

# Refereed Papers

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# Sustaining Homeownership After Delinquency: The Effectiveness of Loan Modifications by Race and Ethnicity

J. Michael Collins

University of Wisconsin-Madison

Carolina K. Reid

University of California, Berkeley

Carly Urban

Montana State University

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## Abstract

*As mortgage foreclosures spiked beginning in 2007, federal policymakers focused on loan modifications as a primary tool for preventing foreclosure and initiated programs to increase the number and effectiveness of loan renegotiations. Yet, loan modifications are largely undertaken at the discretion of private loan servicers and are not as transparent as lender mortgage decisions. Systematic differences are possible in the types of loan modifications that borrowers receive. To be specific, borrowers of color may be receiving less favorable modification terms than comparably situated White borrowers. Because the terms of a loan modification influence the likelihood that a borrower will be able to retain his or her home, it is important to understand who gets what kind of modification and whether that modification succeeds in preventing foreclosure.*

*This study uses data on a national sample of approximately 42,000 privately securitized subprime loans originated between 2004 and 2006 to examine modification types and foreclosure outcomes by race and ethnicity. We find no evidence of significant differences in modification types across borrowers; indeed, we find that Black, Hispanic, and Asian borrowers receive slightly larger reductions in monthly payments than comparably situated non-Hispanic White borrowers. The results also reveal that loan modifications that entail payment reductions reduce the likelihood of redefault and foreclosure 1 year after modification. This finding is consistent across all racial and ethnic demographic*

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## Abstract (continued)

groups. The research suggests that federal efforts to incentivize modifications have helped keep borrowers in their homes, but the research also reveals the need for additional research into servicing and loss-mitigation practices and their role in sustaining homeownership during periods of economic distress.

## Introduction

The recent foreclosure crisis and the resulting erosion of family wealth and neighborhood stability have raised critical questions about the policies and programs that are needed to sustain homeownership. While policy has focused on consumer protections in the mortgage lending market and the terms by which borrowers access credit, an equally important focus is what happens after loan origination. Mortgage-servicing, collections, and loss-mitigation practices should be central to the dialogue around how to promote homeownership while reducing the costs of foreclosures on borrowers, communities, and the overall U.S. economy.

Compared with the vast research and literature about mortgage loan application and origination outcomes, however, mortgage-servicing practices have received fairly little research attention. One barrier to studying loan servicing and loss-mitigation practices is that mortgage modifications are largely at the discretion of loan servicing firms, and modification terms and outcomes are not as systematically transparent as loan application approvals and denials. This lack of information stands in stark contrast to the highly transparent process used to track mortgage loan application approvals and denials under the Home Mortgage Disclosure Act (HMDA). In addition, the process of modifying a loan is highly individualized, time consuming, and “more art than science.”<sup>1</sup> As a result, consumer advocates have raised the concern that the loan modification process could unfairly burden historically underserved borrowers—especially those who lack experience and knowledge of dealing with a lending institution. For example, borrowers who do not speak English or who may distrust banking institutions may fail to pursue a loan modification, or they may not be able to negotiate the best modification terms. Race or perceived race could also serve as a proxy that servicers use for decisionmaking on modifications, especially if these borrowers are deemed less sophisticated, more time consuming, and, therefore, more costly to serve. Understanding whether modification outcomes are different by race or ethnicity is especially important given the disparate impact of the foreclosure crisis on Black and Hispanic households (Bocian et al., 2011) and the role that homeownership plays in the racial wealth gap (Oliver and Shapiro, 2006).

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<sup>1</sup> As quoted in Andrews and Witt (2009: 1): “It’s more art than science,” said Guy Cecala, publisher of *Inside Mortgage Finance*. “Who knows whether the borrower will default, what the value of the property is, what will happen to home values,” he said. “I’m skeptical of all of it.”

In this article, we use a unique dataset that merges national data on the loan performance of subprime home mortgages from more than 100 servicers with data on borrower demographics reported as part of HMDA. With these data, we are able to examine national trends in loan modification types by borrowers' race and ethnicity and to assess the subsequent outcomes of those modified loans for a large sample of subprime loans. Previous research to date has not found racial disparities in the incidence of loan modifications (Been et al., 2013; Collins and Reid, 2010), but these studies have not examined the changes in loan terms by race, nor have they assessed whether differences in modification terms lead to different rates of redefault after.

Our findings suggest that, conditional on a loan having modified terms, there are no significant racial or ethnic differences in the types of modifications that borrowers receive. In fact, we find that controlling for a range of borrower, loan, and housing market characteristics, minorities are equally likely to receive a loan modification that involves lowered interest rates or principal balances. When we examine the amount of change in monthly payments, we find that Black, Hispanic, and Asian borrowers are all more likely to receive a slightly larger reduction than White borrowers, although the amount is small. In terms of the effectiveness of loan modifications, we find that modifications reduce the likelihood of subsequent redefault and foreclosure, and that the terms of the modification influence its effectiveness, even after controlling for a wide range of variables. We do not find significant differences in redefault rates across racial or ethnic groups.

This study proceeds as follows. The first section following this introduction provides a brief background on the evolution of federal loan modification policies, including the federal Home Affordable Modification Program (HAMP). The second section reviews the existing literature on loan modifications, focusing on studies that have examined modification outcomes by race and ethnicity. The third section describes our data and methodology and provides descriptive statistics for our sample. The fourth section presents our findings. The article concludes with the implications of this research for public policy and suggests avenues for future research.

## **Evolution of Loan Modification Efforts**

Since the start of the foreclosure crisis in 2007, mortgage servicing has garnered increased attention for its role in processing mortgage delinquencies. As the interface between borrowers and investors, servicers are often the ones that make the decision to either grant a loan modification or start foreclosure proceedings. Mortgage loan servicers<sup>2</sup> have a number of options open to them in response to a borrower in default: approve a loan modification, offer an alternative such as a short sale, or pursue a foreclosure. Servicers may pursue these options simultaneously, or even encourage borrowers to submit modification applications and then fail to act on the application, request extensions and more data, or require that the borrower initiate the entire process again sometime down the road.

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<sup>2</sup> Although a mortgage loan may be serviced by a third party or by a lender, we use the term "servicer" to indicate the party responsible for reporting to lenders and investors in a security about the status of each loan each month.

In addition to significant variation in the loan modification process, loans can be modified in multiple ways, and not always in ways that are favorable to the borrower. A common form of loan modification occurs when a servicer adds payment arrears to the total loan balance and then calculates a new monthly payment that will amortize the increased balance during the life of the loan. This type of modification generally increases the monthly payment amount and the overall amount of debt (White, 2009a, 2009b). A second type of modification—generally used on adjustable rate mortgages (ARMs)—is to freeze the interest rate and not permit it to reset at a higher rate. With a third type, a servicer can permanently reduce the interest rate on a loan to reduce the monthly payment, while leaving the balance of the mortgage the same. Finally, a servicer can choose to reduce the loan balance or principal, which reduces the overall amount of the loan. A principal reduction is believed to be particularly beneficial to homeowners whose house values are significantly lower than the amount of their mortgage, commonly referred to as being “under water.”

Recent research has suggested significant heterogeneity among servicers in terms of the types of resolutions they offer to borrowers (Agarwal et al., 2012). Early loan modification efforts were solely proprietary and voluntary in nature, and they did little to help delinquent borrowers. As the foreclosure crisis extended into 2008, prompting a large-scale recession and high rates of unemployment, pressure mounted on the federal government to scale up efforts to modify loans and prevent foreclosures. In February 2009, the U.S. Department of the Treasury (hereafter, Treasury) rolled out the federal government’s landmark foreclosure prevention initiative, the Making Home Affordable (MHA) program, which included the Home Affordable Modification Program (HAMP). HAMP was designed to overcome barriers to loan modification by encouraging servicers to bring loan payments in line with borrowers’ incomes (GAO, 2014). Under the program, eligible borrowers work with the servicer to reduce their monthly payment to 38 percent of their income, and then HAMP provides a government subsidy to further reduce the payment to 31 percent. Servicers also receive an upfront fee of \$1,000 for each modification, plus “pay for success” fees on performing modified loans of \$1,000 per year for up to 5 years, thus providing servicers a financial incentive to initiate modifications that help keep borrowers in their homes.<sup>3</sup> Borrowers are eligible for a HAMP modification on first lien loans for owner-occupied properties with an unpaid principal balance of less than \$729,750, originated on or before January 1, 2009.

Since its launch, HAMP has been revised several times to extend its reach and effectiveness. For example, as high unemployment persisted and housing prices nationally continued to fall, HAMP added features to try to address the situation of unemployed homeowners and under-water borrowers. Still, the program has struggled to reach its intended scale. As of November 2013, 1.3 million borrowers had received modifications under HAMP, fewer than Treasury’s initial estimate of 3 to 4 million (GAO, 2014). In addition, since peaking in early 2010, the monthly volume of new modifications made under the program has largely trailed off. Despite

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<sup>3</sup> HAMP also provides a bonus incentive of \$1,500 to lenders/investors and \$500 to servicers for modifications made while a borrower is still current on mortgage payments but at imminent risk of default. To help servicers make a determination if a modification would help to protect the investors’ interests in the loan, HAMP uses a standardized net present value, or NPV, model to compare expected cashflows from a modified loan to the same loan with no modification, using certain assumptions.

not reaching its volume target, some evidence shows that HAMP has been successful in extending beneficial terms to struggling homeowners. The program has led to significant reductions in payments—an average of \$544 each month, or approximately 40 percent of their premodification payment—for borrowers who obtained relief (Treasury, 2014), and a study in New York City found that HAMP modifications outperformed non-HAMP modifications after 1 year (Voicu et al., 2012). In addition to HAMP modifications, the Office of the Comptroller of the Currency (OCC) estimates that an additional 2 million homeowners have received proprietary modifications (OCC, 2014), although very little is known about the terms of these modifications.

Although OCC and Treasury release regular reports on loan modification activity and redefaults, still only a few studies have examined the factors that influence the effectiveness of modifications in a multivariate framework, and even fewer studies consider differences across demographic groups. This study helps to fill that gap. In the next section, we review the existing literature on loan modifications, focusing specifically on studies that seek to understand loan modification trends by borrowers' race and ethnicity.

## **Literature Review**

Although, in theory, the borrower and investor are each better off if a foreclosure is avoided, in practice, it has proven to be much more difficult to modify loans. Research has identified several institutional factors that may influence servicer practices, including servicer incentives and capacity, mortgage securitization and the associated pooling and servicing agreements, information asymmetries, and lack of borrower contact (Adelino, Gerardi, and Willen, 2013; Cordell et al., 2010; Eggert, 2007; Gelpern and Levitin, 2009; Levitin and Twomey, 2011; Piskorski, Seru, and Vig, 2010).

One of the biggest barriers to modifying loans has been the lack of incentives for servicers. Loan modifications are costly: they are labor and time intensive and cannot be easily automated. Unlike the costs associated with foreclosure, neither the labor nor the overhead costs associated with modifications are billable back to investors (Levitin and Twomey, 2011). If the modified loan redefaults before the servicer has recouped the cost of the modification, then the modification is a money loser for the servicer. As a result, until HAMP was put into place, most servicers had very little financial incentive to undertake loan modifications. Moreover, very few servicers invested in either the staff or the technological capacity to respond to the volume of distressed borrowers at the height of the foreclosure crisis (Cordell et al., 2010).

Researchers have also posited that the investor pooling and servicing agreements (PSAs) that govern privately securitized loans may limit a servicer's ability to offer a loan modification. Although PSAs vary for different mortgage pools, in general, they require servicers to manage the loans in a way that maximizes the returns to the investor. A loan modification may be more difficult for servicers to undertake if they need to consider multiple investors with competing interests (Cordell et al., 2010). A handful of papers have found that loans in private-label securities were less likely to be modified than loans held in portfolio (Agarwal et al., 2011; Been et al., 2013; Piskorski, Seru, and Vig, 2010). In contrast, Adelino, Gerardi, and Willen (2013) argued that no differences in loan modification rates exist between loans

held in portfolio and those held in private-label securities. The extent to which securitization influences modifications is still unclear, however, because all four of these studies use different data, methods, and model specifications, making it difficult to compare results.<sup>4</sup>

A third explanation for differences in modification rates may lie in individual servicers' institutional responses to the foreclosure crisis. One option for a servicer is to implement a highly automated process of default management, which enables the servicer to keep the costs of managing delinquencies low (Levitin and Twomey, 2011). In contrast, other servicers have created loss-mitigation units to work with distressed borrowers, often in concert with housing counselors or foreclosure prevention specialists. Experts have also described the renegotiation process as "more art than science"; *ex ante* it is difficult to know whether a modification will actually lead to a cure or whether it merely postpones delinquency (Adelino, Gerardi, and Willen, 2013). Given that a significant percentage of loans self-cure, servicers must also make a judgment as to whether the modification is really necessary for any individual borrower. The extent to which the servicer is willing to invest in staff and time to perfect this "art" may lead to different determinations about the benefits of offering a borrower a modification and on what terms.

All these factors have material effects for a borrower who is seeking to obtain a loan modification and stay in his or her home. Borrowers have very little control over the ownership or administration of their loan after origination, however; they cannot decide whether their loan will be securitized, who their servicer will be, or what contractual provisions will govern the servicing of their loan (Levitin and Twomey, 2011). Consumer rights regarding loss mitigation are fairly narrow, and the process by which loss-mitigation decisions are made is often opaque. As a result, advocates and housing counselors have raised the concern that the loan modification process may lead to unequal outcomes for certain protected classes (California Reinvestment Coalition, 2011). For example, race or perceived race could serve as a proxy that servicers use for decisionmaking on modifications, especially if these borrowers are deemed more time consuming and, therefore, more costly to serve.

In this article, we contribute to a growing literature on the effectiveness of loan modifications and specifically build on studies that examine loan modification terms and subsequent loan performance for different racial and ethnic groups. The lack of public data on individual loan modifications, coupled with the fact that most loan performance datasets do not include any information about the borrower with the exception of a FICO™ credit score, means that we still have a limited understanding of whether loan modifications help prevent foreclosures, and, if so, for whom.<sup>5</sup> Given the importance of homeownership for asset building and community development, research on how to improve outcomes in the default resolution process is especially relevant for public policy.

Empirical studies that have examined the effectiveness of loan modifications have found that the terms of the modification are important in predicting redefault. In one of the first studies

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<sup>4</sup> For a discussion of the points of contention and differences in methodology, see Adelino, Gerardi, and Willen (2013).

<sup>5</sup> Treasury released the first loan-level data on HAMP in 2011. Mayer and Piven (2012) attempt to use these data to identify racial differences in modification outcomes, although in 79 percent of active permanent modification records and 82 percent of trial modification records no information on borrower race or ethnicity is in the data file.



to examine loan modification terms, White showed that most pre-HAMP modifications typically increased a borrower's monthly payment and the principal owed on the loan (White, 2009a, 2009b). He argued that the high redefault rates of early modifications reflected the fact that the loan renegotiation process did little to increase the affordability of the mortgage. Subsequent studies have shown that the most successful loan modifications are those that result in a significant decrease in either the monthly payments or the principal of the loan (Cordell et al., 2009; Cutts and Merrill, 2008; Haughwout, Okah, and Tracy, 2010; Quercia and Ding, 2009). Quercia and Ding (2009), for example, found that loans with greater payment reductions have lower redefault risks and that loans have an even lower risk of redefault when payment reduction is accompanied by principal reduction. The authors suggest that, among the different types of modifications, the principal forgiveness modification has the lowest redefault rate. Cutts and Merrill (2008) similarly showed that the success rate of modified loans varies by the amount of arrearage capitalized into the loan modification; they found a direct relationship between a lower arrearage and a lower redefault rate.

Missing from these studies, however, is an analysis of how these factors might differ for different types of borrowers. Four studies post-crisis have used loan performance datasets merged with HMDA and other data sources to examine differences in loan modification rates by borrowers' race and ethnicity.<sup>6</sup> None of these studies found significant disparities in loan modification outcomes for Black or Hispanic borrowers. In an early study on loan modifications, Collins and Reid (2010) examined data on subprime and Alt-A loans originated in 2005 in California, Oregon, and Washington, analyzing loan modification outcomes through 2010. The results for these three states showed no evidence of lower modification rates for minority borrowers than for White borrowers, conditional on being delinquent.

The other three studies focused on borrowers' outcomes in New York City, which has data systems that enabled the authors to build comprehensive datasets with a large number of control variables. In the first study, Been and her colleagues (2013) used a sample of first lien, prime, and subprime mortgages in New York originated between 2004 and 2008 and found that the race or ethnicity of the borrower has no significant impact on the likelihood that a seriously delinquent loan was modified between 2008 and 2010. They also found that neighborhoods with large shares of Black residents are more likely to receive modifications (even after controlling for other neighborhood-level factors that might influence delinquent loan outcomes). Chan et al. (2014), using a sample of subprime and Alt-A privately securitized loans originated in New York between 2003 and 2008 observed through 2010, found a higher loan modification propensity for Black and Hispanic borrowers, after controlling for a wide range of factors. In the third study, Voicu and his colleagues (2011) used a sample of New York loans from the OCC Mortgage Metrics database (which covers nine of the largest mortgage

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<sup>6</sup> A couple of studies before the foreclosure crisis examined the influence of borrowers' race on postdelinquency outcomes. For example, using a large sample of Federal Housing Administration (FHA) loans, Ambrose and Capone (1996) investigated whether racial differences influence the resolution of loans that enter default. They found that minority borrowers remain in default longer than White borrowers, suggesting that lenders may actually have been more lenient toward minority borrowers. They also found that the foreclosure rate is consistent for both minority and White borrowers, conditional on being delinquent. These previous studies relied almost exclusively on FHA data, however, and do not include other factors (for example, credit score or equity position) that might influence postdelinquency borrower outcomes.

servicers) and found that HAMP loans are more effective at preventing default than proprietary loan modifications, after controlling for a wide range of variables. While they found that borrowers who receive HAMP modifications are less likely to redefault compared with those who receive proprietary modifications, Voicu et al. (2011) also found that the borrower's race or ethnicity is not significantly correlated with the odds of redefault.

As Collins and Reid (2010) pointed out, however, it is hard to use datasets on loan performance to determine whether racial or ethnic differences influence the incidence of loan modifications, because the data do not enable researchers to see the number of borrowers filing applications to have their loan modified. Without application data, determining differences in the incidence of modifications ultimately is difficult. A study by Mayer and Piven (2012) used the publicly released HAMP data to assess whether racial minorities and Hispanics, women, and low-income homeowners benefited equally from HAMP. They concluded that race, ethnicity, gender, and income have “very little” impact on borrowers' successful participation in HAMP. A subsequent study conducted by the General Accounting Office (GAO) using nonpublic HAMP data on four servicers found some differences in the incidence of HAMP modifications across protected classes, but these differences were, in large part, because of differences in servicers' determination of borrowers' eligibility related to their debt-to-income ratio and the completeness of their modification request (GAO, 2014).

In this study, we seek to extend the research on racial and ethnic heterogeneity in loan modifications to include the modification terms borrowers receive. We also follow borrowers to observe differences in borrower repayment outcomes after modifications are made. This question is crucial, because, if modifications merely delay foreclosure, they may actually make lenders and borrowers (who are making payments under the modification) worse off. If redefault rates are systematically higher for borrowers of color who have received modifications, it would suggest that additional policies may be needed if the goal is to help these borrowers resolve their delinquency and sustain homeownership.

Methodologically, we present this analysis using a national sample of subprime and Alt-A mortgages originated at the peak of the subprime lending boom that are being serviced by a wide range of bank and nonbank servicers. This study is the only one to date to use merged loan performance data to study modifications at the national level through December 2012 (covering the peak period during which modifications were made). Although our sample still covers only a segment of the mortgage market, we believe that expanding the geographic and historical coverage of the analysis adds valuable new empirical evidence to our understanding of loan modifications and their effectiveness. We provide further details on the data in the next section.

## **Data and Methods**

For this analysis, we created a unique dataset that merges loan-level data on subprime home mortgages that are managed by Corporate Trust Services (CTS) with loan-level data on

borrowers from the HMDA. This merged dataset enables us to analyze whether differences in loan modification terms are influenced by the race and ethnicity of the borrower and to assess the extent to which these modifications are successful in preventing subsequent redefault.

CTS is a subsidiary service of Wells Fargo Bank, N.A. (hereafter, Wells Fargo) that provides investment vehicles administered by the bank. The CTS data cover privately securitized mortgages for which Wells Fargo serves as the trustee, including mortgages with different interest rate structures, purposes, property types, and lien statuses (Quercia and Ding, 2009; White, 2009b).<sup>7</sup> The database includes loans originated as early as the 1980s, tracks performance until the loan is paid off or foreclosed upon, and includes more than 4 million individual loans. Although Wells Fargo serves as the trustee for these investor pools, the data include loans from more than 100 servicers across the country, including large bank servicers such as Bank of America Corporation and J.P. Morgan Chase & Co. and nonbank servicers such as Ocwen Financial Corporation and Nationstar Mortgage Holdings, Inc. (Goodman and Lee, 2014). The top 20 servicers in our data cover bank and nonbank servicers, and they include 7 out of the 10 largest servicers in terms of market share in 2013 (Goodman and Lee, 2014). The largest servicer in the CTS data handles more than 13 million loans, while the smallest has approximately 70,000 loans in its portfolio. The data also reflect a broad range of servicer quality as ranked by Moody's Corporation credit rating services, including servicers who scored an SQ1, which represents strong combined servicing ability and stability, and SQ4, which represents less-than-average servicing ability and stability (Moody's Investor Service, 2014).

Each monthly loan record contains the borrower's FICO credit score, loan-to-value (LTV) ratio at origination, the last 12 months of delinquency history, the property ZIP Code, the type of loan, and the original and current balance of the loan. Importantly for this study, the CTS data include a modification indicator, which represents all permanent loan modifications and equals one for every period after the loan is modified. The reports also have information about the loan balance, mortgage payment, and interest rate, before and after modification, which enables us to identify whether total mortgage debt, interest rate, or mortgage payments are changed for individual homeowners.

The CTS dataset, however, does not include any information on the borrower's race or ethnicity. For this reason, following methods used by other researchers, we merge the CTS data with loan-level HMDA data (Ding, 2013; Ding et al., 2012). HMDA data provide information on the race and ethnicity of the borrower, his or her income, and the geographic location of the property securing the loan. To match the data, we sort CTS and HMDA loans into the census tracts of the purchased property using a geographic crosswalk file.<sup>8</sup> Within each census tract, we match loan originations on the following variables: origination date, loan amount, lien

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<sup>7</sup> These investor report files are available at <https://www.ctslink.com>.

<sup>8</sup> One challenge in merging these data is relating U.S. Postal Service (USPS) ZIP Codes (the scale of the CTS data) to Census Bureau geographies (the scale of the HMDA data). We used the MABLE/Geocorr12: Geographic Correspondence Engine to allocate loans in ZIP Codes to corresponding census tracts. Details about the crosswalk are available at the Missouri Census Data Center, <http://mcdc.missouri.edu/websas/geocorr12.html>. For robustness, the authors also tested other available crosswalks (for example, the HUD/USPS ZIP crosswalk file), but the match rate did not improve.

status, and loan purpose.<sup>9</sup> Only loans that provide for a direct match on these variables are included in the resulting sample. We were able to match 69.2 percent of the unique loans in the servicing record to HMDA applications. We compare the sample means of CTS matched loans against those that were not matched and find no significant differences in the average loan amount, the borrower's FICO score, or whether the loan had an adjustable interest rate.<sup>10</sup> In addition, we compare the demographic distribution of the CTS sample against the demographic distribution of subprime loans in HMDA and find that the proportions of non-Hispanic White, Black, Hispanic, and Asian borrowers are similar across the two datasets.

The sample used in this study consists of all first-lien mortgages for owner-occupied, single-family residences originated in 2004, 2005, and 2006 (as the market shifted in early 2007, nonconforming subprime loans were no longer being added to the CTS database); we limit the data to loans that were active but at least 60 days delinquent as of June 2009.<sup>11</sup> We drop observations that went into bankruptcy during the panel and loans that were prepaid in the first period of observation. We also remove loans with an original balance of more than \$1 million, because they are arguably a different subset of loans.<sup>12</sup> We observe modifications and loan performance through December 2012. Data on modifications from the OCC show that the volume of modifications peaked in early 2010 and then declined throughout 2011 and 2012, meaning that our sample captures the period during which most modifications were made (OCC, 2014). Because our interest in this study is to understand the relationship between modification types and redefault for different types of borrowers, we focus our analysis on 42,000 modified loans and consider only permanent, not trial, modifications.

Using cross-sectional linear probability models, we examine the performance of these loans from June 2009 through December 2012, at periods 6 and 12 months after modification, controlling for a wide range of loan, borrower, and housing market characteristics.<sup>13</sup>

We create additional variables to distinguish between different types of modifications. We construct two indicator variables, "interest rate decreased" and "loan balance decreased," that equal 1 if the rate decreased or the balance decreased, respectively.<sup>14</sup> To assess the extent of payment relief, we calculate the percentage change in the interest rate and monthly payment ("payment change") before and after modification. We also create an indicator variable that assesses whether

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<sup>9</sup> The matching procedure was completed while one of the authors was at the Federal Reserve Bank of San Francisco, providing access to the nonpublic HMDA data, which include origination date. CTS loans were matched to HMDA on site, and then all identifying HMDA variables (including loan number) were deleted from the matched record, resulting in a CTS data file with race/ethnicity and income attached to each loan record, but no ability to regenerate the origination date or link the CTS records to the public HMDA file.

<sup>10</sup> Other studies that have used matching to merge HMDA data with loan performance records employ a probability matching technique so data on loans with multiple matches are not lost (Bocian et al., 2011). To date, no research has compared and contrasted these methods and the strengths and weaknesses of the different approaches.

<sup>11</sup> We chose to focus on delinquent loans because borrowers who receive modifications without being delinquent may differ from distressed borrowers in important and distinct ways.

<sup>12</sup> Dropping loans over \$1 million results in a loss of about 0.5 percent of observations.

<sup>13</sup> Using a cross-sectional model design versus a panel structure did not change our substantive findings, so we present the cross-sectional results to ease interpretation.

<sup>14</sup> The data do not enable us to see whether the decline in the balance is related to principal forbearance or forgiveness.

a loan was “HAMP-eligible.” Although we cannot directly see which loans were modified under HAMP, this HAMP-eligible variable includes loans that (1) were modified after the launch of HAMP, (2) had an unpaid principal balance of less than \$729,750, (3) had an interest rate reduction that did not bring the interest rate to less than 2 percent (the HAMP interest rate floor), and (4) were ARMs but converted to fixed-rate mortgages after modification (in other words, ARMs that remained ARMs after modification were excluded).

The control variables in our analysis include the borrower’s race and ethnicity, the borrower’s income, the borrower’s FICO score at origination, a no-documentation indicator, a prepayment-penalty indicator, and the combined loan-to-value (CLTV) ratio. We coded the race and ethnicity variables in the HMDA data based on the primary applicant as “Black/African-American” (Black), “Hispanic/Latino” (Hispanic), “Asian/Hawaiian/Pacific Islander” (Asian),<sup>15</sup> and “non-Hispanic White.” The variables that capture the borrower’s race and ethnicity, income, and FICO score are measured at the time of origination; one significant limitation of these data and most data that report loan performance is the inability to assess how changes in the borrower’s income or FICO score over time influence either the probability of default or the success of modification.<sup>16</sup> We take a log transformation of income in the models because borrower income is not normally distributed. To account for changes in the housing market, we use monthly data from Zillow at the ZIP Code level and calculate relative house price changes for each loan, enabling us to see the effect of a borrower’s equity position on modification terms or the likelihood of cure. All our models also include metropolitan statistical area (MSA)-level fixed effects to account for other market-level conditions that may influence modification terms or redefault.

Exhibit 1 presents summary statistics for the CTS sample of modified loans. The descriptive means for these variables are measured at origination with the exception of “HAMP eligibility,” which is determined at the time of modification. For purposes of this study, it is noteworthy that the sample is demographically diverse. Although the plurality of borrowers is non-Hispanic White (48 percent), the sample also includes 22 percent Black borrowers, 28 percent Hispanic borrowers, and 4 percent Asian borrowers. Most loans (62 percent) listed a male borrower as the primary applicant. The average credit score of borrowers in the sample was 613, which is generally considered to be subprime (consistent with the fact that these are subprime and Alt-A loans that are bundled into private-label securities). The average applicant income at origination was \$85,790. Focusing next on loan characteristics, we find that the average loan balance at origination was \$241,265, with a mean LTV ratio of 83.48 percent. Most loans were ARMs (69 percent), with an average interest rate of 7.37 percent. Approximately one out of four modified loans were HAMP eligible, suggesting that a fair number of loans in our sample underwent proprietary modifications.

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<sup>15</sup> Also includes a small percentage of Native American and other races.

<sup>16</sup> Although a borrower’s race and ethnicity should be static characteristics and not change between origination and modification, researchers who have analyzed the HAMP data have found that the race and ethnicity associated with a loan can change. For example, at modification it may be the coapplicant who interfaces with the lender. Lenders may have also made assignment errors, either at origination or at time of modification. In addition, researchers have noted the high degree of nonreporting of race/ethnicity data in HMDA (Wyly and Holloway, 2002).

**Exhibit 1****Summary Statistics for the CTS Sample of Modified Loans**

<b>Borrower Characteristics</b>		<b>Loan Characteristics</b>	
Black	0.22 (0.41)	ARM	0.69 (0.46)
Hispanic	0.28 (0.45)	Loan balance	241,265 (155,010)
Asian	0.04 (0.19)	HAMP-eligible	0.25 (0.43)
Non-Hispanic White	0.48 (0.50)	CLTV ratio	83.48 (12.77)
Male	0.62 (0.49)	Interest rate	7.37 (1.74)
FICO™	613 (73)		
Applicant income	85,790 (88,660)		

ARM = adjustable-rate mortgage. CLTV = combined loan-to-value. HAMP = Home Affordable Modification Program.

Notes: N = 42,374. Data include all loans originated between 2004 and 2006 that were modified before December 2012.

Means reported for period 1 (December 2006). Standard deviations are in parentheses. Black, Hispanic, Asian, non-Hispanic White, and male are based on Home Mortgage Disclosure Act data. FICO™ is credit score at the time of origination. Applicant income is applicants' income at time of application. ARM = 1 for adjustable rate mortgages. HAMP-eligible is determined at the time of modification.

Source: Corporate Trust Services

One significant limitation of the CTS data is its coverage of the mortgage market—in particular, the lack of coverage of prime loans and loans held by banks in portfolio. Nevertheless, given that subprime mortgages account for a significant share of all foreclosures and that most subprime loans that led to the crisis were privately securitized, this sample provides important insights into the performance of loan modifications for this segment of the market. Also, given the potential that modifications are more challenging among privately securitized loans (meaning loans not managed by Fannie Mae, Freddie Mac, or Ginnie Mae), this sample is particularly relevant for policymakers. Finally, one other strength of this data and study is their national coverage; as noted previously, other studies that have examined detailed loan modification outcomes by borrower race and ethnicity have tended to focus on borrowers in New York City (Been et al., 2013; Voicu et al., 2012) or in select states (Collins and Reid, 2010). Expanding the analysis to a national sample of loans enables us to determine the extent to which these more geographically targeted findings on loan default resolutions by race and ethnicity are nationally representative. As we argue in the conclusion, however, additional research is needed to develop a better understanding of servicing practices across the entire mortgage market, especially because existing studies also cover different time periods and mortgage market segments.

## Findings

In this section, we present the results of our analysis. First, we assess whether Black, Hispanic, and Asian borrowers receive less aggressive loan modifications, contingent on receiving a modification. Second, we explore the effectiveness of loan modifications in preventing re-default, again with a focus on differences across racial and ethnic groups.

### Loan Modification Terms by Race and Ethnicity

Because the success of modification is likely shaped by the type of modification a borrower receives, it is important to understand whether, conditional on modification, different borrowers receive differently structured modifications. In exhibit 2, we present three separate models to assess whether racial or ethnic differences influence the type of modification received. The

#### Exhibit 2

#### Models Examining the Likelihood of Receiving a Modification With Interest Rate, Loan Balance, or Payment Reductions

Dependent Variable	Linear Probability		Ordinary Least Squares
	Interest Rate Decreased	Loan Balance Decreased	Payment Change
Black	0.005 (0.005)	0.008 (0.005)	- 0.011** (0.004)
Hispanic	- 0.005 (0.005)	- 0.002 (0.005)	- 0.025*** (0.004)
Asian	- 0.005 (0.011)	0.005 (0.010)	- 0.015* (0.007)
ARM	0.074*** (0.006)	0.035*** (0.005)	- 0.070*** (0.003)
Income (logged)	0.006 (0.004)	0.009* (0.004)	0.003 (0.003)
HAMP-eligible	0.426*** (0.005)	0.038*** (0.004)	- 0.156*** (0.003)
House price change	0.037** (0.012)	- 0.215*** (0.013)	0.122*** (0.008)
More than 60 days behind before modification	0.024*** (0.006)	- 0.010 (0.005)	- 0.003 (0.004)
Total Observations	33,383	33,383	29,896

ARM = adjustable-rate mortgage. HAMP = Home Affordable Modification Program.

\* $p < 0.05$ . \*\* $p < 0.01$ . \*\*\* $p < 0.001$ .

Notes: Interest rate decreased and loan balance decreased are dummy variables regarding the type of modification. Payment change reflects the change in monthly payment before and after modification, recorded in percentage terms. Black, Hispanic, and Asian are based on Home Mortgage Disclosure Act data. Non-Hispanic White is the excluded group. ARM is a dummy for an adjustable rate mortgage. Income (logged) is at the time of application. HAMP-eligible is determined at the time of modification. House price change measures the difference in house prices at the ZIP Code level between date of modification and origination. More than 60 days behind before modification marks the delinquency status the month before modification. The model also controls for FICO™ credit score and combined loan-to-value ratio quartiles, a no-documentation dummy, a prepayment penalty dummy, and metropolitan statistical area-level fixed effects.

Source: Corporate Trust Services

first two columns present the findings from a linear probability model assessing whether a modification entailed (1) a reduction in the loan interest rate and (2) a reduction in the loan principal or balance. The third column presents an ordinary least squares model in which the dependent variable is the percent change in the monthly mortgage payment. In addition to the variables in the exhibit, each model controls for FICO and CLTV quartiles, the percent change in house prices at the ZIP Code level from origination to modification (logged), the borrower's income at origination (logged), a no-documentation indicator variable, a prepayment penalty indicator variable, and MSA-level fixed effects.

Importantly, we find very few differences in the likelihood of either interest rate reductions or balance decreases by race or ethnicity. Compared with White borrowers, Black, Hispanic, and Asian borrowers are equally likely to receive a modification that decreases the interest rate or principal balance, after controlling for a wide range of factors. When we examine the amount of change in monthly payments, we find that Black, Hispanic, and Asian borrowers all receive a slightly larger reduction in their monthly payments than White borrowers. The differences are slight, however, with the difference ranging from a 1.1-percent greater decrease in monthly payments for Black borrowers to 2.5 percent for Hispanic borrowers.

In terms of the other control variables, we find that loans with adjustable interest rates are more likely to result in interest rate and principal balance decreases and also a greater decrease in the monthly payments. We find that higher income borrowers are slightly more likely to receive a modification that entails a principal decrease, but again the effect is small. We also find that living in ZIP Codes with lower house price declines (or house price increases) between origination and modification significantly decreases the likelihood of a borrower receiving a principal reduction, but it increases the likelihood of the borrower receiving a lowered interest rate and a greater reduction in monthly payments. For some servicers, a rising market may change their net present value, or NPV, calculation and reduce the likelihood that they would be willing to forgo principal. We also find that borrowers who are more than 60 days delinquent at the time of modification are slightly more likely to see interest rate reductions than borrowers who are only 2 months behind on their payments; however, serious delinquency appears to have no effect on the likelihood of principal decreases or the amount of payment relief the borrower is offered.

The model also shows that the HAMP-eligible indicator variable has a significant, positive effect on the type of modification a borrower receives. Conditional on receiving a modification, borrowers who fit within HAMP-eligibility criteria—including receiving their modification after HAMP was launched—are more likely to receive an interest rate or principal reduction on their loan. They also receive a much greater decrease in their monthly payments—on average, borrowers who could have received a HAMP modification see their monthly payments go down 15.6 percent compared with borrowers who receive a modification before HAMP was launched or who may not be eligible because their loan balance is too high.

## **Modifications and Loan Performance**

Our second assessment relates to the effectiveness of loan modifications and whether the modifications granted have been successful at keeping borrowers in their homes. We begin



by examining differences in loan performance in a descriptive framework. Exhibit 3 displays summary statistics for our sample of modified loans in the top panel and, for a comparable sample of nonmodified loans in the CTS data, in the bottom panel.<sup>17</sup> Approximately 22 percent of the delinquent loans in our sample were modified between December 2006 and December 2012. Without controlling for other borrower or loan characteristics, we find that modification rates are higher for Hispanic and Black borrowers; approximately 33 percent of Black borrowers and 25 percent of Hispanic borrowers received a loan modification compared with 19 percent of Non-Hispanic White borrowers and 17 percent of Asian borrowers. Most loan modifications involve a rate reduction; 80 percent of all modifications include some form of interest forgiveness, with an average reduction of monthly payments of 29 percent. In contrast, only 18 percent of modifications include a reduction in the loan balance. Consistent with other studies, in these descriptive results, we do not find significant racial or ethnic differences in the types of modifications received. Overall, the incidence of various loan modification types and terms are remarkably consistent across racial and ethnic categories. We also find that approximately

### Exhibit 3

#### Comparing Outcomes for Delinquent Loans With and Without Modifications, by Race and Ethnicity

	White	Black	Asian	Hispanic	Other	Total
<b>Delinquent loans with modification</b>						
Number of delinquent loans	20,506	9,267	1,549	10,568	484	42,374
Percent of delinquent loans modified	0.19	0.33	0.17	0.25	0.23	0.22
Interest rate decreased	0.79 (0.41)	0.81 (0.40)	0.81 (0.39)	0.80 (0.40)	0.82 (0.39)	0.80 (0.40)
Loan balance decreased	0.16 (0.36)	0.20 (0.40)	0.18 (0.38)	0.20 (0.40)	0.15 (0.36)	0.18 (0.38)
Percent payment change	-0.27 (0.24)	-0.30 (0.24)	-0.29 (0.24)	-0.31 (0.24)	-0.28 (0.22)	-0.29 (0.24)
Ever foreclosed	0.33 (0.47)	0.32 (0.47)	0.26 (0.44)	0.28 (0.45)	0.35 (0.48)	0.31 (0.46)
<b>Delinquent loans, no modification</b>						
Number of delinquent loans	86,863	19,227	7,403	31,657	1,600	146,750
Ever foreclosed	0.33 (0.47)	0.42 (0.49)	0.38 (0.49)	0.49 (0.50)	0.42 (0.49)	0.38 (0.49)

*Notes: Means reported, with standard deviations in parentheses. Interest rate decreased and loan balance decreased are dummy variables regarding the type of modification. Percent payment change reflects the change in monthly payments before and after modification, recorded in percentage terms.*

*Source: Corporate Trust Services*

<sup>17</sup> The nonmodified sample includes loans originated between 2004 and 2006 that were at least 60 days delinquent and active in June 2009 but that were not modified between December 2006 and December 2012.

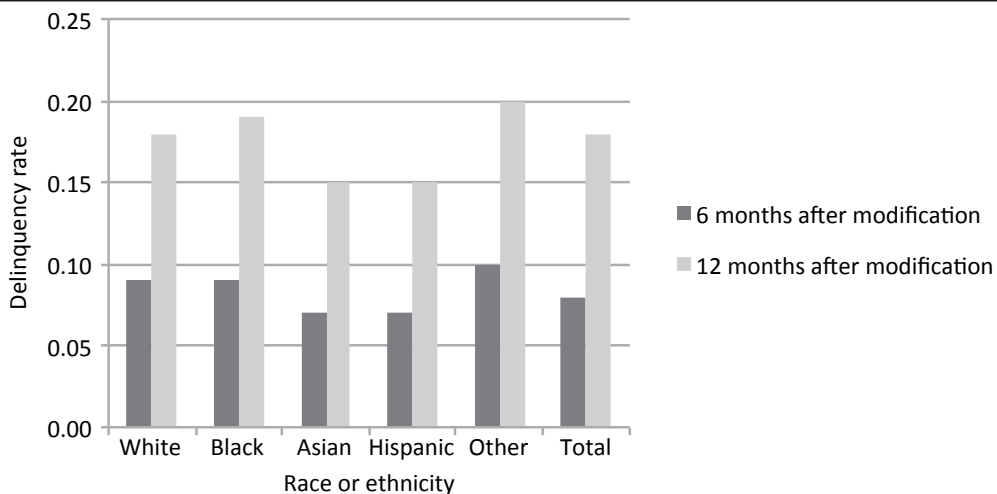
one-third of modified loans end in foreclosure, despite the modification.<sup>18</sup> Asian borrowers have the lowest levels of foreclosure after modification (26 percent), with White, Black, and borrowers classified as “Other” having slightly higher foreclosure rates than average.

For comparison, in the bottom panel of exhibit 3, we present the foreclosure rate for loans that were 60 days or more delinquent but not modified during our observation period. Overall, modified loans perform better than unmodified loans; 38 percent of unmodified loans in our sample end in foreclosure. The data also show that modifications reduced the foreclosure rate for minority borrowers, but not for non-Hispanic White borrowers. For instance, 42 percent of Black borrowers who did not receive a modification lost their home to foreclosure compared with 32 percent of Black borrowers who received a modification. In contrast, the foreclosure rate for non-Hispanic White borrowers is similar for delinquent loans that underwent modification and those that did not.

In exhibit 4, we examine serious delinquency rates for modified loans by race and ethnicity, measured at 6 and 12 months after modification. Approximately 7 percent of loans have missed at least three payments 3 months after modification (and are therefore 90 or more days late). Within a year, nearly 18 percent of borrowers have missed at least three payments. In comparison with White and Black borrowers, Asian and Hispanic borrowers have slightly lower rates of being 90 or more days delinquent, at 6 months and 1 year after modification.

**Exhibit 4**

**Percent of Modified Loans That Returned to Seriously Delinquent Status 6 and 12 Months After Modification**



Source: Corporate Trust Services

<sup>18</sup> The foreclosure rate is measured at the last period of observation, either when the loan ends in foreclosure or in December 2012.

Although these descriptive statistics can help reveal overall trends in loan performance after modification, they do not control for borrower, loan, or housing market characteristics that might influence the likelihood that a borrower can continue to pay his or her mortgage, even with a modification. For this reason, we explore the effectiveness of loan modifications in a multivariate framework. Exhibit 5 presents a cross-sectional linear probability model that assesses loan performance 6 and 12 months after modification. As with the previous models, nonreported controls include FICO and CLTV quartiles, a no-documentation indicator variable, a prepayment penalty indicator variable, house price changes at the ZIP Code level from the time of modification to 6 or 12 months after origination, and MSA-level fixed effects.

Focusing first on differences by race and ethnicity, we find that only Black borrowers are slightly more likely to experience delinquency than White borrowers after receiving a modification. Specifically, 12 months after modification, Black borrowers are more likely to be 60 days delinquent, but the size of the effect is small. We also find that Hispanic borrowers are slightly less likely to be at least 30 days delinquent 6 months after modification. Overall, after controlling for a wide range of factors, we find very little variation in the effectiveness of modifications by race or ethnicity. Borrowers with higher incomes at origination are slightly less likely to become delinquent or go into foreclosure after modification.

HAMP eligibility also reduces the likelihood of redefault. Modifications that were HAMP eligible reduce the likelihood of foreclosure after 12 months by 6 percent, even after controlling for a wide range of other characteristics. We do not find a significant effect of house price changes on the likelihood of redefault; in part, this may be because of the fact that we are measuring house price change between the month of modification and 6 or 12 months later, which results in smaller differentials than our previous measure of house price change, which captured the higher price levels among loans originated before 2007 and the subsequent rapid drop in values during the crisis.

Perhaps counterintuitively, we find that borrowers who are seriously delinquent (90 days or more) at the time of modification are less likely to redefault after modification. Although this finding may in part be due to a selection effect (for example, servicers may be effectively identifying borrowers who need a modification to stay in their homes), it also suggests that modifications can be effective even for borrowers who are several months behind in their payments. In terms of the modifications themselves, we find that interest rate reductions tend to reduce delinquencies (this is consistent at both 6 and 12 months after modification), but that only principal forgiveness reduces the likelihood of foreclosure a year after modification. When we run the same model but control for the percentage change in monthly payments, we find that a decrease in monthly payments reduces the likelihood of redefault and foreclosure across the board (exhibit 6). As we discuss in the conclusion that follows, these results point to the importance of understanding both the nature of modifications and the outcomes that are tracked post-modification to assess which modifications are the most effective at keeping borrowers in their home over the long term.

**Exhibit 5**

**Models Examining the Role of Modifications in Subsequent Loan Performance, Interest Rate and Loan Balance Changes**

	After 6 Months				After 12 Months			
	30 or More Days Behind	60 or More Days Behind	90 or More Days Behind	Fore-closure	30 or More Days Behind	60 or More Days Behind	90 or More Days Behind	Fore-closure
Black	0.001 (0.007)	0.002 (0.006)	-0.003 (0.005)	-0.006 (0.003)	0.010 (0.009)	0.017* (0.008)	0.004 (0.007)	-0.005 (0.006)
Hispanic	-0.016** (0.006)	-0.010 (0.005)	-0.006 (0.005)	-0.005 (0.003)	-0.015 (0.008)	-0.001 (0.007)	-0.003 (0.007)	0.003 (0.005)
Asian	-0.015 (0.013)	-0.010 (0.011)	-0.007 (0.009)	-0.002 (0.006)	-0.005 (0.016)	-0.007 (0.015)	-0.004 (0.014)	-0.001 (0.010)
Male	0.013* (0.005)	0.007 (0.004)	0.004 (0.004)	0.004 (0.003)	0.012 (0.006)	0.006 (0.006)	0.001 (0.005)	0.005 (0.004)
Loan balance decreased	0.006 (0.008)	0.016* (0.007)	0.014* (0.006)	0.008* (0.004)	0.001 (0.010)	0.002 (0.009)	-0.002 (0.009)	-0.019*** (0.006)
Interest rate decreased	-0.039*** (0.006)	-0.032*** (0.006)	-0.027*** (0.005)	-0.004 (0.003)	-0.042*** (0.008)	-0.044*** (0.007)	-0.039*** (0.007)	0.004 (0.005)
More than 60 days behind before modification	-0.097*** (0.006)	-0.079*** (0.005)	-0.058*** (0.004)	-0.028*** (0.003)	-0.111*** (0.008)	-0.110*** (0.007)	-0.105*** (0.006)	-0.061*** (0.004)
ARM	0.011* (0.005)	0.011* (0.005)	0.009* (0.004)	0.001 (0.003)	0.014* (0.007)	0.015* (0.006)	0.018** (0.006)	0.007 (0.004)
Current balance	0.074*** (0.007)	0.060*** (0.006)	0.050*** (0.005)	0.022*** (0.004)	0.095*** (0.009)	0.083*** (0.009)	0.076*** (0.008)	0.040*** (0.006)
Income (logged)	-0.025*** (0.006)	-0.022*** (0.005)	-0.016*** (0.004)	-0.008* (0.003)	-0.024** (0.008)	-0.022** (0.007)	-0.021** (0.007)	-0.015** (0.005)
HAMP-eligible	-0.101*** (0.005)	-0.079*** (0.004)	-0.059*** (0.003)	-0.032*** (0.002)	-0.147*** (0.007)	-0.136*** (0.006)	-0.121*** (0.005)	-0.056*** (0.004)
House price change (6 months after modification)	0.026 (0.057)	-0.017 (0.048)	0.018 (0.042)	-0.003 (0.029)	— —	— —	— —	— —
House price change (12 months after modification)	— —	— —	— —	— —	-0.040 (0.050)	-0.017 (0.046)	-0.008 (0.043)	-0.042 (0.032)
Total observations	27,973	27,973	27,973	27,940	22,645	22,645	22,645	22,411

ARM = adjustable-rate mortgage. HAMP = Home Affordable Modification Program.

\* $p < 0.05$ . \*\* $p < 0.01$ . \*\*\* $p < 0.001$ .

Notes: Model—Linear probability. Additional controls include a no-documentation dummy, a prepayment penalty dummy, metropolitan statistical area-level fixed effects, and FICO™ credit score and combined loan-to-value ratio quartiles. Black, Hispanic, and Asian are based on Home Mortgage Disclosure Act data. Non-Hispanic White is the excluded group. ARM is a dummy for an adjustable rate mortgage. Income (logged) is at the time of application. Interest rate decreased and loan balance decreased are dummies equal to 1 if the loan interest rate or principal balance, respectively, was reduced with the modification. HAMP-eligible is determined at the point of modification. More than 60 days behind before modification marks the delinquency status the month before modification. House price change is measured as the difference in house prices between 6 or 12 months after modification and the time of modification.

Source: Corporate Trust Services (CTS)

**Exhibit 6**

**Models Examining the Role of Modifications in Subsequent Loan Performance, Monthly Payment Changes**

	After 6 Months				After 12 Months			
	30 or More Days Behind	60 or More Days Behind	90 or More Days Behind	Foreclosure	30 or More Days Behind	60 or More Days Behind	90 or More Days Behind	Foreclosure
Black	0.005 (0.007)	0.005 (0.006)	0.001 (0.005)	-0.004 (0.004)	0.008 (0.009)	0.017* (0.008)	0.006 (0.008)	-0.003 (0.006)
Hispanic	-0.018** (0.006)	-0.012* (0.005)	-0.007 (0.005)	-0.005 (0.003)	-0.021** (0.008)	-0.008 (0.007)	-0.009 (0.007)	0.002 (0.005)
Asian	-0.020 (0.013)	-0.016 (0.010)	-0.010 (0.009)	-0.003 (0.006)	-0.026 (0.016)	-0.018 (0.015)	-0.011 (0.014)	-0.004 (0.010)
Male	0.014** (0.005)	0.008 (0.004)	0.005 (0.004)	0.005 (0.003)	0.006 (0.007)	0.001 (0.006)	-0.001 (0.006)	0.004 (0.004)
Payment change	0.305*** (0.014)	0.207*** (0.012)	0.153*** (0.010)	0.054*** (0.008)	0.356*** (0.018)	0.299*** (0.016)	0.251*** (0.015)	0.124*** (0.011)
More than 60 days behind before modification	-0.099*** (0.006)	-0.078*** (0.005)	-0.058*** (0.004)	-0.029*** (0.003)	-0.111*** (0.008)	-0.112*** (0.007)	-0.106*** (0.006)	-0.060*** (0.004)
ARM	0.003 (0.006)	0.007 (0.005)	0.004 (0.004)	-0.003 (0.003)	0.007 (0.007)	0.007 (0.007)	0.010 (0.006)	0.000 (0.005)
Current balance	0.048*** (0.007)	0.040*** (0.006)	0.037*** (0.005)	0.017*** (0.004)	0.081*** (0.010)	0.071*** (0.009)	0.067*** (0.008)	0.038*** (0.006)
Income (logged)	-0.014* (0.006)	-0.014** (0.005)	-0.012** (0.004)	-0.007* (0.003)	-0.021** (0.008)	-0.019** (0.007)	-0.019** (0.007)	-0.015** (0.005)
HAMP eligible	-0.009 (0.006)	-0.014** (0.005)	-0.011* (0.004)	-0.014*** (0.003)	-0.040*** (0.008)	-0.043*** (0.007)	-0.042*** (0.007)	-0.019*** (0.005)
House price change (6 months after modification)	-0.040 (0.060)	-0.068 (0.050)	-0.002 (0.042)	-0.010 (0.029)	—	—	—	—
House price change (12 months after modification)	—	—	—	—	-0.110* (0.055)	-0.088 (0.050)	-0.075 (0.046)	-0.078* (0.035)
Total observations	24,926	24,926	24,926	24,905	19,657	19,657	19,657	19,481

ARM = adjustable-rate mortgage. HAMP = Home Affordable Modification Program.

\* $p < 0.05$ . \*\* $p < 0.01$ . \*\*\* $p < 0.001$ .

Notes: Model—Linear probability. Additional controls include a no-documentation dummy, a prepayment penalty dummy, metropolitan statistical area-level fixed effects, and FICO™ credit score and combined loan-to-value ratio quartiles. Black, Hispanic, and Asian are based on Home Mortgage Disclosure Act data. Non-Hispanic White is the excluded group. ARM is a dummy for an adjustable rate mortgage. Income (logged) is at the time of application. Interest rate decreased and loan balance decreased are dummies equal to 1 if the loan interest rate or principal balance, respectively, was reduced with the modification. HAMP-eligible is determined at the point of modification. More than 60 days behind before modification marks the delinquency status the month before modification. House price change is measured as the difference in house prices between 6 or 12 months after modification and the time of modification.

Source: Corporate Trust Services (CTS)

## **Conclusions**

Confronted with a rising number of foreclosures, the federal government launched HAMP in 2009, with the goal of increasing the scale and impact of loan modifications. Since then, concerns have emerged about whether loan modifications are successful at preventing foreclosure and whether racial or ethnic differences influence who benefits from a modification. Using a sample of national subprime and Alt-A loans, we find no evidence of racial disparities in the types of loan modifications received. Overall, race or ethnicity is not a significant factor in predicting loan modification terms. The one exception is in the area of monthly payment reductions; we find that Black, Hispanic, and Asian borrowers receive modifications that entail a greater reduction in monthly payments than non-Hispanic White borrowers, although the additional amount of payment relief is small. These findings stand in stark contrast to the literature on mortgage originations, which has revealed persistent differences in loan outcomes by race and ethnicity in terms of loan pricing and terms (Avery, Brevoort, and Canner, 2006; Bocian, Li, and Ernst, 2008; Nichols, Pennington-Cross, and Yezer, 2004).

Our findings on the effectiveness of loan modifications are more mixed. We find that modifications do reduce the likelihood of delinquency and foreclosure, and that substantive differences in the effectiveness of modifications are very little across racial and ethnic groups. HAMP-eligible modifications (those that were made after HAMP was officially launched and that met loan amount criteria) display significantly lower subsequent rates of delinquency and foreclosure, as do modifications with reductions in monthly payments. These findings suggest that the focus of HAMP on the affordability of payments may facilitate better borrower outcomes than earlier voluntary modification efforts in which monthly payments would often increase (White, 2009a, 2009b). Because we cannot directly observe HAMP versus proprietary modifications, however, the direct impact of HAMP remains an important avenue for future research. Another important question for future research is whether the modification terms (for example, interest rate reductions) will remain in place and contribute to the sustainability of the loan beyond the 1 year we can observe.

Beyond the primary questions driving this study, several other issues are raised by this research. First, the models show that the affordability of monthly payments is a key factor influencing redefault, suggesting that affordability concerns are an important component of any loss-mitigation program. Under HAMP, interest rate reductions are required to be in place only for 5 years. As loans modified under HAMP revert to premodification interest rate levels in the coming years, some borrowers will have recovered from the recession sufficiently to manage these increased payments. Other borrowers, however, may need ongoing attention from servicers to develop alternative payment arrangements or to even sell the property to avoid default. The needs of borrowers with modified mortgage loans will require additional capacity from servicers and deserve ongoing oversight by regulators. Future research should also focus on racial and ethnic differences as borrowers reach the 5-year limit of their loan modifications.

Second, housing counseling has been an emphasis of the response to rising foreclosures, as evidenced by the National Foreclosure Mitigation Counseling Program. This program is associated with increased rates of loan modifications for troubled borrowers (Collins and Schmeiser, 2013; Collins, Schmeiser, and Urban, 2013; Mayer et al., 2009). Existing datasets on loan performance, including the one used in this study, unfortunately do not include information about whether borrowers received counseling either prepurchase or during the loan renegotiation process. The role of counseling needs to be considered in any review of policies responding to borrowers in distress as policymakers consider ways to stimulate loan workouts in other markets, particularly the student loan market, which has garnered increased attention in recent years.

Third, our research demonstrates that not all loan modifications are successful, and we believe that a lot can still be learned about which types of modifications and post-purchase interventions are the most effective at sustaining homeownership. As with other research focused on loan modifications, our study is limited in its coverage of the mortgage market; existing datasets generally either focus on one market segment (for example, subprime and Alt-A loans as with the CTS) or do not include a specific loan modification flag, requiring that researchers make assumptions about which loan changes are because of a modification. Increased transparency in servicing practices and better publicly available data on loan modification terms and outcomes by race and ethnicity (and by income and gender) for the entire mortgage market would increase our ability to assess the relative strengths and weaknesses of different loan modification practices and develop policies to better assist borrowers who face mortgage distress. HMDA, and the role it played in increasing transparency about mortgage applications, offers one potential model. Servicers could be required to disclose loan modification terms and borrower characteristics using a similar annual reporting mechanism as is used for home mortgage loan applications. Evidence is emerging that simply enforcing reporting requirements might shift servicer behavior (Collins and Urban, 2014).

Finally, our finding that one-third of modified, subprime loans still end in foreclosure raises the larger question of how to reduce the vulnerability of lower wealth and lower income households in the homeownership market. The Consumer Financial Protection Bureau and the reforms enacted by the Dodd-Frank Wall Street Reform and Consumer Protection Act expand consumer protections while limiting the ability of financial institutions to engage in high-risk lending practices. Mortgage terms are not the only predictors of the sustainability of homeownership, however. Borrowers of color, especially those who have lower incomes or who work in lower skilled jobs, may face increased risk and income volatility associated with structural changes in the labor market (Reid, 2014). In addition, lower income homeowners have a smaller financial cushion with which to withstand the impact of negative life events, such as unemployment or serious illness, or to meet unanticipated repair costs (Mallach, 2011). For these borrowers, loan terms may not be the only, or even the most important, factor influencing the sustainability of homeownership. Although transparent and effective guidelines for loan servicing are critical, greater emphasis and funding for policies that provide post-purchase support can help to ensure that borrowers of color are able to stay in their homes and experience the potential benefits of homeownership.

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## Authors

J. Michael Collins is an associate professor of public affairs and consumer science at the University of Wisconsin-Madison.

Carolina K. Reid is an assistant professor in the Department of City and Regional Planning at the University of California, Berkeley.

Carly Urban is an assistant professor in the Department of Agricultural Economics and Economics at Montana State University.

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