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Mortgage Foreclosure  
Prevention Efforts

**Kristopher Gerardi and Wenli Li**

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## Mortgage Foreclosure Prevention Efforts

**Kristopher Gerardi and Wenli Li\***

In 2007, the United States began to experience its worst housing and foreclosure crisis since the Great Depression. In response, policymakers have been devising foreclosure prevention plans, most of which focus on loan modifications.

This article begins with an overview of the different loss mitigation tools that mortgage lenders and policymakers have used in the past to combat foreclosure and then briefly summarizes the main U.S. programs of the past few years. By most analyses, the authors note, these recent programs have had poor results in terms of significantly reducing foreclosures, and borrowers who have received modifications are redefaulting at extremely high rates.

The authors then review both the theoretical academic literature of the 1990s and early 2000s and the more recent empirical literature generated by the recent foreclosure crisis. Many of the recent studies have focused on loan modification as a loss mitigation tool.

Given the limited success of government loan modification programs, the authors believe that policymakers will likely turn their attention to other alternatives. The authors point to signs that the focus is now shifting to programs that do not attempt to prevent foreclosures but rather try to help homeowners who have already experienced foreclosure.

JEL classification: D11, D12, G21

Key words: mortgage, foreclosure, modification, renegotiation, loss mitigation

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# Mortgage Foreclosure Prevention Efforts

**Kristopher Gerardi and Wenli Li**

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In response to the housing and foreclosure crisis that began in 2007, the worst such crisis since the Great Depression, policymakers have had to spend much of their time devising plans to prevent foreclosures. While there have been numerous plans to date, and each has its own unique aspects, virtually all of them have focused on loan modifications. A loan modification involves changing the terms of the mortgage contract in such a way as to lower the borrower's monthly mortgage payment and, in some cases, to also lower the amount of principal owed.

The motivation for such loan workouts is the observation that foreclosure costs are large for virtually all market participants. From the borrower's perspective, a mortgage default and subsequent foreclosure has a severe adverse impact on future access to mortgage and nonmortgage credit, is disruptive to household stability because of the mental anguish that results from eviction, and results in the household's incurring potentially large moving costs. From the lender's perspective, a foreclosure often entails incurring maintenance and tax obligations, transaction costs associated with liquidating the property, and mortgage losses to the extent that the sale price falls short of the unpaid mortgage balance. Finally, from a social perspective, a few studies have found some support for the existence of negative externalities from clusters of foreclosures, including depressed market values of surrounding properties.<sup>1</sup> On the other hand, the perceived costs of providing loan workouts in the form of modifications is generally small compared to these foreclosure costs. For example, a study by White (2009) compared the average foreclosure loss experienced by lenders to the amount of the average principal reduction and concluded that there was significant room for increased modification activity:

The average loss for the 21,000 first mortgages liquidated in November was \$145,000, representing an average loss of 55% of the amount due. Losses on second lien mortgages were close to 100%. In comparison, for the modified loans with some amount of principal or interest written off, the average loss recognized was \$23,610.... This seven-to-one difference between foreclosure losses and modification write-offs is striking, and lies at the heart of the failure of the voluntary mortgage modification program. Particularly for foreclosed loans with losses above the 57% average, some of which approach 100%, the decisions of servicers to foreclose is mystifying.... At a minimum, there is room for servicers to be more generous in writing down debt for the loans they are modifying, while still recovering far more than from foreclosures in the depressed real estate market of late 2008. (White 2009, 14)

Such observations have been the motivation behind the vast majority of foreclosure loss mitigation programs. These programs, which we describe in some detail below, have attempted to fix the perceived market frictions that impede efficient levels of modification activity. One of the most widely cited frictions is a variety of institutional factors related to the collection and

sale of mortgages into mortgage-backed securities (MBSs).<sup>2</sup> Those who blame securitization for extremely low levels of modification activity argue that the incentives of the servicers (the firms that collect mortgage payments on behalf of the MBS investors) have become decoupled from the group that ultimately bears the losses entailed from foreclosure, the investors. Many of these programs have tried to mitigate such incentive problems in the hopes of increasing modification levels and lowering the number of foreclosures that have plagued the housing market and the economy in general.

However, while the results have varied across the different loan modification programs, none of them have been able to appreciably stop the rising tide of foreclosures in U.S. housing markets. For example, RealtyTrac reported in its *Midyear 2009 U.S. Foreclosure Market Report* that one in 84 housing units received at least one foreclosure filing in the first half of the year, which amounted to approximately 1.5 million foreclosure filings.<sup>3</sup> Commentators have pointed to various explanations for the failure of these foreclosure prevention efforts, and in this document, we survey the available evidence to try to provide some insight on the topic. In particular, we turn to the academic literature (and, to a lesser extent, literature from the mortgage industry) to see what, if anything, it has to say about the reasons behind the success or failure of loss mitigation efforts in housing markets. The theme that emerges in our analysis is that the process of renegotiating and modifying large numbers of mortgages is likely characterized by severe asymmetric information issues, which, when properly accounted for, dramatically increase the costs of modifications to levels that approach and may even surpass the cost of foreclosures described above.

This article describes the different tools that mortgage lenders and policymakers have used in the past to combat foreclosure and then briefly summarizes the main U.S. policies of the past few years. We then review both the theoretical academic literature of the 1990s and early 2000s and the more recent empirical literature that the recent foreclosure crisis has spawned. Finally, we summarize the lessons learned from the literature and outline characteristics that an effective loss mitigation strategy should contain.

## An overview of foreclosure prevention efforts

**Loss mitigation tools.** While loan modifications are by far the most widely discussed alternative to foreclosure, in the current environment, a number of other alternatives have emerged. We divide the types of loss mitigation tools into those that allow borrowers to remain in their homes and those that do not. For a much more detailed and thorough analysis of loss mitigation tools, we direct the reader to Capone (1996).

There are three types of loss mitigation strategies that allow borrowers to stay in their homes. For borrowers with one-time or very short-term difficulties in repayment, the lender will usually use a partial repayment strategy whereby the borrower resumes regular monthly payments, plus some past-due amount, until the loan becomes current. For borrowers with slightly larger, but still short-term, financial troubles, the lender will often provide forbearance. Forbearance is an agreement between a lender and a delinquent borrower in which the lender agrees not to foreclose for an agreed-upon period of time and the borrower agrees to a mortgage repayment plan that will bring the borrower current on his payments by the end of the period.<sup>4</sup> After the forbearance period, a repayment plan is usually set by the lender that results in the full reinstatement or payoff of the mortgage within a specific period of time from the end of the forbearance period. Finally,

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1. The literature on this subject is actually relatively thin. See the companion literature review by Frame (forthcoming).

2. We are referring here to structured nonagency MBSs, as opposed to agency pass-throughs.

3. Foreclosure filings were reported on more than 336,000 U.S. properties in June 2009, which was the fourth straight monthly total exceeding 300,000. The second quarter of 2009 showed the highest quarterly total since RealtyTrac began issuing its report in the first quarter of 2005.

4. Springer and Waller (1993) explore patterns in the use of forbearance as a loss mitigation tool.

loan modifications, as described above, are a tool that has traditionally been employed to deal with borrowers suffering from more permanent types of shocks.

At least two types of foreclosure alternatives force a borrower to move out of his or her home. One such alternative is a preforeclosure sale, or short sale, in which the lender allows the borrower to sell the house at a price below the amount owed on the mortgage, inclusive of sale costs and other fees. The lender will then either negotiate an unsecured repayment plan with the borrower for the additional amount owed or will forgive the remaining debt (Cutts and Green 2005). Another alternative is a deed in lieu of foreclosure, in which a mortgage borrower voluntarily deeds collateral property in exchange for a release from all obligations under the mortgage. While both of these alternatives involve some of the same costs of foreclosure from the borrower's perspective, including moving costs and mental anguish, they are both usually less costly than foreclosure in terms of restricted access to future credit markets.

While short sale and deed in lieu sound like reasonable alternatives to foreclosure in theory, in practice they are used much less often than either forbearance or loan modification. It is difficult to pin down exactly why this is the case, but there are several possibilities. First, these two options typically involve the lender forgiving the entire difference between the outstanding mortgage balance and the market value of the property (similar to foreclosure). While in many states it is legal for the lender to seek a deficiency judgment for this difference, even in the case of short sale or deed in lieu, the lender rarely does so, perhaps because the probability of recovery is so low due to the borrower's weak financial situation.<sup>5</sup> Thus, in states with relatively quick foreclosure processes, there may not be as much upside to a short sale or deed in lieu because the lender is able to evict the borrower and put the house on the market relatively quickly and minimize maintenance and legal costs without resorting to these alternatives. But in states where the foreclosure process is very long and costly (usually in judicial foreclosure states, where the lender is required to file a lawsuit against the borrower in order to foreclose), these two options may be more attractive. Another potential complication with a short sale or deed in lieu occurs if the borrower has multiple lenders (second liens), in which case all lenders would have to provide their approval.<sup>6</sup>

Short sales and deeds in lieu may also have some significant disadvantages from a borrower's perspective. First, borrowers incur tax obligations relating to the forgiveness of the deficiency balance. Under federal law, a creditor is required to file a 1099C whenever it forgives a loan balance greater than \$600. This forgiveness may create a tax liability for the former property owner because it is considered "income."<sup>7</sup> Second, there is some evidence that homeowners in financial distress are often not interested in voluntarily relinquishing their home and are simply hanging on to their houses without any realistic hope of repaying their mortgages (Bahchieva, Wachter, and Warren 2005).

**U.S. policy responses to the recent foreclosure crisis.** In response to the rapid rise in foreclosures, the U.S. government, along with the industry and industry associations, has sponsored a series of programs using loan modifications as an alternative to foreclosure. These programs provide additional incentives (often in the form of a subsidy) to lenders, servicers, and borrowers for loan modification. The programs can be viewed in two phases marked by the implementation of the Obama administration's Making Home Affordable (MHA) program in March 2009.<sup>8</sup>

The mortgage crisis first broke out in the subprime market. To calm that market, Congress approved the FHASecure program in September 2007. FHASecure was a temporary initiative

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5. See Ghent and Kudlyak (2009) for a list of recourse versus nonrecourse states. In addition, there is some anecdotal evidence that lenders may be pursuing deficiency judgments for more borrowers after agreeing to short sales (Christie 2010).

6. In addition, the decision would also depend on lenders' expectations of future market conditions. If lenders do not expect to fetch much under short sale or deed in lieu, they will have less incentive to speed up the process.

7. The Mortgage Forgiveness Debt Relief Act of 2007 provides tax relief for some loans forgiven in the period 2007 through 2012.

8. Our writing expands upon Cordell et al. (2009) and Robinson (2009), who also provide an overview of recent government loan modification efforts.

designed to make it possible for lenders to refinance delinquent adjustable-rate mortgages (ARMs) and/or to offer new subordinate financing in cases where the combined loan-to-value ratio exceeded the applicable Federal Housing Administration (FHA) loan-to-value ratio and geographical maximum mortgage amount. The program also applied to borrowers who were delinquent on their non-FHA ARMs because of a rate reset or the occurrence of “extenuating circumstances.” However, the creation of new junior liens equal to the principal forgiven on the original first lien, along with a few other complicated features, proved difficult to achieve in practice. By November 2008, only 4,212 refinancings were made, despite the initial goal of 80,000 loans. This program was discontinued by the U.S. Department of Housing and Urban Development (HUD) in December 2008.

*Foreclosure loss mitigation programs have attempted to fix the perceived market frictions that impede efficient levels of modification activity.*

In October 2007, then-Treasury Secretary Henry Paulson announced the creation of the Hope Now Alliance. At its inception, the alliance was composed of lenders representing approximately 60 percent of all outstanding mortgages in the United States, counseling services, trade organizations, and a group representing MBS investors. Additional organizations joined over the following months. Hope Now describes the assistance that it provides to homeowners as loan workouts. These workouts can result in establishing either a repayment plan with the homeowner to bring them back to current or a permanent loan modification whereby the terms of the mortgage are modified in order to make the loan more affordable for the homeowner. Despite the numerous calls received at the Homeowners’ Hotline that was set up by Hope Now, the group appeared to be ineffective in addressing the increasing problem of foreclosures in the United States. It has also been noted that most of the assistance provided by the group has been to establish repayment plans rather than actually modify the terms of the mortgage (Zibel 2008).

On December 6, 2007, Hope Now, working closely with the American Securitization Forum and the U.S. Treasury, introduced a fast-track plan to help borrowers avoid interest rate resets. Under the Streamlined Foreclosure and Loss Avoidance Framework, better known as the “Teaser Freezer” plan, mortgage servicers were encouraged to modify mortgages by freezing the homeowner’s introductory interest rate for five years. Eligibility for the plan was limited to a subgroup of homeowners who acquired their homes using an adjustable-rate subprime loan product. Other requirements were that homeowners had to be in relatively good standing on their mortgage and were unable to refinance into a fixed-rate or government-insured product. It was also necessary that the mortgage cover an owner-occupied property held in a pool of securitized mortgages. Using an event-study methodology and focusing on the ABX index—the only source of daily security prices in the subprime market—Balla, Carpenter, and Robinson (2009) found that investors in the ABX initially perceived that the plan would improve the conditions in the subprime market. But the positive effects of the plan were swamped by the continued deterioration in the housing market.

After the failure of IndyMac Federal Savings Bank, the Federal Deposit Insurance Corporation (FDIC) assumed control of the bank and initiated a modification program for mortgages securitized or serviced by IndyMac in August 2008. Under the FDIC Loan Modification Program, or “Mod in a Box,” borrowers received a loan modification with a maximum 31 percent housing-to-income ratio through the use of interest rate reduction, amortization term extension, and, in some cases, principal deferment. The requirements for eligibility were that homeowners must have been at least sixty days delinquent on their primary mortgage and must have had a cumulative loan-to-value (CLTV) ratio greater than 75 percent. Through December 31, 2009, the FDIC had entered into eighty-six shared-loss agreements with single-family assets totaling \$53.2 billion.

In the spring of 2008, Congress passed legislation creating the Hope for Homeowners (H4H) refinancing program. The program allowed certain borrowers facing difficulty with their mortgages to refinance into a new thirty-year or forty-year fixed-rate mortgage insured by the FHA. To be



eligible for the program, the borrower had to be refinancing a mortgage on his or her primary residence and could not own any other residential property. Also, the homeowner must have had a front-end debt-to-income (DTI) ratio that exceeded a threshold ratio of 31 percent. For lenders, H4H required that first-lien holders accept 96.5 percent of the appraised value of the home as payment for all outstanding claims. The plan also called for all subordinate liens to be extinguished, either by an upfront payment or through a share of the FHA's take on future house-price appreciation. The program was not well received because lenders and investors were not willing to write down principal. Additionally, servicers complained about the complexity of the program, and the mortgage rates offered were relatively high. The program was later revised in the Helping Families Save Their Homes Act, signed on May 20, 2009. Among the changes, HUD may now permit original lenders or investors to share in any future house-price appreciation in return for the required write-down of the current balance.

In November 2008, working with Hope Now, Fannie Mae and Freddie Mac offered the Streamlined Modification Program for loans that they guarantee. Similar to the FDIC's "Mod in a Box" program, the Streamlined Modification Program uses an affordability measure to modify mortgages held by government-sponsored enterprises (GSEs). To quickly modify mortgages at risk of default, the program modifies first liens to reduce the homeowners' front-end DTI ratio to 38 percent. The eligibility requirements for the Streamlined Modification Program include that the house securing the mortgage must be the homeowner's primary residence and that a GSE must own or have securitized the loan. In addition, only homeowners who are at least ninety days past due on their mortgage, have documentation that they encountered some financial hardship, and have a combined loan-to-value ratio on their home greater than 90 percent are eligible for the program. One important innovation of the Streamlined Modification Program is that it provides an \$800 incentive payment from the GSEs to the servicers for each mortgage that is modified. The Streamlined Program was retired in March 2009.

The Federal Reserve Board also participated actively in the effort to reduce foreclosures. In January 2009, the Federal Reserve Board announced the adoption of the Homeownership Preservation Policy, which applies to the residential mortgage assets held by the special-purpose vehicles established by the Federal Reserve to facilitate the acquisition of Bear Stearns by JPMorgan Chase and to assist the American International Group Inc. Under the policy, borrowers who are sixty days delinquent or are expecting a known trigger event (for example, an interest rate reset) or who have recently experienced a decline in income can modify their loans into a fixed-rate mortgage for no longer than forty years and with a mortgage debt-to-income ratio of 38 percent or less.

The programs summarized above, by most analyses, have had poor results in terms of significantly reducing foreclosures. While the number of concessionary modifications as a fraction of seriously delinquent mortgages has recently increased (see Adelino, Gerardi, and Willen 2009), they still make up only a very small fraction of delinquent mortgages. Furthermore, borrowers that have received modifications are redefaulting at extremely high rates. For example, the Fitch ratings service released a report in May 2009 that projected modified loans in subprime pools would sour at high rates despite a change in the loan terms. Fitch's conservative projection was that between 65 percent and 75 percent of modified subprime loans would fall sixty days or more delinquent within twelve months of the loan change. Adelino, Gerardi, and Willen (2009), using a fairly representative U.S. mortgage data set, found that loans modified between the first quarter of 2005 and the third quarter of 2008 were characterized by a redefault rate of approximately 50 percent; for subprime loans the redefault rate was close to 70 percent.

However, according to both the Adelino, Gerardi, and Willen (2009) study and the 2009 *Mortgage Metrics Report* published by the Office of the Comptroller of the Currency (OCC) and the Office of Thrift Supervision (OTS), redefault rates vary substantially depending on the type of modification. For example, according to the OCC and OTS report, which analyzed the loan performance at nine

national banks and four thrifts with the largest mortgage portfolios, “modifications that decreased monthly payments had consistently lower redefault rates, with greater percentage decreases [in monthly payments] resulting in lower subsequent redefault rates.” The report also found that the redefault rate for modified mortgages was generally lower if the borrower’s payment was reduced by more than 10 percent.<sup>9</sup>

In response to the perceived failure of previous policies to substantially lower foreclosure rates, in March 2009 the Obama administration launched a comprehensive initiative called Making Home Affordable (MHA) to increase loan modifications through the Home Affordable Modification Program (HAMP) and refinances through the Home Affordable Refinance Program (HARP). HAMP requires that all banks and lending institutions that accepted funding from the Troubled Asset Relief Program (TARP) must implement loan modifications for eligible loans under HAMP’s guidelines. For non-TARP banks, participation is voluntary. As in some of the earlier programs discussed above, the modifications attempt to target a DTI ratio of 31 percent; however, in order to qualify for HAMP, lenders must first reduce payments on mortgages to no greater than a 38 percent DTI ratio. The modified interest rate under HAMP will remain in effect for five years. Eligible borrowers are those who are current on their mortgage payments but face financial hardship or imminent default.<sup>10</sup> The program basically comprises two pieces. The first piece is a “trial modification” that provides the borrower with a temporarily reduced monthly payment (typically for six months). This provision is essentially the same as a forbearance agreement between the borrower and the lender. The second piece, which is conditional on a successful trial modification, is a permanent modification (either a reduction of the interest rate, extension of the maturity, or reduction in the principal balance). According to the Treasury Servicer Performance Report, through December 2009 more than 900,000 homeowners had started trial modifications, and more than 1 million offers for trial modifications had been extended to borrowers. However, the number of permanent modifications has been low by most accounts.<sup>11</sup>

## Literature review

**Theoretical literature.** It may be surprising to many to learn that prior to the current crisis, there was academic and industry interest in the topic of foreclosure loss mitigation associated with residential mortgages.

Ambrose and Capone (1996) was one of the first studies in the mortgage literature to formalize a cost-benefit analysis of the lender’s decision to either foreclose or renegotiate with a delinquent borrower. The authors assume that the lender is faced with five alternatives when dealing with a seriously delinquent borrower: loan modification, preforeclosure sale, deed in lieu of foreclosure, forbearance, or foreclosure. One of the insights that comes out of the paper is the idea that “self-cure” risk is a very important component of the cost-benefit analysis. Self-cure risk is defined as

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9. Unfortunately, up to the writing of this paper, we cannot find any information on whether the redefault rate also depends on the type of lender that initiated the modification. In particular, it may be interesting to find out whether the IndyMac loan modifications that were initiated directly by the FDIC performed any differently from loan modifications initiated by private lenders.

10. For further description and discussion of HAMP, see Cordell et al. (2009).

11. According to the Servicer Performance Report Through January 2010, there have been 116,000 permanent modifications plus 76,000 approved by servicers and pending borrower acceptance.

HAMP applies to borrowers who are current on their mortgage payments and have a stable income sufficient to support the new mortgage payment. Eligible loans include those owned or controlled by Fannie Mae or Freddie Mac where the first mortgage does not exceed 105 percent of the current market value of the property. The program replaces an adjustable-rate mortgage and initial-interest mortgage or balloon/reset mortgage with a fifteen-, twenty-, or thirty-year fixed-rate mortgage. Refinanced mortgages cannot be used to pay off or reduce subordinate liens. In addition, cash cannot be taken out. According to the Treasury, through December 2009, this program has allowed more than 3.8 million borrowers to refinance, saving an estimated \$150 per month on average and more than \$6.8 billion in total over the first year.



the situation in which a delinquent borrower is able to solve the issues that led to delinquency in the first place and repay the entire amount of the loan without any assistance from the lender. The idea is that if self-cure risk is high, then the lender incurs unnecessary costs of assisting borrowers who would have cured anyway. We will talk about self-cure risk in more detail below, but to illustrate its potential importance in loss mitigation decisions, we draw the reader's attention to this quote from Capone (1996): "Industry sources suggest that 70–80 percent of all loans arriving at 90-days delinquency can still reinstate without assistance." Of course, such statistics are extremely sensitive to the economic environment, but this quote illustrates that such concerns are not trivial.

Riddiough and Wyatt (1994b) was the first paper to analyze the foreclosure versus the renegotiation decision in a strategic environment, in which lenders in the residential mortgage market hold private information regarding their costs of completing a foreclosure.<sup>12</sup> This private information plays an important role because of the large average magnitude of foreclosure costs and the heterogeneity of costs across lenders. In the model, the lender's decision to renegotiate or foreclose on a given borrower acts as a signal of the lender's foreclosure costs to other borrowers who are considering default. Thus, a lender must be cognizant of the reputation that it forms from previous decisions regarding foreclosure and renegotiation. If, for example, a lender has historically given borrowers generous concessions in the form of favorable loan modifications, then borrowers currently in financial duress, having observed this past behavior, will infer high foreclosure costs associated with the lender. In such a scenario, borrowers may have an incentive to strategically default to gain concessions from the lender, whereas the same borrowers might not default if they had to negotiate with a lender that was less generous and thus perceived to have lower foreclosure costs.

Wang, Young, and Zhou (2002), building on the work of Riddiough and Wyatt, argue that the existence of asymmetric information between a borrower and lender implies that it is optimal for the lender to randomly reject requests for concessionary modifications. Their model is composed of a single lender (a bank) and two types of borrowers: financially distressed borrowers who will default with certainty unless the lender is willing to provide concessions and nondistressed borrowers who may be tempted to default because they have negative equity but who do not because of high default costs. The nondistressed borrowers can request a modification from the lender but must pay a cost to do so. The lender can distinguish between the two borrower types only by screening. The screening technology is assumed to be perfect but costly. Thus, the lender has two tools at its disposal to limit the number of nondistressed borrower applications. It can either pay a screening cost to identify borrowers with certainty, or it can use a random rejection policy, which is costless but has the disadvantage of rejecting distressed and nondistressed borrowers with equal probability. Wang, Young, and Zhou show that in such a model, the lender's optimal policy always takes one of two forms. A lender will either randomly reject applicants without any screening (which happens when the screening cost is sufficiently large) or will accept all applications but will screen enough applicants to completely deter nondistressed borrowers from applying (which happens when the screening cost is relatively low). The lender's optimal random rejection rate depends on the cost of liquidation, the magnitude of the default benefit to the borrower, the fraction of distressed borrowers in the population, and the size of the application cost that must be incurred by a nondistressed borrower.

A random rejection policy for modification applications may seem to be extremely abstract and unrealistic, but through various methods, lenders may be able to effectively approximate such a policy. For example, a lender could purposefully understaff its calling center so that many calls by borrowers seeking assistance go unanswered. There have been many anecdotes over the course of the current foreclosure crisis of understaffing on the part of mortgage servicers and

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12. According to Cutts and Green (2005), these costs include the opportunity cost of principal and income not received, servicing costs, legal costs, property maintenance costs, and costs associated with property disposition.

thus the inability of many borrowers to communicate directly with their servicer. Of course, this situation may simply reflect certain mortgage servicers' inability to forecast the extent of mortgage delinquencies rather than a conscious decision to ignore a fraction of borrowers, but the fact that such anecdotes continue to appear in the media at such an advanced stage of the crisis makes us at least a little skeptical.

Finally, it is worth noting that these models are all static, and thus expectations of future market conditions do not play a role in the equilibrium outcomes. In reality, the borrower's default decision and the lender's decision to foreclose or renegotiate are dynamic decisions that depend importantly on such expectations. Foote et al. (2009) develop a very simple, stylized model of the borrower's decision to default and point out that a higher probability of future house price appreciation increases the expected return of not defaulting on the mortgage and staying in the house. Adelino, Gerardi, and Willen (2009) develop a simple model of the lender's decision to foreclose or modify and show that future house price appreciation affects the gains to modification. If lenders expect house prices to fall in the future and modification redefault rates are high, then they may prefer to forgo renegotiation and foreclose immediately rather than have to foreclose on a significant number of borrowers at a later date when house prices are even lower.

**Empirical literature.** With the housing downturn and the huge increase in foreclosures nationwide, the issue of loss mitigation—and, in particular, loan modification—has become a topic of interest in the recent mortgage literature. Numerous academics and policymakers (both in the field of economics and in the field of law) have taken the view that lenders (through the mortgage servicers that they pay to collect and process mortgage payments) are foreclosing on an inefficiently large number of borrowers.<sup>13</sup> These authors note that the process of foreclosing on a borrower is typically very costly, both because of the time costs involved as well as the direct monetary costs incurred, which include maintenance and depreciation costs, tax payments, and real estate agent fees. In addition, the servicer typically resells a foreclosed property for much less than the outstanding balance on the mortgage. Thus, on the surface, it would appear that the lender would be better off taking a small loss to modify the loan of a seriously delinquent borrower as opposed to refusing a modification and initiating the costly process of foreclosure.

So what could possibly explain this puzzling behavior on the part of lenders and servicers of offering few concessionary modifications to distressed borrowers and choosing, instead, in most situations, the costly process of foreclosure? As we discussed briefly above, perhaps the most prevalent explanation for this behavior is the existence of contract frictions and misaligned incentives in the institutional structure of MBSs, which renders renegotiation between borrowers and MBS investors prohibitively costly. The estimates of the deadweight losses that result from these frictions are extremely high.<sup>14</sup> Those who blame securitization for the low number of modifications point to at least two culprits. The first is the pooling and service agreements (PSAs) that govern the behavior of mortgage servicers in securitization trusts. Some PSAs directly specify and restrict the latitude that servicers have when deciding between modification and foreclosure. As a general rule, these PSAs allow servicers to modify loans but only in cases where imminent default is deemed to be likely and where the benefit of a modification over foreclosure can be shown with a net present value (NPV) calculation.<sup>15</sup> Second, those who blame securitization claim that servicers may not modify many loans for fear of being sued by investors in one tranche of

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13. See, for example, Eggert (2007), Geanakoplos and Koniak (2008), Levitin (2009a, b), White (2008), and the Congressional Oversight Panel of the Troubled Assets Relief Program (2009).

14. Foote et al. (2009) use figures from the FDIC and White (2009) to arrive at an estimated total deadweight loss of approximately \$180 billion. However, the authors are skeptical of such an estimate and refer to the predictions of the Coase theorem in their arguments.

15. Hunt (2009) looked at a number of subprime MBS contracts and found that outright bans on modifications were rare and that most of the contracts that allowed modifications basically instructed the servicer to behave as if it were the single owner of the loan.

the MBS even if modifying as opposed to foreclosing would benefit the investors in the trust as a whole. Since investors in the various tranches have different claims to the cash flows from the MBS, a modification could alter the flows in a way that would benefit one tranche at the expense of another.<sup>16</sup> Thus, there may be enough ambiguity in the PSAs to make servicers wary of getting caught up in so-called tranche warfare, which may provide servicers an incentive to follow the path of least resistance and foreclose on seriously delinquent borrowers.<sup>17</sup>

In response to such concerns, Adelino, Gerardi, and Willen (2009) and Piskorski, Seru, and Vig (2009) conducted empirical studies using microdata on a nationally representative sample of mortgages that sought to either confirm or deny the presence of frictions in the securitization process that could impede efficient levels of renegotiation activity. While both of these studies use the same data set (Lender Processing Services [LPS]) to compare securitized mortgages to mortgages that are held in the originator's own portfolio and are not sold in the secondary market, the studies come to completely different conclusions.

*The U.S. policy programs summarized here, by most analyses, have had poor results in terms of significantly reducing foreclosures.*

Piskorski, Seru, and Vig find relatively large differences in foreclosure rates between securitized mortgages and loans held in the originator's portfolio. Since portfolio-held loans, which are usually serviced in-house by the lender, in theory do not suffer from the same types of contract frictions and misaligned incentives that potentially plague securitized mortgages, the authors interpret this difference as evidence that frictions in the securitization process hinder the renegotiation process and create a bias toward foreclosure. They estimate the difference in foreclosure rates as between 3.8 percent and 7.0 percent in absolute terms (depending on the specific vintage) and between 18 percent and 32 percent in relative terms. The authors state in their conclusion: "As banks are likely to fully internalize the costs and benefits of the decision to foreclose a delinquent loan, it is natural to interpret our results as suggesting that securitization has imposed renegotiation frictions that have resulted in higher foreclosure rates than would be desired by investors." While Piskorski, Seru, and Vig do discuss alternative interpretations that would also be consistent with their findings, policymakers and analysts have pointed to their study as evidence confirming that securitization is to blame for a large part of the foreclosure crisis. For example, in congressional testimony on February 3, 2009, Edward Morrison, a professor at Columbia Law School, said, "Recent research shows that when these mortgages become delinquent, servicers opt for foreclosure over mortgage modification much more often than private lenders who service their own mortgages," and he cites the Piskorski, Seru, and Vig paper in an accompanying footnote.

Adelino, Gerardi, and Willen (2009) focus on loan modification rates as opposed to foreclosure rates and find small differences in the modification rates of securitized mortgages compared to portfolio loans.<sup>18</sup> The differences they find are sensitive to the particular sample but are rarely more than 10 percent in relative terms, which, when combined with the extremely low level of modification rates for both types of loans (less than 5 percent), translates into economically insignificant magnitudes.

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16. If this is in fact a significant impediment to renegotiation, it is a bit puzzling as to why market participants would not have foreseen this issue and dealt with it in the PSAs. However, it is certainly possible that the PSAs were not written with an eye to the current housing and foreclosure crisis.

17. Yet another potential friction to renegotiation that has been raised is the prevalence of second liens. A popular alternative to obtaining a single high-LTV loan with private mortgage insurance (necessary to qualify for a GSE guarantee) was to obtain two mortgages, with the first having an LTV of 80 percent and the second an LTV between 5 and 20 percent. These second liens are often referred to as "piggybacks." Some market observers believe that the presence of second liens may be impeding renegotiation and other foreclosure prevention efforts. However, to our knowledge there is very little empirical analysis on this topic, and the foreclosure prevention programs discussed above do not explicitly address this issue.

18. Both the Adelino, Gerardi, and Willen and Piskorski, Seru, and Vig studies control for numerous borrower and mortgage characteristics.

The authors interpret their findings as evidence that securitization is not playing a significant role in impeding efficient levels of renegotiation in the mortgage market. They state: “We document that servicers have been reluctant to renegotiate mortgages since the foreclosure crisis started in 2007, having performed payment reducing modifications on only about 3 percent of seriously delinquent loans. We show that this reluctance does not result from securitization: servicers renegotiate similarly small fractions of loans that they hold in their portfolios.”

*The foreclosure crisis continues to depress the housing market and the overall economy, and policymakers must find a way to mitigate its effects if the economy is to experience a robust recovery.*

So the natural question then becomes, if securitization is not to blame for the extremely low levels of loan modifications, compared to foreclosures, that have characterized the current housing crisis, what is to blame?<sup>19</sup> Adelino, Gerardi, and Willen point to various issues in the lender’s decision to renegotiate with a borrower, which, when accounted for, substantially raise the costs of renegotiation. In a simple theoretical model of mortgage modification, they find that self-cure risk, redefault risk, and the

issue of asymmetric information between the lender and the borrower could substantially increase the cost of providing concessionary modifications to a borrower and could thus severely limit lenders’ willingness to renegotiate with distressed borrowers rather than to initiate foreclosure proceedings.

In their sample of mortgages that covers the period from early 2005 through 2008, Adelino, Gerardi, and Willen find that more than 30 percent of seriously delinquent borrowers recover and become current on their mortgage (or “cure”) without receiving a loan modification.<sup>20</sup> If we take this number at face value and assume that a lender were to provide a concessionary modification to all of its seriously delinquent borrowers, then approximately 30 percent of the money spent by the lender in such an endeavor (that is, the reduced interest and/or principal payments) would be essentially wasted. In addition to finding relatively high self-cure rates in the data, Adelino, Gerardi, and Willen also find high redefault rates. They find that between 20 percent and 50 percent of modified mortgages (depending on the specific sample) end up back in serious delinquency within six months. Given the short horizon, these percentages are very high, implying that for a large fraction of borrowers, the lender is simply postponing foreclosure. This strategy is costly in an environment of low sales volume and declining prices since it means that lenders will recover even less in foreclosure. Furthermore, a borrower who faces a high likelihood of eventually being evicted will have little incentive to maintain the house (and may even make things worse), which will also reduce a lender’s expected recovery in foreclosure.

Finally, in another paper, Adelino, Gerardi, and Willen (2010a) discuss the issue of asymmetric information, which was at the heart of the previous literature on mortgage modification in the 1990s. Riddiough and Wyatt (1994a) modeled asymmetric information from the perspective of the borrower since lenders hold private information regarding their costs of foreclosure. Wang, Young, and Zhou (2002) instead posit that borrowers hold private information with respect to their plans to default since some borrowers are truly financially distressed and in imminent danger of defaulting, while others have no plans to default and are simply pretending to be distressed in order to obtain a modification.<sup>21</sup> Adelino, Gerardi, and Willen’s model is similar in spirit to Wang, Young,

19. See Adelino, Gerardi, and Willen (2010b) for a detailed explanation and reconciliation of the differences between their 2009 study and Piskorski, Seru, and Vig (2009).

20. Seriously delinquent borrowers are defined as those who are at least sixty days delinquent on their mortgage (having missed at least two payments).

21. The issue of moral hazard in the context of borrowers strategically defaulting in order to qualify for modifications has also been discussed in other papers. Foote et al. (2009) is one recent example. In addition, Riddiough and Wyatt (1994a) provide an extensive discussion and analysis of the moral hazard problem associated with pursuing workouts rather than foreclosures for the commercial mortgage market. Their analysis suggests that lenders will consider foreclosure alternatives only when the cost of foreclosing is higher than the cost of revealing information concerning the true foreclosure costs to other borrowers and thus encouraging additional defaults.

and Zhou but differs substantially in the particular details. Their model is basically equivalent to a monopoly pricing problem, in which, instead of a price, the lender is deciding which profit-maximizing modification to offer borrowers. The lender has monopoly power in this case because the mortgage is an exclusive contract between the borrower and the lender, and the lender always has the option to foreclose on the borrower. In their model, there is a single lender who holds the mortgages of a group of borrowers. Each borrower has a reservation value of default, whereby a modification (in the form of principal write-down) offered that is greater than the reservation value will prevent the borrower from defaulting right away, while a borrower with a reservation value lower than the modification offered will default immediately. In the case of perfect information, where the lender knows each borrower's reservation value, there is perfect discrimination since the lender offers each borrower his/her reservation value as long as that value is below the cost of liquidation. Assuming perfect information, no redefault risk, and a cost of foreclosure (liquidation) to the lender that is higher than the maximum reservation value among the group of borrowers, there is no foreclosure in equilibrium.

In the case of asymmetric information, however, the lender does not know each reservation value but does know the distribution of reservation values across its borrowers. Thus, the lender can no longer discriminate and must offer the same modification to all of its eligible borrowers. Adelino, Gerardi, and Willen assume that a fraction of the lender's borrowers are not eligible for a modification because of a high cost of applying and becoming eligible for a modification.<sup>22</sup> In the first scenario, the authors assume that this group of ineligible borrowers is independent of the modification offered by the lender. Under this scenario, the authors show that if the lender offers a modification (which depends on liquidation costs, redefault risk, and self-cure risk), the modification that maximizes the lender's profits is roughly the average of the reservation values of the eligible pool of borrowers, adjusted (downward) for self-cure risk and redefault risk. Since borrowers with reservation values above the modification default, with asymmetric information the incidence of foreclosure is quite high. In a second scenario, the authors allow the size of the eligible pool of borrowers to depend on the size of the modification the lender offers. Specifically, as the size of the modification increases, more borrowers decide to become eligible (by missing mortgage payments, for example). The lender internalizes this effect when deciding on the optimal modification to offer to borrowers, and the authors show that this effect reduces the size of the optimal modification. This scenario corresponds to a situation of moral hazard, in which borrowers have an incentive (receiving the modification) to take hidden action, which increases the costs to the lender of offering modifications.<sup>23</sup>

Asymmetric information can explain why the calculations performed by White (2009) are perfectly consistent with the extremely low levels of modification activity found by Adelino, Gerardi, and Willen (2009). The calculation simply compares the cost of liquidation with the average level of modification offered by lenders and implies that because the cost of liquidation is so much higher (seven times), lenders are acting irrationally. Lenders can only segment borrowers based on observable characteristics (that is, FICO scores at origination, LTV, DTI ratios at origination), and thus the optimal modification will only be a function of those observable characteristics. But we know that even conditioning on observable characteristics, there are large differences across borrowers due to characteristics that are unobserved by lenders and servicers, especially with respect to default propensities. Thus, the lender will have to offer the same modification terms to

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22. Intuitively, this group corresponds to borrowers who are financially sound and not delinquent on their mortgages. Many of the current modification programs have eligibility requirements that include being seriously delinquent on the mortgage. Thus, for financially sound borrowers who are current on their mortgages, missing a number of mortgage payments to qualify for a modification would be quite costly in terms of the impact on credit scores and, hence, access to future credit.

23. Mulligan (2008) also addresses this issue with respect to the effect of means-tested modification programs on optimal labor supply.



these borrowers. In such an environment, lenders could increase the generosity of the modification in order to try and prevent foreclosing on borrowers with higher reservation values, but at the same time, they will have to offer the more generous modification to the borrowers with lower reservation values for whom a lower modification would suffice. This practice decreases profits to the lender. Moral hazard makes things even worse as the lender recognizes that by offering more generous modifications, borrowers who have no plans to default will have the incentive to gain eligibility and qualify for the modification, further decreasing expected profits. Thus, with asymmetric information, self-cure risk, and redefault risk, the profit-maximizing modification the lender offers will be significantly lower than the average liquidation cost. These same reasons, along with uncertain future house price movements, also underscore the lackluster performance of the various government loan modification programs to date.

## Conclusion

In this article we have discussed the various loss mitigation tools available to borrowers and lenders in the mortgage market and have summarized the academic literature on these tools. We have focused most of the discussion on loan modifications because these have received the most attention both in the literature and in policy circles. The Obama administration's primary focus thus far has been on trying to save as many homeowners from foreclosure as possible by attempting to convince lenders to voluntarily modify their delinquent loans. By most counts, this policy has achieved limited success, and as a result it is likely that policymakers will turn their attention to other alternatives as the foreclosure crisis continues to take its toll on the U.S. economy.

Numerous other loss mitigation proposals have been put forth by various academic scholars and industry insiders in recent months. For example, a couple of intriguing proposals—Davis, Malpezzi, and Ortalo-Magné's (2009) WI-FUR plan and the Boston Fed plan (Foote, Fuhrer et al. 2009)—can be interpreted as providing substantial but temporary assistance to borrowers in financial distress because of job loss. The details of these plans differ, but the main idea is to temporarily subsidize the monthly mortgage payments of involuntarily unemployed households until reemployment occurs or the maximum number of months of eligibility in the plan is reached (fifteen months for the Boston Fed plan and two years for the WI-FUR plan). These plans are not permanent modifications of the mortgage contracts since the payment subsidy is temporary. In addition, depending on the plan, some borrowers would be required to pay back the subsidy at a later date. One of the potentially big advantages of these plans is that they would be able to use the existing infrastructure of unemployment insurance, which would keep the administrative costs and monitoring costs to relatively low levels. In addition, the asymmetric information issues discussed in detail above would likely be limited since to qualify for these plans a borrower would need to be enrolled in the unemployment insurance program and thus would need to have experienced a job loss (rather than simply missing a few mortgage payments).

While it is unclear what the best loss mitigation tool is in practice, what is clear is that the foreclosure crisis continues to depress the housing market and the overall economy, and policymakers must find a way to mitigate its effects if the economy is to experience a robust recovery. For almost two years now, most efforts have focused on loan modification programs. There are signs that this focus is now shifting to other types of foreclosure-prevention programs and to programs that do not attempt to prevent foreclosures but rather try to help the millions of homeowners who have already experienced foreclosure make the transition to a new home and a new lifestyle.



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