208	0.0595	0.1221	0.7267
ApprovalRateHomePurc	1	0.00564	0.00130	18.7593	<.0001
MrtgOrigMedAmt_thou	1	-0.00019	0.000201	0.8565	0.3547
Unemp	1	-0.0267	0.0107	6.2711	0.0123
Unemp_chg_pct	1	-0.00330	0.000947	12.1308	0.0005
Hpi	1	-0.00062	0.000276	5.1088	0.0238
Hpi_chg_pct	1	0.0127	0.00275	21.2614	<.0001
LTV	1	-0.00005	0.000699	0.0056	0.9404
LTVnot80	1	0.00387	0.0388	0.0100	0.9205
black	1	0.1875	0.0342	30.0319	<.0001
asian	1	-0.1175	0.0966	1.4808	0.2236
othrace	1	-0.0227	0.0584	0.1515	0.6971
hispanic	1	-0.1303	0.0403	10.4439	0.0012
income	1	-1.64E-8	3.517E-8	0.2168	0.6415



Odds Ratio Estimates			
Effect	Point Estimate	95% Wald Confidence Limits	
Months_foreclosure	1.000	0.993	1.006
Entered_counseling	1.580	1.486	1.681
year03	1.009	0.852	1.195
year04	1.002	0.855	1.175
year05	0.935	0.805	1.085
year06	0.895	0.774	1.036
year07	0.845	0.727	0.984
FICOOrg	0.998	0.997	0.998
CurrentIntRate	0.978	0.956	1.000
MrtGrdBC	1.135	1.059	1.217
IntTypeARM	0.977	0.911	1.047
IntTypeOth	0.940	0.724	1.220
OptionARM	0.844	0.754	0.945
InvAgency	1.021	0.942	1.108
InvGov	0.707	0.378	1.320
InvPortfolio	1.081	0.975	1.197
Jumbo	0.979	0.872	1.101
ApprovalRateHomePurc	1.006	1.003	1.008
MrtgOrigMedAmt_thou	1.000	0.999	1.000
Unemp	0.974	0.953	0.994
Unemp_chg_pct	0.997	0.995	0.999
Hpi	0.999	0.999	1.000
Hpi_chg_pct	1.013	1.007	1.018
LTV	1.000	0.999	1.001
LTVnot80	1.004	0.930	1.083
black	1.206	1.128	1.290
asian	0.889	0.736	1.074
othrace	0.978	0.872	1.096
hispanic	0.878	0.811	0.950
income	1.000	1.000	1.000



Association of Predicted Probabilities and Observed Responses

Percent Concordant	59.3	Somers' D	0.204
Percent Discordant	39.0	Gamma	0.207
Percent Tied	1.7	Tau-a	0.036
Pairs	396221906	c	0.602



LOGIT Model of Foreclosure Cure – NFMC Only, Counseling Level Effects

Model Fit Statistics		
Criterion	Intercept Only	Intercept and Covariates
AIC	42787.184	42065.283
SC	42796.302	42375.312
-2 Log L	42785.184	41997.283

Testing Global Null Hypothesis: BETA=0			
Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	787.9009	33	<.0001
Score	758.4968	33	<.0001
Wald	742.9528	33	<.0001



Analysis of Maximum Likelihood Estimates

Parameter	DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
Intercept	1	-1.8525	0.4030	21.1334	<.0001
Months_foreclosure	1	-0.00057	0.00337	0.0288	0.8652
level_1_intk	1	0.4112	0.0365	126.7766	<.0001
level_2_intk	1	0.4205	0.0450	87.1698	<.0001
level_3_intk	1	0.5710	0.0398	206.0678	<.0001
counseling_hours	1	-0.00430	0.00345	1.5522	0.2128
year03	1	0.00323	0.0863	0.0014	0.9701
year04	1	-0.00387	0.0810	0.0023	0.9619
year05	1	-0.0769	0.0761	1.0219	0.3121
year06	1	-0.1193	0.0744	2.5712	0.1088
year07	1	-0.1749	0.0773	5.1232	0.0236
FICOOrg	1	-0.00209	0.000251	69.1857	<.0001
CurrentIntRate	1	-0.0221	0.0114	3.7867	0.0517
MrtGrdBC	1	0.1254	0.0355	12.4416	0.0004
IntTypeARM	1	-0.0226	0.0355	0.4050	0.5245
IntTypeOth	1	-0.0594	0.1333	0.1984	0.6560
OptionARM	1	-0.1751	0.0578	9.1666	0.0025
InvAgency	1	0.0238	0.0414	0.3310	0.5651
InvGov	1	-0.3320	0.3188	1.0847	0.2977
InvPortfolio	1	0.0787	0.0523	2.2664	0.1322
Jumbo	1	-0.0176	0.0596	0.0871	0.7680
ApprovalRateHomePurc	1	0.00574	0.00130	19.3662	<.0001
MrtgOrigMedAmt_thou	1	-0.00017	0.000201	0.7546	0.3850
Unemp	1	-0.0266	0.0107	6.1601	0.0131
Unemp_chg_pct	1	-0.00309	0.000950	10.6080	0.0011
Hpi	1	-0.00058	0.000276	4.3535	0.0369
Hpi_chg_pct	1	0.0122	0.00276	19.6679	<.0001
LTV	1	-0.00007	0.000698	0.0089	0.9250
LTVnot80	1	0.00636	0.0388	0.0268	0.8699
black	1	0.1773	0.0344	26.6100	<.0001
asian	1	-0.1232	0.0966	1.6264	0.2022
othrace	1	-0.00432	0.0586	0.0054	0.9413
hispanic	1	-0.1413	0.0404	12.2188	0.0005



Analysis of Maximum Likelihood Estimates

Parameter	DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
income	1	-1.52E-8	3.491E-8	0.1905	0.6625



Odds Ratio Estimates			
Effect	Point Estimate	95% Wald Confidence Limits	
Months_foreclosure	0.999	0.993	1.006
level_1_intk	1.509	1.404	1.621
level_2_intk	1.523	1.394	1.663
level_3_intk	1.770	1.637	1.913
counseling_hours	0.996	0.989	1.002
year03	1.003	0.847	1.188
year04	0.996	0.850	1.167
year05	0.926	0.798	1.075
year06	0.888	0.767	1.027
year07	0.840	0.722	0.977
FICOOrg	0.998	0.997	0.998
CurrentIntRate	0.978	0.957	1.000
MrtGrdBC	1.134	1.057	1.215
IntTypeARM	0.978	0.912	1.048
IntTypeOth	0.942	0.726	1.224
OptionARM	0.839	0.749	0.940
InvAgency	1.024	0.944	1.111
InvGov	0.717	0.384	1.340
InvPortfolio	1.082	0.977	1.199
Jumbo	0.983	0.874	1.104
ApprovalRateHomePurc	1.006	1.003	1.008
MrtgOrigMedAmt_thou	1.000	0.999	1.000
Unemp	0.974	0.954	0.994
Unemp_chg_pct	0.997	0.995	0.999
Hpi	0.999	0.999	1.000
Hpi_chg_pct	1.012	1.007	1.018
LTV	1.000	0.999	1.001
LTVnot80	1.006	0.933	1.086
black	1.194	1.116	1.277
asian	0.884	0.732	1.068
othrace	0.996	0.888	1.117
hispanic	0.868	0.802	0.940
income	1.000	1.000	1.000



Association of Predicted Probabilities and Observed Responses			
Percent Concordant	59.5	Somers' D	0.206
Percent Discordant	38.8	Gamma	0.210
Percent Tied	1.7	Tau-a	0.036
Pairs	396221906	c	0.603





**Appendix F: Parameter Estimates for
OLS Regression Models of Reduction in
Monthly Payment for Loans Receiving a Modification –
NFMC vs. Non-NFMC**





OLS Regression Model of Dollar Reduction in Monthly Mortgage Payment for Loans Receiving a Modification – NFMC vs. Non-NFMC

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	33	1788849321	54207555	100.08	<.0001
Error	12812	6939201249	541617		
Corrected Total	12845	8728050570			

Root MSE	735.94655	R-Square	0.2050
Dependent Mean	381.53262	Adj R-Sq	0.2029
Coeff Var	192.89217		



Parameter Estimates

Variable	Label	DF	Parameter Estimate	Standard Error	t Value	Pr > t
Intercept	Intercept	1	578.70111	221.12435	2.62	0.0089
Entered_counseling	Entered counseling prior to loan modification	1	453.68308	15.27409	29.70	<.0001
Delinqntk1	1 mo. late at Intake	1	7.70845	23.37134	0.33	0.7415
Delinqntk2	2 mos. late at Intake	1	-61.66571	22.97037	-2.68	0.0073
Delinqntk3	3 mos. late at Intake	1	-105.31499	24.89884	-4.23	<.0001
Delinqntk4	4+ mos. late at Intake	1	-77.66252	17.89546	-4.34	<.0001
black	Black borrower	1	73.51204	18.25193	4.03	<.0001
asian	Asian/PI borrower	1	12.02673	38.54794	0.31	0.7551
othrace	Other race borrower	1	70.91791	35.39346	2.00	0.0451
hispanic	Hispanic borrower	1	72.47108	20.38125	3.56	0.0004
OriginalLoanAmt	Original Loan Amount	1	0.00022391	0.00001880	11.91	<.0001
year03	Loan originated 2003	1	15.74209	64.34586	0.24	0.8067
year04	Loan originated 2004	1	73.20956	56.11802	1.30	0.1921
year05	Loan originated 2005	1	59.53578	53.40036	1.11	0.2649
year06	Loan originated 2006	1	98.47679	52.56929	1.87	0.0611
year07	Loan originated 2007	1	165.45429	53.18987	3.11	0.0019
FICOOrg	FICO/Credit Score – Original	1	0.08404	0.11765	0.71	0.4750
CurrentIntRate	Current Interest Rate	1	25.61525	5.66090	4.52	<.0001
MrtGrdBC	Grade B/C mortgage	1	219.89975	19.62876	11.20	<.0001
IntTypeARM	ARM loan	1	141.74421	18.58635	7.63	<.0001
IntTypeOth	Other interest type loan	1	187.60269	85.68276	2.19	0.0286
OptionARM	Option ARM loan	1	-249.94641	21.19385	-11.79	<.0001
InvAgency	Agency loan	1	-32.25953	21.32159	-1.51	0.1303
InvGov	Government loan	1	20.00386	199.00254	0.10	0.9199
InvPortfolio	Portfolio loan	1	-82.59868	18.66072	-4.43	<.0001
Jumbo	Jumbo loan	1	263.73629	23.08444	11.42	<.0001
ApprovalRateHomePurch_06_07	Home mortgage approval rate (%), 2006-07	1	2.50386	0.68514	3.65	0.0003
MrtgOrigMedAmt_thou	Median home purchase mortgage amount, 2006-07 avg. (\$1,000s)	1	0.07415	0.04680	1.58	0.1131
Unemp	Unemployment rate, Jan 08	1	-29.66799	5.52981	-5.37	<.0001
Unemp_chg_pct	Pct change in unemp. rate, Jan-Dec 08	1	-0.43518	0.52751	-0.82	0.4094
Hpi	House price index, 2008Q1	1	0.24179	0.09303	2.60	0.0094
Hpi_chg_pct	Pct change in house price index, 2008Q1-2008Q4	1	-9.98384	1.22405	-8.16	<.0001



Parameter Estimates

Variable	Label	DF	Parameter Estimate	Standard Error	t Value	Pr > t
LTV	Loan-to-value ratio	1	0.40650	0.31388	1.30	0.1953
LTVnot80	Dummy for LTV not = 80	1	-63.88000	19.76410	-3.23	0.0012



OLS Regression Model of Percentage Reduction in Monthly Mortgage Payment for Loans Receiving a Modification – NFMC vs. Non-NFMC

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	33	1814710	54991	188.88	<.0001
Error	12812	3730160	291.14583		
Corrected Total	12845	5544871			

Root MSE	17.06300	R-Square	0.3273
Dependent Mean	13.35022	Adj R-Sq	0.3255
Coeff Var	127.81057		



Parameter Estimates

Variable	Label	DF	Parameter Estimate	Standard Error	t Value	Pr > t
Intercept	Intercept	1	-3.79655	5.12679	-0.74	0.4590
Entered_counseling	Entered counseling prior to loan modification	1	17.20146	0.35413	48.57	<.0001
Delinqintk1	1 mo. late at Intake	1	-0.02915	0.54187	-0.05	0.9571
Delinqintk2	2 mos. late at Intake	1	-1.60648	0.53257	-3.02	0.0026
Delinqintk3	3 mos. late at Intake	1	-2.89568	0.57728	-5.02	<.0001
Delinqintk4	4+ mos. late at Intake	1	-3.60159	0.41491	-8.68	<.0001
black	Black borrower	1	0.55581	0.42317	1.31	0.1891
asian	Asian/PI borrower	1	0.54408	0.89374	0.61	0.5427
othrace	Other race borrower	1	-1.17618	0.82060	-1.43	0.1518
hispanic	Hispanic borrower	1	0.29855	0.47254	0.63	0.5275
OriginalLoanAmt	Original Loan Amount	1	-9.01607E-7	4.359694E-7	-2.07	0.0387
year03	Loan originated 2003	1	-0.34265	1.49187	-0.23	0.8183
year04	Loan originated 2004	1	2.88026	1.30110	2.21	0.0269
year05	Loan originated 2005	1	2.42250	1.23809	1.96	0.0504
year06	Loan originated 2006	1	3.57255	1.21882	2.93	0.0034
year07	Loan originated 2007	1	5.30619	1.23321	4.30	<.0001
FICOOrg	FICO/Credit Score – Original	1	0.01499	0.00273	5.50	<.0001
CurrentIntRate	Current Interest Rate	1	1.37957	0.13125	10.51	<.0001
MrtGrdBC	Grade B/C mortgage	1	7.15814	0.45509	15.73	<.0001
IntTypeARM	ARM loan	1	4.84446	0.43093	11.24	<.0001
IntTypeOth	Other interest type loan	1	3.83822	1.98656	1.93	0.0534
OptionARM	Option ARM loan	1	-4.37085	0.49138	-8.90	<.0001
InvAgency	Agency loan	1	-0.14465	0.49434	-0.29	0.7698
InvGov	Government loan	1	0.84451	4.61389	0.18	0.8548
InvPortfolio	Portfolio loan	1	2.05326	0.43265	4.75	<.0001
Jumbo	Jumbo loan	1	0.35559	0.53522	0.66	0.5065
ApprovalRateHomePurch_06_07	Home mortgage approval rate (%), 2006-07	1	-0.00495	0.01589	-0.31	0.7553
MrtgOrigMedAmt_thou	Median home purchase mortgage amount, 2006-07 avg. (\$1,000s)	1	0.00107	0.00108	0.99	0.3239
Unemp	Unemployment rate, Jan 08	1	-0.21227	0.12821	-1.66	0.0978
Unemp_chg_pct	Pct change in unemp. rate, Jan-Dec 08	1	0.00693	0.01223	0.57	0.5708
Hpi	House price index, 2008Q1	1	0.00126	0.00216	0.58	0.5591
Hpi_chg_pct	Pct change in house price index, 2008Q1-2008Q4	1	-0.15638	0.02838	-5.51	<.0001



Parameter Estimates

Variable	Label	DF	Parameter Estimate	Standard Error	t Value	Pr > t
LTV	Loan-to-value ratio	1	-0.00786	0.00728	-1.08	0.2801
LTVnot80	Dummy for LTV not = 80	1	-1.60091	0.45823	-3.49	0.0005



**Appendix G: Parameter Estimates for
OLS Regression Models of Reduction in
Monthly Payment for Loans Receiving a Modification –
NFMC Only**



OLS Regression Model of Dollar Reduction in Monthly Mortgage Payment for Loans Receiving a Modification – NFMC Only, Simple Counseling Effect

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	30	1589742495	52991416	152.41	<.0001
Error	8010	2785012384	347692		
Corrected Total	8040	4374754879			

Root MSE	589.65408	R-Square	0.3634
Dependent Mean	485.58861	Adj R-Sq	0.3610
Coeff Var	121.43079		



Parameter Estimates

Variable	Label	DF	Parameter Estimate	Standard Error	t Value	Pr > t
Intercept	Intercept	1	-63.21151	227.94750	-0.28	0.7816
Entered_counseling	Entered counseling prior to loan modification	1	455.56486	15.43422	29.52	<.0001
black	Black borrower	1	80.76390	17.53717	4.61	<.0001
asian	Asian/PI borrower	1	-23.99347	41.63724	-0.58	0.5645
othrace	Other race borrower	1	39.37392	30.71839	1.28	0.2000
hispanic	Hispanic borrower	1	49.18528	19.68973	2.50	0.0125
income	Household/family income (\$)	1	0.00013306	0.00017192	0.77	0.4390
OriginalLoanAmt	Original Loan Amount	1	0.00102	0.00006399	15.93	<.0001
year03	Loan originated 2003	1	4.59206	51.64067	0.09	0.9291
year04	Loan originated 2004	1	15.17457	47.71769	0.32	0.7505
year05	Loan originated 2005	1	-75.88225	44.11758	-1.72	0.0855
year06	Loan originated 2006	1	-35.96589	43.06811	-0.84	0.4037
year07	Loan originated 2007	1	59.29702	43.81796	1.35	0.1760
FICOOrg	FICO/Credit Score – Original	1	0.47233	0.12536	3.77	0.0002
CurrentIntRate	Current Interest Rate	1	49.64159	5.53102	8.98	<.0001
MrtGrdBC	Grade B/C mortgage	1	274.90823	17.80461	15.44	<.0001
IntTypeARM	ARM loan	1	82.31973	18.16552	4.53	<.0001
IntTypeOth	Other interest type loan	1	178.27832	87.91079	2.03	0.0426
OptionARM	Option ARM loan	1	-317.92802	21.21674	-14.98	<.0001
InvAgency	Agency loan	1	-108.92284	21.96418	-4.96	<.0001
InvGov	Government loan	1	-44.71718	180.42896	-0.25	0.8043
InvPortfolio	Portfolio loan	1	-102.41478	20.13356	-5.09	<.0001
Jumbo	Jumbo loan	1	156.79870	29.40610	5.33	<.0001
ApprovalRateHomePurch_06_07	Home mortgage approval rate (%), 2006-07	1	2.76000	0.66840	4.13	<.0001
MrtgOrigMedAmt_thou	Median home purchase mortgage amount, 2006-07 avg. (\$1,000s)	1	0.92176	0.10373	8.89	<.0001
Unemp	Unemployment rate, Jan 08	1	-35.46920	5.84277	-6.07	<.0001
Unemp_chg_pct	Pct change in unemp. rate, Jan-Dec 08	1	-0.47622	0.52898	-0.90	0.3680
Hpi	House price index, 2008Q1	1	-0.12761	0.13993	-0.91	0.3618
Hpi_chg_pct	Pct change in house price index, 2008Q1-2008Q4	1	-9.14796	1.29065	-7.09	<.0001
LTV	Loan-to-value ratio	1	0.57529	0.41882	1.37	0.1696
LTVnot80	Dummy for LTV not = 80	1	-58.32927	18.67939	-3.12	0.0018



OLS Regression Model of Dollar Reduction in Monthly Mortgage Payment for Loans Receiving a Modification – NFMC Only, Counseling Level Effects

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	33	1609812754	48782205	141.27	<.0001
Error	8007	2764942125	345316		
Corrected Total	8040	4374754879			

Root MSE	587.63561	R-Square	0.3680
Dependent Mean	485.58861	Adj R-Sq	0.3654
Coeff Var	121.01512		



Parameter Estimates

Variable	Label	DF	Parameter Estimate	Standard Error	t Value	Pr > t
Intercept	Intercept	1	-148.01517	227.45540	-0.65	0.5152
level_1_intk	Received Level 1 Counseling	1	452.74745	17.70409	25.57	<.0001
level_2_intk	Received Level 2 Counseling	1	357.33204	23.21648	15.39	<.0001
level_3_intk	Received Level 3 Counseling	1	523.06107	18.93363	27.63	<.0001
counseling_hours	Tot Indiv Foreclosure Counseling Hours Received	1	-2.49106	1.24876	-1.99	0.0461
black	Black borrower	1	76.13699	17.56522	4.33	<.0001
asian	Asian/PI borrower	1	-29.05545	41.50280	-0.70	0.4839
othrace	Other race borrower	1	42.61960	30.62268	1.39	0.1640
hispanic	Hispanic borrower	1	48.24353	19.66342	2.45	0.0142
income	Household/family income (\$)	1	0.00011430	0.00017146	0.67	0.5050
OriginalLoanAmt	Original Loan Amount	1	0.00102	0.00006377	15.93	<.0001
year03	Loan originated 2003	1	2.41659	51.46712	0.05	0.9626
year04	Loan originated 2004	1	10.76974	47.56157	0.23	0.8209
year05	Loan originated 2005	1	-75.91992	43.97154	-1.73	0.0843
year06	Loan originated 2006	1	-39.15135	42.92958	-0.91	0.3618
year07	Loan originated 2007	1	54.90199	43.67360	1.26	0.2088
FICOOrg	FICO/Credit Score – Original	1	0.46723	0.12495	3.74	0.0002
CurrentIntRate	Current Interest Rate	1	50.12918	5.51293	9.09	<.0001
MrtGrdBC	Grade B/C mortgage	1	271.98418	17.76056	15.31	<.0001
IntTypeARM	ARM loan	1	79.65113	18.10769	4.40	<.0001
IntTypeOth	Other interest type loan	1	183.38578	87.61943	2.09	0.0364
OptionARM	Option ARM loan	1	-309.39208	21.17524	-14.61	<.0001
InvAgency	Agency loan	1	-104.51680	21.91086	-4.77	<.0001
InvGov	Government loan	1	-46.80795	179.81882	-0.26	0.7946
InvPortfolio	Portfolio loan	1	-100.78603	20.06931	-5.02	<.0001
Jumbo	Jumbo loan	1	159.27927	29.30815	5.43	<.0001
ApprovalRateHomePurch_06_07	Home mortgage approval rate (%), 2006-07	1	2.62235	0.66648	3.93	<.0001
MrtgOrigMedAmt_thou	Median home purchase mortgage amount, 2006-07 avg. (\$1,000s)	1	0.92176	0.10340	8.91	<.0001
Unemp	Unemployment rate, Jan 08	1	-33.54541	5.82921	-5.75	<.0001
Unemp_chg_pct	Pct change in unemp. rate, Jan-Dec 08	1	-0.19468	0.52889	-0.37	0.7128
Hpi	House price index, 2008Q1	1	-0.11655	0.13950	-0.84	0.4035
Hpi_chg_pct	Pct change in house price index, 2008Q1-2008Q4	1	-8.70570	1.28875	-6.76	<.0001



Parameter Estimates

Variable	Label	DF	Parameter Estimate	Standard Error	t Value	Pr > t
LTV	Loan-to-value ratio	1	0.60506	0.41741	1.45	0.1472
LTVnot80	Dummy for LTV not = 80	1	-55.53676	18.62112	-2.98	0.0029



OLS Regression Model of Percentage Reduction in Monthly Mortgage Payment for Loans Receiving a Modification – NFMC Only, Simple Counseling Effect

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	30	1212580	40419	141.96	<.0001
Error	8010	2280622	284.72191		
Corrected Total	8040	3493203			

Root MSE	16.87370	R-Square	0.3471
Dependent Mean	18.61660	Adj R-Sq	0.3447
Coeff Var	90.63796		



Parameter Estimates

Variable	Label	DF	Parameter Estimate	Standard Error	t Value	Pr > t
Intercept	Intercept	1	-10.52187	6.52301	-1.61	0.1068
Entered_counseling	Entered counseling prior to loan modification	1	18.70370	0.44167	42.35	<.0001
black	Black borrower	1	1.35987	0.50185	2.71	0.0067
asian	Asian/PI borrower	1	0.43484	1.19150	0.36	0.7152
othrace	Other race borrower	1	-0.55596	0.87905	-0.63	0.5271
hispanic	Hispanic borrower	1	0.81407	0.56345	1.44	0.1486
income	Household/family income (\$)	1	-0.00000968	0.00000492	-1.97	0.0492
OriginalLoanAmt	Original Loan Amount	1	0.00000623	0.00000183	3.40	0.0007
year03	Loan originated 2003	1	-0.35684	1.47776	-0.24	0.8092
year04	Loan originated 2004	1	1.25879	1.36550	0.92	0.3566
year05	Loan originated 2005	1	0.58101	1.26248	0.46	0.6454
year06	Loan originated 2006	1	1.30162	1.23245	1.06	0.2909
year07	Loan originated 2007	1	4.07074	1.25391	3.25	0.0012
FICOOrg	FICO/Credit Score – Original	1	0.02848	0.00359	7.94	<.0001
CurrentIntRate	Current Interest Rate	1	1.75290	0.15828	11.07	<.0001
MrtGrdBC	Grade B/C mortgage	1	8.28927	0.50950	16.27	<.0001
IntTypeARM	ARM loan	1	3.55295	0.51983	6.83	<.0001
IntTypeOth	Other interest type loan	1	3.05430	2.51568	1.21	0.2247
OptionARM	Option ARM loan	1	-5.62433	0.60714	-9.26	<.0001
InvAgency	Agency loan	1	-2.62132	0.62853	-4.17	<.0001
InvGov	Government loan	1	-1.24522	5.16321	-0.24	0.8094
InvPortfolio	Portfolio loan	1	1.42747	0.57615	2.48	0.0132
Jumbo	Jumbo loan	1	-1.63863	0.84149	-1.95	0.0515
ApprovalRateHomePurch_06_07	Home mortgage approval rate (%), 2006-07	1	-0.01348	0.01913	-0.70	0.4810
MrtgOrigMedAmt_thou	Median home purchase mortgage amount, 2006-07 avg. (\$1,000s)	1	0.00497	0.00297	1.67	0.0943
Unemp	Unemployment rate, Jan 08	1	-0.41388	0.16720	-2.48	0.0133
Unemp_chg_pct	Pct change in unemp. rate, Jan-Dec 08	1	0.01896	0.01514	1.25	0.2104
Hpi	House price index, 2008Q1	1	-0.00045559	0.00400	-0.11	0.9094
Hpi_chg_pct	Pct change in house price index, 2008Q1-2008Q4	1	-0.20110	0.03693	-5.44	<.0001
LTV	Loan-to-value ratio	1	-0.03575	0.01199	-2.98	0.0029
LTVnot80	Dummy for LTV not = 80	1	-1.91260	0.53453	-3.58	0.0003



OLS Regression Model of Percentage Reduction in Monthly Mortgage Payment for Loans Receiving a Modification – NFMC Only, Counseling Level Effects

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	33	1226322	37161	131.26	<.0001
Error	8007	2266881	283.11238		
Corrected Total	8040	3493203			

Root MSE	16.82594	R-Square	0.3511
Dependent Mean	18.61660	Adj R-Sq	0.3484
Coeff Var	90.38141		



Parameter Estimates

Variable	Label	DF	Parameter Estimate	Standard Error	t Value	Pr > t
Intercept	Intercept	1	-12.78549	6.51280	-1.96	0.0497
level_1_intk	Received Level 1 Counseling	1	18.84744	0.50693	37.18	<.0001
level_2_intk	Received Level 2 Counseling	1	16.11276	0.66476	24.24	<.0001
level_3_intk	Received Level 3 Counseling	1	20.36422	0.54213	37.56	<.0001
counseling_hours	Tot Indiv Foreclosure Counseling Hours Received	1	-0.08756	0.03576	-2.45	0.0143
black	Black borrower	1	1.27612	0.50295	2.54	0.0112
asian	Asian/PI borrower	1	0.31688	1.18836	0.27	0.7897
othrace	Other race borrower	1	-0.47636	0.87683	-0.54	0.5870
hispanic	Hispanic borrower	1	0.81634	0.56303	1.45	0.1471
income	Household/family income (\$)	1	-0.00001029	0.00000491	-2.10	0.0361
OriginalLoanAmt	Original Loan Amount	1	0.00000614	0.00000183	3.36	0.0008
year03	Loan originated 2003	1	-0.42518	1.47367	-0.29	0.7730
year04	Loan originated 2004	1	1.13881	1.36184	0.84	0.4031
year05	Loan originated 2005	1	0.58681	1.25905	0.47	0.6412
year06	Loan originated 2006	1	1.22767	1.22922	1.00	0.3180
year07	Loan originated 2007	1	3.94754	1.25052	3.16	0.0016
FICOOrg	FICO/Credit Score – Original	1	0.02839	0.00358	7.94	<.0001
CurrentIntRate	Current Interest Rate	1	1.76376	0.15785	11.17	<.0001
MrtGrdBC	Grade B/C mortgage	1	8.23225	0.50854	16.19	<.0001
IntTypeARM	ARM loan	1	3.48891	0.51848	6.73	<.0001
IntTypeOth	Other interest type loan	1	3.16462	2.50883	1.26	0.2072
OptionARM	Option ARM loan	1	-5.40179	0.60632	-8.91	<.0001
InvAgency	Agency loan	1	-2.52492	0.62738	-4.02	<.0001
InvGov	Government loan	1	-1.33033	5.14881	-0.26	0.7961
InvPortfolio	Portfolio loan	1	1.46665	0.57465	2.55	0.0107
Jumbo	Jumbo loan	1	-1.57141	0.83919	-1.87	0.0612
ApprovalRateHomePurch_06_07	Home mortgage approval rate (%), 2006-07	1	-0.01741	0.01908	-0.91	0.3618
MrtgOrigMedAmt_thou	Median home purchase mortgage amount, 2006-07 avg. (\$1,000s)	1	0.00500	0.00296	1.69	0.0912
Unemp	Unemployment rate, Jan 08	1	-0.36423	0.16691	-2.18	0.0291
Unemp_chg_pct	Pct change in unemp. rate, Jan-Dec 08	1	0.02582	0.01514	1.71	0.0882
Hpi	House price index, 2008Q1	1	-0.00018332	0.00399	-0.05	0.9634
Hpi_chg_pct	Pct change in house price index, 2008Q1-2008Q4	1	-0.18848	0.03690	-5.11	<.0001



Parameter Estimates

Variable	Label	DF	Parameter Estimate	Standard Error	t Value	Pr > t
LTV	Loan-to-value ratio	1	-0.03497	0.01195	-2.93	0.0034
LTVnot80	Dummy for LTV not = 80	1	-1.83760	0.53318	-3.45	0.0006



