Working Paper No. 09-02

Securitization and Distressed Loan Renegotiation: Evidence From the Subprime Mortgage Crisis

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December, 2008

*Acknowledgments: We thank Chris Mayer and Luigi Zingales for discussions. Ira Yeung and Rembrandt Koning provided outstanding research assistance as well as many suggestions. Cristina Rosales from Arbor Residential Mortgage provided valuable insight into the practice of loan modification. Piskorski thanks the Paul Milstein Center for Real Estate at Columbia Business School for financial support. Seru thanks the Initiative on Global Markets at University of Chicago for financial assistance. All remaining errors are our responsibility.

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Abstract

We show that delinquent loans are serviced differently depending on their securitization status. Conditional on a loan becoming seriously delinquent, we find a significantly lower foreclosure rate associated with loans held by the bank ('portfolio' loans) when compared to similar loans that are securitized; the likelihood of a portfolio loan default is lower in relative terms by about 20-30% for all the loans and about 30-50% for loans of better credit quality. This evidence supports the view that, relative to servicers of securitized loans, servicers of portfolio loans undertook actions that resulted in lower rates of foreclosure. Our findings suggest that securitization imposes significant renegotiation costs and a failure to renegotiate securitized loans may have substantially contributed to the recent surge in foreclosures. A policy intervention that allows for renegotiation of securitized loans could result in significant welfare gains.

I Introduction

Financial intermediaries serve an important purpose by channeling funds between savers and users of funds. They are able to do so since they can screen (loan origination) and monitor (loan servicing and restructuring) users of funds. The recent boom in securitization has seen these core activities taken outside the purview of the "traditional" bank. Loan originations, once primarily conducted by loan officers inside the bank, have shifted to mortgage brokers outside the bank. Similarly, servicing of the loans once they are originated is often no longer done by the final bearer of the risk. Thus, securitization adds a new set of actors to the supply chain of credit and thereby introduces a new array of agency issues and incentive problems.

The goal of this paper is to empirically investigate the effect of securitization on the important activity of loan servicing. Besides processing the cash stream from borrowers and channeling it to the lending entity or security investors, servicers of mortgages make the crucial decision either to foreclose a delinquent loan or to engage in a workout/modification of mortgage terms with the borrower. The recent unprecedented downturn in the housing market marked by plummeting house prices and a wave of delinquencies and foreclosures has sparked concern that frictions precluding efficient loan modification by servicers may have significantly exacerbated the housing crisis. A primary concern is that securitization might have affected the incentives of the servicers and slowed or reduced their propensity to modify loans – even in scenarios where such action would be pareto-improving for borrowers and investors of mortgage-backed securities (MBS).

Related to this concern, Federal Reserve Chairman Ben Bernanke has repeatedly called on lenders to aid struggling homeowners by reducing their principal and the sum of money they borrowed to lessen the likelihood of foreclosure. Similarly, Mayer and Hubbard (2008) have suggested that the government take action to lower mortgage rates and help address refinancing problems for owners with negative equity by engaging in sharing equity write-offs with lenders. On a similar note, Zingales (2008) suggests that Congress should pass a law that makes a re-contracting option available to all homeowners living in a zip code where house prices dropped by more than twenty percent since the time they bought their property. Our paper contributes to this debate by examining the servicer's decision to foreclose or modify a loan across a large set

of securitized and non-securitized loans and by quantifying the magnitudes related to frictions in the loan modification market.

Several economic arguments suggest that securitized loans might be serviced differently from those directly held on the banks' balance sheets. The agency and incentive conflict brought about by the separation of ownership and control is an obvious starting point. According to the agency view (Jensen and Meckling 1976), it is reasonable to expect that servicing of the securitized loans might be different from those directly held on the banks' balance sheets since in the latter case a servicer fully internalizes the costs and benefits of foreclosing or modifying the loans.

Other arguments are more specific and suggest that servicers of securitized loans may have greater incentives to foreclose some of the delinquent loans relative to servicers of bank-held loans, even if it is ex-post efficient for the lenders to modify some loans in certain states of the world. First, securitization brings about a shift from concentrated debt to dispersed debt, from single creditor to multiple creditors, and from relationship lending to arm's-length contracting. These features make it harder to renegotiate debt contracts and may lead to inefficient liquidations (Bolton and Scharfstein 1996; Asquith Gertner and Scharfstein 1994; Gilson, John and Lang 1990; Zingales 2008; Franks and Tourus 1994).

Moreover, institutional constraints may thwart the renegotiation process. For example, the servicer may be concerned about legal liabilities, especially if modification is not done correctly in the sense that it may end up benefiting some borrowers at the expense of others. Since the servicers received little guidance on the modification process due to the infrequent use of modification in the past, there is little consensus among servicers as to what is legally permissible and what is not. In addition, tax and accounting laws introduce further barriers to the loan modifications.[1] Finally, unlike the foreclosure process in which servicers are generally reimbursed for the associated costs through cash flows of the securitization trust, loss mitigation techniques such as loan modification do not, in most cases, enable servicers to either funnel the costs through to borrowers or receive compensation for their expenses for securitized loans. Since loan modification costs can be substantial, servicers might not respond appropriately to rising delinquencies due to both higher servicing expenditures per loan and increased manpower.[2]

[1] See Kravitt 2005; Bair 2007; and Eggert 2007 for more details.

[2] The industry studies estimate that average loan modification cost can add about $ 750-1,000 per loan. See

It is of course possible that borrowers and investors are able to bargain around the inefficiency and as a result securitization does not impose any renegotiation costs. Thus, whether securitization creates frictions in the bargaining process is ultimately an empirical question – one which we investigate in this paper. We do this by examining differences in servicing of securitized loans at risk of foreclosure relative to the loans held on the banks' balance sheets. Using a large database of delinquent mortgages (i.e., those that missed a few payments), either held on the banks' balance sheets (henceforth called *portfolio* loans) or securitized, we track whether or not every delinquent loan originated in 2005 and 2006 was subsequently foreclosed. The main test of the paper assesses what differences exist in foreclosure rates of delinquent loans depending on their securitization status.

Since loans that are securitized might differ on observables (such as credit scores) from those banks keep on their balance-sheet, it is important to control for ex-ante characteristics of the loan (i.e., when loans are originated). Our dataset provides rich information for each loan in the sample allowing us to use a relatively flexible specification with a host of loan and borrower characteristics and regional dummies. We estimate the regressions separately for each quarter to alleviate concerns about changing macroeconomic conditions. Conditional on a loan becoming seriously delinquent, we find a lower foreclosure rate associated with loans held by the bank as compared to loans that are securitized. The differences are statistically significant and economically large: the likelihood of a portfolio loan default is lower in absolute terms by around 3-7% (between 19% and 33% relative to the mean foreclosure rate). Though the results are consistently present in all the eight quarters of our sample, they become significantly stronger in quarters when house prices have declined appreciably.

Of course, besides observable differences, loans may also differ in unobservable characteristics due to information lenders obtain when ex-ante screening borrowers or when ex-post monitoring them. These differences might also create differences in foreclosure rates between securitized and portfolio delinquent loans. The simplest argument, for instance, could be that lenders retain better-quality loans on their balance sheet based on private information they collect during borrower screening. Consequently, a lower foreclosure rate of portfolio loans might mechanically reflect this selection and not necessarily differences in servicing incentives. In our analysis, we

for example Barclays 2008 Global Securitization Annual.

therefore need to worry about differences in unobservables of securitized and portfolio loans.

It is worth noting that our focus on the sample of delinquent loans should alleviate this concern to some degree. If lenders only obtain signals about the likelihood of delinquency during the origination process or through subsequent monitoring, differences in foreclosure rates of delinquent securitized and portfolio loans cannot be attributed to unobservables. However, it is plausible that lenders also have private information about the likelihood of subsequent foreclosure of the loan. To assuage these concerns, we restrict our analysis to a sample of loans that are better quality on the dimension of hard information characteristics such as credit score and documentation level. The reason behind focusing on these loans is that soft information about borrowers is less likely to be valuable for these borrowers at the time of origination. This is confirmed in studies that provide evidence that potential screening on unobservables is less important for these types of loans (Keys et al. 2008; Rajan et al. 2008).

To conduct this test we restrict our analysis to fully documented loans with a good initial credit quality as represented by a FICO credit score of at least 680. We obtain results that are quantitatively larger than those in the entire sample: the likelihood of a portfolio loan default is lower in absolute terms by around 4-10% (between 30% and 50% relative to the mean foreclosure rate). As before, the differences are the strongest in periods when house prices decline.

While this test addresses selection concerns at the time of origination, it is also plausible that the differences in foreclosure rates between delinquent securitized and portfolio loans might simply reflect worse information obtained for securitized loans between origination and delinquency. We alleviate this concern by conditioning on the credit score of the borrower *at the time* of delinquency for a sub-sample of loans with this information. Since it takes on average about one and half years for a borrower to become delinquent, we expect credit scores at the time of delinquency (updated every three months on average) to capture some of the information regarding quality of the borrower that is revealed between origination and delinquency. We find that doing so does not affect the nature of our results. While we cannot completely rule out the role of unobservable characteristics, we take these results as a support for our interpretation.

There are two other tests which also support the notion that differences in foreclosure rates across securitized and portfolio loans are largely due to servicing incentives. First, the evidence

pointing to greater difference in performance between securitized and bank-held loans for more recent vintages is consistent with the notion that during periods of house price appreciation (earlier vintages), borrowers had a chance to build up additional housing equity and thus could exit delinquency by refinancing their loans or by selling their homes. This could have alleviated the liquidation bias generated by failure to renegotiate securitized loans. In contrast, during periods of house price declines these effects are stronger since borrowers have limited ability to sell or refinance.

Second, we examine how the difference in foreclosure rates of securitized and portfolio loans varies with creditor foreclosure laws, i.e., laws that govern foreclosure and house repossession. We find that, conditional on being seriously delinquent, the difference in foreclosure rates is much higher for those loans that are originated in states with creditor-friendly laws, i.e., states that allow for quick foreclosure and house repossession. We interpret this evidence as suggesting that strong creditor rights can exacerbate the renegotiation frictions imposed by securitization. This finding is consistent with servicer incentives driving our results since it shows that servicers have a stronger incentive to foreclose a securitized loan in states where it is legally easier (and faster) to do so.

Overall, we interpret our results as providing evidence that delinquent loans are serviced differently depending on their securitization status. In particular, the evidence is consistent with servicers of loans held directly by lending institutions having undertaken actions that resulted in lower rates of foreclosures relative to servicers of securitized loans. The magnitude of our findings is large and stark, suggesting that incentives of the servicers of securitized mortgages may have a role in the recent wave of foreclosures.

The rest of the paper is organized as follows. We discuss the hypothesis and connections between our work and existing literature in Section II. A brief overview of lending in the subprime market and the role of servicers is provided in Section III. Data and sample construction are described in Section IV. Our main empirical findings are presented in Sections V and VI. Section VII concludes and provides policy implications of our findings.

II Hypothesis and Connections to Literature

Our hypothesis is that the servicer decision to foreclose delinquent loans or engage in a work-out/modification of mortgage terms with the borrower varies depending on the securitization status of the loan. There are two elements to better understanding our hypothesis: what economic arguments drive the foreclosure vs. loan modification decision, and why this decision might vary across securitized and portfolio loans.

In general, the arguments for and against loan modifications are complicated by the incentive effects of renegotiation on current and possibly future borrowers. Even though borrower's default might be costly to the lender, debt forgiveness or renegotiation can have perverse incentive effects. Offering this option could lower incentives of borrowers to repay their debt, resulting in a contract that is ex-ante less efficient. It may also trigger strategic defaults by borrowers. Therefore, in many contracting models it is efficient at least from the ex-ante perspective to commit not to renegotiate future contract terms.

However, there have been arguments made in favor of loan modifications or debt renegotiation. Bolton and Rosenthal (2002) argue that a legal moratorium on debt contracts, a form of loan modification, can improve both ex-ante and ex-post inefficiency in the presence of adverse macro shocks. Kroszner (2003) empirically analyzes the impact of debt repudiations and concludes that debt forgiveness creates value. Piskorski and Tchistyi (2008) characterize the features of optimal mortgage lending in the environment with stochastic house appreciation with a risk of housing downturn and show that it is optimal for the lenders to help borrowers who were in good standing before the housing crisis by reducing their mortgage balance and lowering their mortgage rates. Therefore, in their setting mortgage modification arises as optimal even from the ex-ante perspective. Finally, since rising foreclosures may impose negative externalities, such as neighborhood effects of foreclosures and increased risk to the stability of the financial system, some form of debt renegotiation might also be optimal from the public policy perspective.

Why do we expect the servicer decision on loan modifications to differ across securitized and portfolio loans? As was pointed out in Section I, there are several reasons to believe this is the case. Securitization brings about a movement from concentrated debt to dispersed debt, from single creditor to multiple creditors, and from relationship lending to arm's-length contracting.

It also introduces heterogeneous classes of debt. These features make it harder to renegotiate debt contracts and can potentially lead to inefficient liquidations (Bolton and Scharfstein 1996; Asquith Gertner and Scharfstein 1994; Gilson, John and Lang 1990; Zingales 2008; and Franks and Tourus 1994). Thus, securitization may introduce bargaining inefficiencies due to coordination problems between a group of heterogeneous investors. In addition, securitization imposes several institutional constraints on the servicer which might also thwart the renegotiation process.

Our paper contributes to the research studying incentives of loan servicers. In related research, Pennington-Cross and Ho (2006) find that the servicer affects the likelihood of default to a strong degree and the possibility of prepayment to a lesser, but still substantial, degree. Gan and Mayer (2006) reviewed the actions of servicers to determine when they operate most efficiently and concluded that they alter their behavior depending on whether they own a first-loss position for the loans they service. More broadly, we contribute to the literature that debates the costs (Dell'Ariccia, Igan and Laeven 2008; Demyanyk and Van Hemert 2008; Keys et al. 2008; Mian and Sufi 2008; Morrison 2005 and Parlour and Plantin 2007) and benefits of securitization (Kashyap and Stein 2000; Loutskina 2006; Loutskina and Strahan 2007). Finally, the paper is also related to the literature that empirically examines renegotiation in the context of corporate default (see for instance, Benmelech and Bergman 2007 and Roberts and Sufi 2008)

III Background

Approximately 60% of outstanding U.S. mortgage debt is traded in mortgage-backed securities (MBS), making the U.S. secondary mortgage market the largest fixed-income market in the world (Chomsisengphet and Pennington-Cross 2006). The bulk of this securitized universe ($3.6 trillion outstanding as of January 2006) is comprised of agency pass-through pools – those issued by Freddie Mac, Fannie Mae and Ginnie Mae. The remainder, approximately, $2.1 trillion as of January 2006 has been securitized in non-agency securities. While the non-agency MBS market is relatively small as a percentage of all U.S. mortgage debt, it is nevertheless large on an absolute dollar basis. The two markets are separated based on the eligibility criteria of loans that the GSEs have established. Broadly, agency eligibility is established on the basis of loan

size, credit score, and underwriting standards.

Servicers play a vital role in the mortgage lending. They not only process the cash stream from borrowers and channel it to lenders or investors, but also help restructure some loans where the borrower becomes delinquent. In particular, when a borrower becomes delinquent on the mortgage, loan servicers begin to evaluate the borrower's willingness and financial ability to continue making monthly mortgage payments. For borrowers facing short-term financial hardship, servicers generally negotiate forbearance or repayment plans. However, when a borrower's inability to make mortgage payments is expected to be permanent, servicers typically have two choices: to foreclose on the property or to pursue a loan modification. We now briefly discuss what each of these actions entails.

For borrowers experiencing temporary financial hardships resulting from illness, short-term unemployment, or natural disaster, the most attractive options are generally either allowing borrowers to temporarily reduce, postpone, or suspend making payments on a loan (forbearance agreement) or allowing borrowers to become current on their loans by increasing their scheduled monthly payment until the past due amounts are paid off (repayment plan).[3]

In contrast, if the borrower's inability is expected to be permanent, servicers' may offer the borrower a loan modification. Loan modification aims to increase the value of a loan by changing its original terms, making payments more affordable for the borrower. Unlike other forms of loss mitigation, loan modification is a potential solution that allows borrowers with a long-term financial hardship to keep their home.[4] Typically the loan modifications can be classified in the following three categories:

1. **Principal reduction mods:** The servicer forgives a portion of principal, which lowers

[3]Historically, forbearance or repayment agreements have been the most common form of loss mitigation when foreclosure is avoidable. However, these methods are appropriate only when it is expected that the borrower will be able to make the scheduled payments. When a borrower becomes delinquent as a result of a payment shock at reset, it is likely that he is simply unable to afford the new payments. As a result, a forbearance or repayment plan would not make the payments any more affordable. In such cases, a loan modification is a possible long-term solution.

[4]Though historically loan modifications have been used infrequently by servicers, in the current housing environment loan modification has become more common; see Credit Suisse, 2008, Subprime Loan Medication Update.

the borrower's monthly payment.

2. **Reset mods:** This refers to modifications of hybrid ARM loans after the initial fixed-rate period. Common modifications include rate freezing, in which borrowers continue to make payment based on the initial rate after the first reset, or not fully resetting, in which borrowers make payment at a new rate higher than the initial rate but lower than the fully indexed rate subject to reset cap. Sometimes, these mods are accompanied by balance increases capitalizing previously missed payments.

3. **Other traditional mods:** These mods are made on fixed-rate loans or on ARM loans that don't have accompanying reset mods. Most of them are taken in the form of capitalized interest, or rate reduction, or both.

Of course, the servicers might foreclose the property if they believe that loan modification is a loss-making proposition. Interestingly, the flexibility provided to servicers in making these decisions differs depending on whether or not a given loan is securitized. Servicers of securitized loans are also typically bound by the Pooling and Servicing Agreement (PSA), a legal document that outlines the responsibilities of the servicer. In some cases PSAs explicitly restrict the extent of loan modifications allowed. Even for those PSAs that do limit modifications, typically about 5% (in some cases by loan amount and others by loan number) of the original loan pool can be modified unless outside permission from the trustee is obtained.[5] However, given the infrequent use of loan modifications in the past, information is scarce as to what types of modifications have historically been implemented and what kind of success servicers have seen. As a result, there is little consensus among servicers as to what is legally permissible.

It is important to examine how servicers are compensated in order to understand why their decision to foreclose rather than modify the loan might depend on the securitization status of the loan. For the servicer, both foreclosure and loan modification involve cash outflows, but unlike most expenses incurred during foreclosure, modification costs are not reimbursable for securitized loans. Loan modifications might benefit the servicer by extending the time period

[5] A recent study (Credit Suisse, 2007, "The Day After Tomorrow: Payment Shock and Loan Modifications") reviewing 30 PSAs from a variety of Wall Street and originator/servicer shelves and across different vintages found that around 65% of the deals have no explicit restrictions concerning mortgage modification.

over which the servicing fee can be collected (typically on the order of 25-37.5 basis points).[6] Loan modification also allows servicers to avoid or delay the cost of financing principal and interest advances. As a result, servicers may prefer loan modification to foreclosure when they expect the resulting cash flows from the borrower to exceed the cost of loan modification. It seems reasonable to expect that in an environment with substantial house price risk, the risk of borrower defaulting again or refinancing risk might make modification less attractive for the servicer. Therefore, given that the modification costs are not reimbursable for securitized loans, it seems plausible to assume that fewer modifications would occur for securitized loans.

IV Data

The data for this study comes from McDash Analytics and includes loan-level data reported by mortgage servicing firms. The dataset has detailed information on the loan at the time of origination, such as the loan amount, term, LTV ratio, credit score, and interest rate type - data elements that are typically disclosed and form the basis of contracts, for both securitized and portfolio loans.

We now describe some of these variables in more detail. The borrower's credit quality is captured by a summary measure called the FICO score. The FICO score has increasingly become the most recognizable measure used by lenders, rating agencies, and investors to assess borrower quality (Gramlich, 2007). The software used to generate the score from individual credit reports is licensed by the Fair Isaac Corporation (FICO) to the three major credit repositories - TransUnion, Experian, and Equifax. These repositories, in turn, sell FICO scores and credit reports to lenders and consumers.

FICO scores provide a ranking of potential borrowers by the probability of having some negative credit event in the next two years. Probabilities are rescaled into a range of 400-900, though nearly all scores are between 550 and 800, with a higher score implying a lower probability of a negative event. The negative credit events foreshadowed by the FICO score can be as small as one missed payment or as large as bankruptcy. Borrowers with lower scores are proportionally more likely to have all types of negative credit events than are borrowers with

[6] Lehman Brothers, 2007, A Closer Look at Loan Modifications, Fixed Income US Securitized Product Research.

higher scores.

Borrower quality can also be gauged by the level of documentation collected by the lender when taking the loan. The documents collected provide historical and current information about the income and assets of the borrower. Documentation in the market (and reported in the database) is categorized as full, limited or no documentation. Borrowers with full documentation provide verification of income as well as assets. Borrowers with limited documentation provide no information about their income but do provide some information about their assets. No-documentation borrowers provide no information about income or assets, which is a very rare degree of screening lenience on the part of lenders. In our analysis, we combine limited- and no-documentation borrowers and call them low-documentation borrowers.

The data also provide information on the features of the loan contracts. Specifically, we have information on the type of mortgage loan (fixed rate, adjustable rate, balloon or hybrid), and the loan-to-value ratio (LTV) of the loan, which measures the amount of the loan expressed as a percentage of the value of the home. There is information on the purpose of the loan. Typically loans are classified as either for purchase or for refinance (with or without cashout), and we focus exclusively on loans for home purchases. Information about the geography where the loan is located (MSA) is also available in the database. Finally, McDash provides information on whether the loan is securitized or a portfolio loan.

We restrict our sample to first-lien non-agency mortgages originated in 2005 and 2006. We drop loans that have incomplete information about original credit scores, original interest rates, origination amounts, and property values and those that have LTV values greater than 150. We focus on loans with maturities of 15, 20 and 30 years since this constitutes most of the sample. To avoid survivorship bias we limit our sample to those loans that entered the McDash database within four months of the origination date.

We focus on loans originated in or after 2005 since the McDash coverage prior to this year is less representative.[7] After filtering out the dataset as described above, there were approximately 6.2 million unique mortgages. From here, we split the data into quarters, giving between 650,000 and one million loans in each quarter. Of these loans, roughly 75% were portfolio loans, i.e., the

[7] As our data coverage covers up to the end of first quarter of 2008, we focus on loans originated till the end of 2006 in order to have sufficient data to evaluate subsequent loan performance.

loans that were not securitized.

For our default regressions, we consider a subsample of the loans defined above that become 60+ days delinquent as reported by the servicers. In the paper, we use the definition of Mortgage Bankers Association of 60+ days delinquency though all our results hold if we used the Office of Thrift Supervision definition of 60+ delinquency instead. A loan is 60+ days delinquent if the borrower is behind by two mortgage payments. The missed payments do not necessarily have to be consecutive. There were about 330,000 delinquent loans in our entire sample. About 11.3% of these loans were portfolio-held as of the time of delinquency.

In our analysis we also consider a sub-sample of higher-quality loans with full documentation and FICO credit score of at least 680. Using this classification, there were about 1.3 million such loans in the subsample (125,000 to 200,000 per quarter). This sample contains approximately 16,500 delinquent loans, of which 20.4% were portfolio held at the time of delinquency.

Finally, we also examine variation in foreclosure rates across states with different liquidation laws.[8] A state is defined as *tough* if the historical average number of days to process foreclosures is less than or equal to the median (about 117 days).[9] Twenty-five states and the District of Columbia were classified as tough states. Alabama was the toughest state, with an average of 25 days to process a foreclosure. At the other end of the spectrum, the average time to process a foreclosure was 445 days in New York. The "median" state is California, which took an average of 117 days to process foreclosures.

V Empirical Methodology and Results

In this section we discuss the empirical methodology and state our identification assumptions. We then discuss descriptive statistics of the data and present the results obtained from the analysis.

[8]We use state foreclosure rules as reported by Mortgage-Investements.com (http://www.mortgage-investments.com/borrow-money/foreclosure-laws.htm)

[9]We interchangeably call these states as being creditor friendly or having strong creditor rights.

V.A Identification and Tests

Servicers of mortgages make the crucial decision either to foreclose a delinquent loan or to engage in a workout/modification of mortgage terms with the borrower. In our empirical analysis we want to estimate the impact securitization has on this servicing decision. The most simple approach of doing this would be to use the following specification:

$$Pr(Y_i = 1|Delinquency) = \Phi(\alpha + \beta \times Portfolio_i + \gamma.X_i + \delta_m + \epsilon_i), \quad (1)$$

where the dependent variable is an indicator variable for a *delinquent* loan i that takes a value of 1 if the loan is foreclosed and 0 otherwise. X_i is a vector of loan and borrower level characteristics that includes variables such as FICO scores, interest rate, loan to value ratio (LTV) and origination amount and γ a vector of coefficients. *Portfolio* is an indicator variable that takes the value 1 if the delinquent loan was held on lender's balance sheet and 0 if the loan was securitized. In this specification β would measure the impact of securitization on servicer's decision to foreclose the delinquent property or engage in a workout.

This approach makes the following identification assumption: conditional on observables, there is a random assignment of portfolio and securitized loans at the time of origination and at the time of delinquency. Following this, we ensure that the empirical specification conditions on a plethora of explanatory variables that might be important at origination. In particular, besides observables listed above, we also use the term length, whether the loan was fixed term, whether it was insured, and age of the loan as of the time of delinquency. In addition, to account for regional factors we also include MSA fixed effects (δ_m). Moreover, we make the specification (1) very flexible by including squares of LTV ratio and loan amount as well as dummies of different FICO range.

It is nevertheless possible that after conditioning on a host of observables, the assumption of random assignment at the time of origination may be violated, making the estimate β biased. In particular, if lenders collect unobservable private information about the borrower quality at the time of origination and securitize loans of worse quality, β would be downward biased, i.e., securitized loans would default at a higher rate. Notably, restricting the analysis to the sample of delinquent loans alleviates this concern to some degree. If lenders only obtain signals about the likelihood of delinquency during the origination process (i.e., the signals are of short-term

prospects), differences in foreclosure rates of delinquent securitized and portfolio loans cannot be attributed to selection on unobservables at the time of origination.

It is conceivable that lenders might also obtain signals about the likelihood of subsequent foreclosure of a loan when they screen the borrower. If so, this could also bias β downwards. We circumvent this issue by restricting our analysis to borrowers for whom such information is likely to be less valuable at the time of loan origination, i.e., borrowers that are better quality on the dimension of hard information characteristics, such as credit score and documentation level. The reason to focus on these loans is that unobservable soft information is less likely to be valuable for these borrowers. This is confirmed in studies that provide evidence that screening on unobservables is less important for these types of loans (Keys et al. 2008).

Finally, it is also plausible to conjecture that lenders obtain information about the borrower between origination and delinquency. The differences in foreclosure rates between delinquent securitized and portfolio loans might simply reflect worse information obtained for securitized loans. We alleviate this concern by conditioning on the credit score of the borrower *at the time* of delinquency for a sub-sample of loans with this information. Since it takes on average about one and half years for a borrower to become delinquent (see Table 1), we expect credit scores at the time of delinquency to capture some of the information regarding quality of the borrower that is revealed between origination and delinquency.[10] If the conjecture is true, this test should reduce the bias in β (i.e., reduce the magnitude of β).

V.B Descriptive Statistics

We start the empirical analysis by providing summary statistics of some of the key variables used in our analysis in Tables 1 and 2. We use all the delinquent loans in Table 1 while only delinquent loans that were of high-quality at the time of origination (fully documented loans with FICO > 680) are considered in Table 2.

As can be observed from Panel A of Tables 1 and 2, there seem to be differences in the proportion of loans that are securitized depending on the riskiness of the loans. About 11.2% in the sample of all delinquent loans are held on portfolio compared with 20.3% of the fully

[10] Fair Isaac reports that credit scores get updated on average every three months.

documented loans. In addition to higher FICO scores, the fully documented loans had slightly lower LTV ratios and larger origination amounts on average. In both samples, the origination amounts increase from 2005 Q1 through 2006 Q4. In most quarters, the sample of all loans defaults more often than the sample of fully documented loans. A loan is considered in default when it enters foreclosure post-sale or REO (real estate owned) status during the course of the loan's history. Defaults mechanically fall as we get closer to the end of the sample (2006 Q3 and 2006 Q4) since a long history for these loans is not available.[11]

Panels B of Tables 1 and 2 split the respective samples by investor status at the time of delinquency. The panels show that portfolio loans have higher FICO scores and lower interest rates than securitized loans. On the other hand, portfolio loans usually have slightly higher LTV ratios and origination amounts. In both the sample of all loans and the subsample of fully documented loans, loans held on portfolio default less often than securitized loans. However, portfolio loans take less time to become delinquent than do securitized loans. Since these are univariate statistics, we next turn to multivariate regressions to assess what differences exist in default between portfolio and securitized loans after we condition for observables of the loan.

V.C Main Test: Comparing Defaults of Securitized and Portfolio Loans

We now describe the results from our main test. We estimate equation (1) and report the marginal effects of a logit regression performed for the entire sample in Table 3. The dependent variable is whether or not the loan enters default (is foreclosed or enters a REO state) conditional on the loan becoming delinquent.[12] We estimate the regressions separately for each quarter to alleviate concerns that macroeconomic conditions might have changed substantially during our sample period. MSA fixed effects are included in all the specifications to account for regional variation across the country.

As can be seen in Columns (1) to (8), the coefficient on (*Portfolio*) dummy is consistently negative and significant for all quarters. This suggests that, conditional on being delinquent, a

[11] Note that our data runs till end of 2008 Q1 and as a result loans in 2006 Q3 and 2006 Q4 are tracked for less than two years after delinquency.

[12] Note that for brevity we will refer to a loan in default as being foreclosed. As noted above, the loan could technically be foreclosed or in REO state. In either case, however, the loan is liquidated rather than modified.

loan on lender's balance-sheet is less likely to be foreclosed than a loan that is securitized. The effects are large: keeping all the variables at their mean values, being on portfolio reduces the likelihood of default for a delinquent loan by at least 20% relative to the mean.

The coefficients on most other variables are also as expected. For instance, loans with higher LTV ratios are more likely to default. Interestingly, the coefficient on FICO suggests that, conditional on being delinquent, loans with lower FICO default less. This is in contrast to the negative relationship one typically observes between FICO and delinquencies.[13] There could be several potential reasons for this result. First, if a high FICO loan becomes seriously delinquent it is most likely that the borrower has received a larger credit shock, given initial credit quality. As a result, these loans are more likely to be foreclosed. Second, it is likely that *relative* to borrowers with lower FICO scores, there is less information about these borrowers that lenders can use at the time of delinquency to decide whether or not to restructure the loan. This could be both since these loans are ex-ante more likely to pay off (due to higher quality) and as a result lenders do not screen them as intensively (Manove et al., 2001), and because there is less soft information available about these borrowers after hard information (like credit scores) has been collected (Rajan et al., 2008).

This evidence supports the view that there are substantial differences in the way the delinquent loans are serviced depending on their securitization status. If this estimate satisfied the identification assumptions discussed in Section V.A, this result suggest that servicers of portfolio loans undertook actions that resulted in lower rates of foreclosures relative to servicers of securitized loans. As we have elaborated on before, this could be due to frictions in the renegotiation process for securitized loans such as coordination problems between a group of heterogeneous investors, lack of proper incentives to modify the loans, and legal and institutional frictions.

V.C.1 Effect of Ease Of Refinancing

We have so far assumed that borrowers do not have the ability to take actions around these renegotiation frictions. However, it is reasonable that during periods of house price apprecia-

[13] In unreported tests we confirm that there is a strong negative relationship between FICO and the likelihood of a loan becoming delinquent.

tion, borrowers have a positive equity in the house and are able to refinance themselves out of trouble. Consequently, the renegotiation friction highlighted in our main tests should be weaker in magnitude if we moved into a period when refinancing was easier. We now investigate if this is the case in our sample.

Before doing so we first examine how the house prices moved during the sample period. Figure 1 plots the house price index over the years and shows that it has been slowing down towards the end of 2005 and starts falling around mid 2006. To assess how this decline in house prices translated into difficulty that borrowers faced when refinancing out of this market, we plot the prepayment rates of borrowers across vintages. Since McDash does not report data reliably before 2005, we rely on First American Loan Performance database to get the prepayment rates for all the securitized subprime borrowers from 2001 to 2006. As is shown in Figure 2, during periods of house price appreciation (2001-2004) borrowers in the non-agency market were able to voluntarily prepay their loans and refinance them at a significantly faster rate than when the house prices declined (2005-2006).

The evidence above suggests that we can make comparisons between our estimates towards the end of the sample period when house prices were declining (2006 Q3 and 2006 Q4) with estimates in the beginning of the sample period when house prices were not declining (2005 Q1 and 2005 Q2). Comparing these from Table 3 suggests that the magnitude of our results are stronger in the periods of house price declines. For instance, from Column (7) of Table 3, we can observe that a delinquent loan on the portfolio of a bank defaults by about 33% relative to the mean. In contrast, in earlier years this estimate is about 20% (for instance 2005 Q1). It is important to note that since we do not have enough time series on delinquent loans towards the end of the sample, the estimates in Columns (7) and (8) are likely to be even higher once more data is collected. Overall this evidence suggests that, borrowers are able to undo some of the liquidation bias generated by failure to renegotiate these loans during the period of house price increases.

V.D Addressing Selection: Loans with Full Documentation

As discussed in Section V.A, though we have controlled for all the relevant observable characteristics of the loans, differences in performance between securitized and portfolio loans could be driven by some unobservable information about quality that lenders obtain at the time of origination. While focusing on the sample of financially distressed loans, under some assumptions, would alleviate some of these concerns, we examine a subset of the data where we believe this would be less of a concern. We focus on sub-sample of loans of higher quality: loans that are fully documented and also have good initial credit quality as represented by FICO credit score of at least 680 (about more than half of the fully documented loans have FICO more than 680). We do so since any selection on unobservables at the time of origination is likely to be of less concern for these types of loans (Keys et al. 2008).

We present the estimates using the specification (1) for this sub-sample in Table 4. As can be observed from Columns (1) to (8), the coefficient on the portfolio dummy is negative and significant for all but one quarter. In other words, conditional on being delinquent, loans that are of higher quality at the time of origination are serviced differently depending on the securitization status of the loan. The estimates are again economically meaningful. For example, in 2006 Q4, being on portfolio decreases the probability of default in absolute terms by about 4.5%, nearly a 33% decrease relative to the mean default rate of 13.7%. Similarly, in 2006 Q3, the probability of default for portfolio loans is lower by about 52% in relative terms. The estimates on other variables are qualitatively similar to those reported in Table 3.

We also find that similar to the entire sample, the magnitude of our results are stronger in the periods of house price declines. For instance, the difference between default rates of portfolio and securitized loans is about 20% in relative terms in 2005 Q1 and 2005 Q2 – a significantly smaller number when compared to 32% and 52% in 2006 Q3 and 2006 Q4. This evidence again suggests that borrowers were able to undo some of the liquidation bias generated by failure to renegotiate these loans during the period of house price increases.

V.E Addressing Selection: Credit Score At Time of Delinquency

In this section, we provide additional evidence that suggests that the differences in default rates of securitized and portfolio loans are likely due to renegotiation frictions we highlighted. Even though we have addressed concerns about selection on unobservables at the time or origination of the loan some selection concerns remain. In particular, it is possible that lenders obtain information about the borrower between origination and delinquency. Consequently, our results could be driven by selection on unobservables *at the time of delinquency*.

To address this concern, we note that McDash provides time series information on updated credit scores for few of the loans in our sample.[14] In particular, for these loans we are able to obtain the FICO score *at the time* of delinquency. Since it takes on average about one and half years for a borrower to become delinquent (see Table 1), we expect credit scores at the time of delinquency to capture some of the information regarding quality of the borrower that is revealed *between* origination and delinquency.

We conduct the test using loans for which we have information on the credit score at the time of delinquency and using specification (1). The results of this estimation are visually presented in Figure 3 where we report β, the coefficient on *Portfolio* and its 95% confidence interval. As can be observed, β is negative and significant for all the quarters in our sample, even though the sample size is substantially reduced (about $1/10^{th}$ the sample size of Table 3 in each quarter). Overall, this evidence provides additional support for our hypothesis.

V.F Other Confirmatory Tests

We now present some additional tests which confirm the robustness of our findings. These tests are unreported for brevity and are available upon request. First, there might be concerns that some of the results might be sensitive to the particular definition of delinquency we have chosen. To alleviate this concern, we estimated our regressions using alternative MBA definitions of

[14] Tests comparing the observables at the time of origination for loans for which updated credit score is reported with those for loans for which this information is missing reveals limited differences. For instance, the interest rate on loans with information on updated FICO is about 7.8% vs. 7.7% for loans with no such information. Similarly, LTV ratios are 82% vs 80% and FICO scores are on average 625 vs. 635. Conversations with McDash suggest that this field is randomly reported.

delinquency (30+ and 90+). Our results are qualitatively and quantitatively very similar.

Second, even though we controlled for regional dummies, there might be concerns that house price index changed quite dramatically during the sample period, which might not be reflected in the MSA fixed effects. For instance, one might be worried that perhaps borrowers with securitized and portfolio loans belonged to very different neighborhoods and faced different house price changes over the sample period. To address this concern, we re-estimate the baseline regressions controlling for house price movements in addition to MSA fixed effects and find that our results are not affected.

Finally, we also re-estimate our regressions defining high-quality loans using different FICO breakpoints (e.g., FICO of 700 instead of FICO of 680), using a more flexible specification (squares and cubes of all variables) and adding more explanatory variables, and in each instance find qualitatively similar results as those reported in the paper.

VI Role of Liquidation Laws

It has been suggested that servicing incentives be examined in conjunction with the foreclosure laws (e.g., White 2008). To see this, note that in the U.S. many states protect borrowers by imposing restrictions on the foreclosure process. This may make it difficult for servicers to foreclose in states where these laws make it harder to foreclose (i.e., in creditor unfriendly or *weak* states). If true, this provides a nice test to confirm our hypothesis. In particular, since we argue that renegotiation frictions prompt servicers to liquidate securitized loans, it is plausible to expect that the *differences* between foreclosure rates of securitized and portfolio loans should accentuate in states where laws allow servicers to foreclose easily. This forms the basis of our test in this section.

Accordingly, we re-estimate our regressions separately for states where foreclosure laws are creditor friendly (called *tough* states) and for states where these laws are creditor unfriendly (called *weak* states). We find that, conditional on being seriously delinquent, the difference in the foreclosure rates between securitized and portfolio loans is much higher for those loans that are originated in states with creditor-friendly laws, i.e., states that allow for quick foreclosure and house repossession.

In particular, Tables 5 and 6 report the estimates for all loans originated in weak and tough creditor right states. Note that, as should be expected, on average delinquent loans in states with tough liquidation laws are about twice as likely to default as delinquent loans in states with weak liquidation laws (28.0% to 14.2%). More importantly for our purpose, we find that the coefficient on the portfolio dummy is negative and significant in both weak and tough states. Moreover, the estimated portfolio coefficient in tough states is either quite similar or larger in most quarters.

We also conduct the test using the sample of high-quality loans we used earlier to address selection concerns and report the results in Tables 7 and 8 for loans originated in weak and tough states respectively. Again, as is expected, the mean default rate for high-quality delinquent loans is higher in tough states as compared to weak states (29% vs. 12%). More importantly, the portfolio coefficient is insignificant in the sample of high-quality loans originated in weak states for all but one quarter. In contrast, the portfolio effect is large and significant in the sample of high-quality loans originated in tough states for all the quarters. On average, Table 8 suggests that being held on portfolio reduces the default rate of a high-quality delinquent loan originated in states with tough laws by as much as 14.7% (about 57.7% relative to the mean).

Overall, we interpret the evidence in this section as suggesting that strong creditor rights can exacerbate the renegotiation frictions imposed by securitization. This finding is consistent with servicer incentives driving our results since it shows that they have a stronger incentive to foreclose a securitized loan in states where it is legally easier (and faster) to do so.

VII Conclusion and Policy Implications

Prior to securitization, mortgage loans would be owned by the financial intermediary who would monitor the loans that they originated. However, in the new world of securitization, loans are originated by the bank (or broker) packaged and sold to several distanced and dispersed investors who delegate the monitoring to a servicer. We investigate whether securitization creates costs that hinder the efficient renegotiation of financially distressed loans. Controlling for contract terms and regional conditions, we find that seriously delinquent loans are foreclosed at a higher rate if they are securitized as compared to loans that are held directly by the lending

institutions. We suggest that a plausible reason for different servicing of delinquent loans that are securitized is the renegotiation friction faced by servicers of these loans. Among other things, these servicers are faced with coordination problems amongst heterogeneous investors, lack of proper compensation for loan modification, and other legal and institutional frictions.

There are several caveats of our analysis. First, our measure of performance efficiency (foreclosures) is driven by the notion that in times of big macro shocks, debt forgiveness and loan modifications can create value (Bolton and Rosenthal 2002; Kroszner 2003; Piskorski and Tchistyi 2008). It is clear that policies arguing for debt forgiveness or renegotiation in normal times need to account for the perverse ex-ante incentive effects such a policy would create – even though borrower's default might be costly to the lender. Our arguments about efficiency are therefore relevant at present because we are facing a big macroeconomic crisis.

Second, in making efficiency arguments, we compare the performance of the delinquent loans on banks' balance-sheets with those that are securitized under the assumption that banks service their loans optimally. This is true only to the extent that banks do not face the same coordination, incentive or institutional constraints as do servicers of securitized loans. However, there might be reasons to expect that banks face soft budget constraints and therefore suffer from continuation bias. Consequently, the differences in foreclosure rates we document may not be entirely due to inefficient renegotiation of securitized loans.

Third, we address selection on unobservables at the time of origination and at the time of delinquency using a battery of tests. However, there may still be some unobservables about loan quality which distinguish loans that are securitized from those held on the bank's balance-sheet. To the extent that our tests are not able to account for these, our estimates may be biased. In addition, the actual estimates of renegotiation friction may be smaller than ones we report, since some of the modified loans can default again in the future. Next, though our analysis suggests that securitization can have costs at the time of a negative macro shock, we refrain from making any welfare claims about securitization. We believe securitization is an important innovation and has several merits that have been documented earlier (e.g., Loutskina 2006). Finally, while we argue that our results are driven by renegotiation frictions faced by servicers of securitized loans, our analysis cannot pin down which of the frictions is most important. A

careful investigation of this question is policy relevant and is a promising area for future research.

Our findings have important policy implications. The results suggest that there might be a role for government intervention for at least two reasons. First, in time of a crisis, foreclosures can exert significant negative externalities, like negative neighborhood effects and the reduction in collateral prices that can further aggravate financial distress. Consequently, renegotiation frictions that we document for securitized loans can accentuate the current subprime crisis, thereby reducing welfare. Second, it is also plausible that the magnitude of these bargaining frictions were not anticipated by lenders and borrowers when the loan contracts were written (Hart and Zingales, 2008). Government initiatives at facilitating renegotiation could therefore be ex-post pareto-improving for borrowers and investors in some cases.

Our findings lend support to several recent policy proposals that argue for the government to take steps to address the recontracting failure inherent in securitized loans. For example, Mayer and Hubbard (2008) suggest that the borrowers be offered a possibility to refinance their mortgages to affordable government sponsored loans with possible principal reduction. Similarly, Zingales (2008) proposes that Congress should make a re-contracting option available to all homeowners living in a zip code where house prices dropped substantially. Our finding about renegotiation frictions having been temporarily alleviated in states with weaker creditor rights is consistent with the view than bankruptcy laws may interact with servicer incentives (White 2008). However, it is not clear if making the laws pro-debtor friendly would tackle this friction since the social costs of making bankruptcy laws pro-debtor (e.g., strategic defaults and increased cost of mortgage credit) might outweigh the benefits.

In the end, relative merits of any policy intervention should depend on a careful evaluation of its social benefits as well as its potential costs. This task is complicated by the need to take into account the impact of policy intervention on incentives of *current borrowers* to repay as well as on the behavior of borrowers and lenders in the future. Our paper contributes to this policy debate by documenting that delinquent loans are serviced differently depending on their securitization status and by quantifying the magnitudes related to the frictions in the loan modification market.

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Table 1: Summary Statistics of All Loans

The sample only includes first time loans. The investor is either private (securitized) or portfolio (bank balance-sheet) at the time of first observed month of 60+ days delinquency. It is either self-owned or parent-owned. Delinquent is defined as 60+ days MBA delinquent. Default is defined as a loan that enters into foreclosure post-sale or REO status. Age at Delinquency is the number of months since origination when a loan becomes 60+ days delinquent. All loans in the sample are originated between 2005 to 2006.

Panel A: Conditional on Delinquency

	2005 Q1	2005 Q2	2005 Q3	2005 Q4	2006 Q1	2006 Q2	2006 Q3	2006 Q4
% Portfolio	13.8%	12.5%	13.5%	10.7%	8.9%	8.6%	10.4%	11.7%
Original Credit Score	628.0	630.9	639.8	638.0	637.6	636.6	634.4	632.8
LTV	80.1	80.3	79.8	79.1	79.6	80.0	79.9	80.5
Original Interest Rate	7.02%	7.13%	7.13%	7.56%	8.08%	8.26%	8.45%	8.29%
Original Loan Amount	217,526	231,752	252,690	254,366	251,435	256,711	261,184	272,667
Age at Delinquency	17.5	16.9	16.9	15.4	13.4	12.0	10.6	9.17
% Default	24.19%	23.52%	22.73%	24.70%	26.27%	22.29%	19.93%	16.18%
N	35,585	46,521	46,907	45,133	42,978	42,354	37,386	30,574

Panel B: Conditional on Delinquency by Investor

Portfolio	2005 Q1	2005 Q2	2005 Q3	2005 Q4	2006 Q1	2006 Q2	2006 Q3	2006 Q4
Original Credit Score	639.2	656.2	656.3	662.9	664.7	660.1	634.0	641.6
LTV	78.9	79.2	79.4	79.1	80.3	81.3	82.2	83.2
Original Interest Rate	6.16%	6.29%	6.50%	6.67%	6.97%	7.54%	7.97%	7.64%
Original Loan Amount	248,033	282,570	271,062	305,099	297,276	286,659	249,147	264,680
Age at Delinquency	17.4	16.9	14.9	14.2	12.8	11.0	9.0	8.0
% Default	19.22%	19.26%	18.80%	20.00%	22.63%	19.18%	16.01%	15.35%
N	4,921	5,837	6,313	4,811	3,822	3,654	3,892	3,570

Private	2005 Q1	2005 Q2	2005 Q3	2005 Q4	2006 Q1	2006 Q2	2006 Q3	2006 Q4
Original Credit Score	626.2	627.2	637.2	635.0	634.9	634.4	634.4	631.6
LTV	80.3	80.5	79.9	79.1	79.5	79.9	79.7	80.2
Original Interest Rate	7.15%	7.26%	7.23%	7.67%	8.19%	8.32%	8.50%	8.37%
Original Loan Amount	212,631	224,461	249,833	248,313	246,960	253,884	262,583	273,723
Age at Delinquency	17.5	16.9	17.2	15.6	13.5	12.1	10.8	9.3
% Default	24.99%	24.14%	23.35%	25.27%	26.62%	22.58%	20.38%	16.29%
N	30,664	40,684	40,594	40,322	39,156	38,700	33,494	27,004

Table 2: Summary Statistics of High Quality Loans
(Full Documentation and FICO of at least 680)

The sample only includes first time loans. The investor is either private (securitized) or portfolio (bank balance-sheet) at the time of first observed month of 60+ days delinquency. It is either self-owned or parent-owned. Delinquent is defined as 60+ days MBA delinquent. Default is defined as a loan that enters into foreclosure postsale or REO status. Age at Delinquency is the number of months since origination when a loan becomes 60+ days delinquent. All loans in the sample are originated between 2005 to 2006.

Panel A: Conditional on Delinquency

	2005 Q1	2005 Q2	2005 Q3	2005 Q4	2006 Q1	2006 Q2	2006 Q3	2006 Q4
% Portfolio	17.6%	20.8%	21.5%	19.3%	20.7%	21.2%	17.8%	24.2%
Original Credit Score	716.5	718.3	718.8	718.5	717.6	716.2	715.6	717.8
LTV	79.9	80.2	79.6	78.7	78.4	79.1	79.0	79.4
Original Interest Rate	6.09%	6.29%	6.12%	6.53%	6.86%	7.16%	7.31%	7.19%
Original Loan Amount	250,483	256,730	280,300	276,557	276,597	297,623	311,906	320,919
Age at Delinquency	21.2	20.0	19.4	17.8	15.8	13.5	11.7	9.8
% Default	25.45%	25.08%	20.02%	21.01%	23.48%	20.44%	16.95%	13.67%
N	2,008	2,911	2,452	2,228	1,793	2,099	1,793	1,207

Panel B: Conditional on Delinquency by Investor

Portfolio	2005 Q1	2005 Q2	2005 Q3	2005 Q4	2006 Q1	2006 Q2	2006 Q3	2006 Q4
Original Credit Score	723.2	726.0	727.6	728.2	721.9	722.4	719.9	722.0
LTV	80.5	80.5	80.5	79.4	78.5	80.1	81.8	79.5
Original Interest Rate	5.13%	5.66%	5.44%	6.18%	6.54%	6.76%	6.89%	6.65%
Original Loan Amount	257,893	266,009	292,939	290,574	273,631	294,194	305,043	342,780
Age at Delinquency	21.1	20.6	18.5	15.9	14.7	12.3	10.7	9.4
% Default	19.26%	19.64%	14.61%	14.22%	18.28%	13.03%	8.44%	10.96%
N	353	606	527	429	372	445	320	292

Private	2005 Q1	2005 Q2	2005 Q3	2005 Q4	2006 Q1	2006 Q2	2006 Q3	2006 Q4
Original Credit Score	715.1	716.3	716.4	716.2	716.4	714.6	714.7	716.5
LTV	79.8	80.2	79.4	78.5	78.4	78.9	78.3	79.4
Original Interest Rate	6.29%	6.46%	6.31%	6.62%	6.94%	7.27%	7.40%	7.36%
Original Loan Amount	248,903	254,290	276,839	273,214	277,374	298,546	313,397	313,942
Age at Delinquency	21.2	19.8	19.6	18.3	16.2	13.8	11.9	10.0
% Default	26.77%	26.51%	21.51%	22.62%	24.84%	22.43%	18.81%	14.54%
N	1,655	2,305	1,925	1,799	1,421	1,654	1,473	915

Table 3: Logit Regression of Default Conditional on 60+ Days Delinquency (All Loans)

This table reports the marginal effects of a logit regression. Coefficients on discrete variables represent the effect of moving from 0 to 1. Coefficients on continuous variables represent the effect of moving one standard deviation from the mean. The investor is the investor at the time of first 60+ days delinquency. Age at Delinquency is the age of the loan at the time of first 60+ days delinquency. The excluded variables are private investor, FICO >= 680, 30-year term and missing insurance information. Robust t-statistics are reported in parentheses. All loans in the sample are originated between 2005 to 2006. ***, ** and * represents significance at 1%, 5% and 10% respectively.

	2005 Q1	2005 Q2	2005 Q3	2005 Q4	2006 Q1	2006 Q2	2006 Q3	2006 Q4
Dependent Variable: Foreclosure								
Mean	0.2419	0.2352	0.2273	0.2470	0.2627	0.2229	0.1993	0.1618
Portfolio (d)	-0.046**	-0.048**	-0.046**	-0.070**	-0.059**	-0.060**	-0.066**	-0.038**
	(-8.12)	(-8.86)	(-8.21)	(-10.91)	(-8.21)	(-12.99)	(-12.97)	(-14.25)
FICO < 620 (d)	-0.109**	-0.133**	-0.127**	-0.145**	-0.155**	-0.124**	-0.108**	-0.069**
	(-11.15)	(-18.42)	(-17.92)	(-23.61)	(-19.81)	(-15.24)	(-16.43)	(-12.51)
620 <= FICO < 680 (d)	-0.025**	-0.037**	-0.034**	-0.038**	-0.042**	-0.030**	-0.028**	-0.017**
	(-3.57)	(-8.01)	(-6.36)	(-8.01)	(-7.82)	(-6.41)	(-4.97)	(-4.37)
LTV	0.579**	0.280**	0.501**	0.535**	0.553**	0.401**	0.100**	0.055**
	(6.47)	(4.50)	(7.10)	(6.68)	(7.37)	(5.14)	(3.56)	(3.18)
LTV Squared	-0.405**	-0.163**	-0.342**	-0.361**	-0.373**	-0.265**	-0.035	-0.015
	(-5.73)	(-3.24)	(-6.20)	(-5.53)	(-6.16)	(-4.17)	(-1.45)	(-1.04)
Origination Amount	-0.003	0.000	-0.001	-0.003	0.001	0.007	0.003	0.009**
	(-0.47)	(0.08)	(-0.19)	(-0.84)	(0.09)	(1.08)	(0.62)	(2.21)
Origination Amount Squared	0.009	0.001	-0.002	-0.001	0.001	-0.011	-0.008	-0.016**
	(1.64)	(0.26)	(-0.28)	(-0.16)	(0.19)	(-1.52)	(-1.42)	(-2.12)
Original Interest Rate	0.015**	0.012**	0.020**	0.018**	0.021**	0.015**	0.013**	0.010**
	(6.71)	(5.40)	(9.89)	(8.89)	(8.44)	(9.01)	(9.04)	(8.13)
FIX (d)	-0.081**	-0.070**	-0.058**	-0.060**	-0.053**	-0.046**	-0.036**	-0.026**
	(-15.34)	(-12.52)	(-13.62)	(-13.93)	(-7.24)	(-10.27)	(-7.55)	(-6.97)
15 Year Term (d)	0.013	-0.047**	-0.074**	-0.060**	-0.108**	-0.028	0.114**	0.072*
	(0.48)	(-2.21)	(-3.12)	(-2.69)	(-5.50)	(-1.06)	(3.59)	(1.94)
20 Year Term (d)	0.022	-0.053	-0.073*	-0.074	-0.086	-0.104**	-0.046	-0.050**
	(0.35)	(-1.27)	(-1.88)	(-1.47)	(-1.32)	(-3.31)	(-0.87)	(-2.91)
No Insurance (d)	-0.018**	-0.016**	-0.002	0.004	0.013**	0.024**	0.014**	-0.002
	(-3.53)	(-2.81)	(-0.37)	(0.64)	(2.32)	(4.42)	(2.23)	(-0.59)
Insurance (d)	-0.019	-0.011	-0.015	0.009	-0.005	-0.019	-0.013	-0.004
	(-1.55)	(-0.98)	(-1.40)	(0.64)	(-0.27)	(-1.06)	(-0.99)	(-0.38)
Age at Delinquency	-0.085**	-0.096**	-0.109**	-0.135**	-0.163**	-0.136**	-0.127**	-0.097**
	(-13.51)	(-17.02)	(-26.89)	(-32.76)	(-44.74)	(-51.75)	(-60.27)	(-126.99)
MSA Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	35,365	46,279	46,636	44,904	42,789	42,050	37,008	29,939

Table 4: Logit Regression of Default Conditional on 60+ Days Delinquency (High Quality Loans)

This table reports the marginal effects of a logit regression. Coefficients on discrete variables represent the effect of moving from 0 to 1. Coefficients on continuous variables represent the effect of moving one standard deviation from the mean. The investor is the investor at the time of first 60+ days delinquency. Age at Delinquency is the age of the loan at the time of first 60+ days delinquency. The excluded variables are private investor, FICO >= 760, 30-year term and missing insurance information. Robust t-statistics are reported in parentheses. All loans in the sample are originated between 2005 to 2006. ***, ** and * represents significance at 1%, 5% and 10% respectively.

	2005 Q1	2005 Q2	2005 Q3	2005 Q4	2006 Q1	2006 Q2	2006 Q3	2006 Q4
Dependent Variable: Foreclosure Mean	0.2545	0.2508	0.2002	0.2101	0.2348	0.2044	0.1695	0.1367
Portfolio (d)	-0.039	-0.057**	-0.041**	-0.066**	-0.079**	-0.096**	-0.089**	-0.045**
	(-1.29)	(-3.04)	(-1.98)	(-3.85)	(-2.88)	(-4.81)	(-7.20)	(-3.25)
680 <= FICO < 720 (d)	-0.028	0.002	0.050*	0.027	-0.023	0.037	-0.028	0.010
	(-0.87)	(0.06)	(1.89)	(1.20)	(-0.59)	(1.27)	(-1.15)	(0.35)
720 <= FICO < 760 (d)	-0.005	0.024	0.113**	0.026	-0.013	0.046	-0.028	0.010
	(-0.15)	(0.76)	(2.49)	(1.05)	(-0.32)	(1.25)	(-1.25)	(0.33)
LTV	0.529**	0.007	0.448**	0.213**	0.236**	0.351**	0.112*	-0.045
	(2.37)	(0.10)	(4.71)	(2.07)	(2.04)	(2.00)	(1.85)	(-1.48)
LTV Squared	-0.439**	0.034	-0.355**	-0.143	-0.157	-0.281*	-0.067	0.058**
	(-2.19)	(0.55)	(-4.14)	(-1.56)	(-1.48)	(-1.74)	(-1.07)	(1.98)
Origination Amount	-0.055	0.008	0.003	0.057	0.006	0.025	0.009	0.059**
	(-1.48)	(0.65)	(0.18)	(1.51)	(0.33)	(1.18)	(0.54)	(2.14)
Origination Amount Squared	0.164**	-0.012	0.001	-0.162*	0.002	-0.025	-0.010	-0.070*
	(2.63)	(-1.48)	(0.09)	(-1.73)	(0.10)	(-1.23)	(-0.64)	(-1.80)
Original Interest Rate	0.022	0.036**	0.026**	0.034**	0.007	0.040**	0.015*	0.015**
	(1.45)	(3.53)	(2.57)	(3.53)	(0.74)	(3.58)	(1.96)	(2.37)
FIX (d)	-0.085**	-0.108**	-0.049**	-0.053**	-0.078**	-0.006	-0.036**	0.001
	(-3.71)	(-6.34)	(-2.35)	(-2.83)	(-3.15)	(-0.38)	(-2.32)	(0.08)
15 Year Term (d)	-0.040	-0.145**	-0.018	-0.103**	-0.067	-0.086	0.489**	0.040
	(-0.28)	(-3.03)	(-0.16)	(-2.31)	(-0.55)	(-1.23)	(2.12)	(0.43)
20 Year Term (d)		0.041	-0.074	-0.032				
		(0.32)	(-0.85)	(-0.31)				
No Insurance (d)	-0.014	-0.055**	-0.022	-0.041**	-0.006	0.011	-0.001	0.000
	(-0.58)	(-2.30)	(-1.22)	(-2.27)	(-0.25)	(0.39)	(-0.09)	(-0.01)
Insurance (d)	-0.040	-0.017	-0.024	-0.072**	0.091	-0.003	-0.028	-0.048**
	(-0.62)	(-0.45)	(-0.59)	(-2.89)	(0.93)	(-0.06)	(-0.62)	(-2.24)
Age at Delinquency	-0.100**	-0.104**	-0.109**	-0.121**	-0.183**	-0.139**	-0.130**	-0.089**
	(-6.40)	(-9.09)	(-18.96)	(-16.17)	(-23.29)	(-23.59)	(-35.71)	(-30.00)
MSA Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	1,758	2,631	2,123	1,978	1,555	1,826	1,518	905

Table 5: Logit Regression of Default Conditional on 60+ Delinquency and Weak Liquidation Laws (All Loans)

This table reports the marginal effects of a logit regression. Coefficients on discrete variables represent the effect of moving from 0 to 1. Coefficients on continuous variables represent the effect of moving one standard deviation from the mean. A state is classified as having weak liquidation laws if the average foreclosure processing time is greater than 117 days. The investor is the investor at the time of first 60+ days delinquency. Age at Delinquency is the age of the loan at the time of first 60+ days delinquency. The excluded variables are private investor, FICO >= 680, 30-year term and missing insurance information. Robust t-statistics are reported in parentheses. All loans in the sample are originated between 2005 to 2006. ***, ** and * represents significance at 1%, 5% and 10% respectively.

	2005 Q1	2005 Q2	2005 Q3	2005 Q4	2006 Q1	2006 Q2	2006 Q3	2006 Q4
Dependent Variable: Foreclosure								
Mean	0.1679	0.1554	0.1431	0.1585	0.1718	0.1350	0.1115	0.0727
Portfolio (d)	-0.044**	-0.036**	-0.033**	-0.049**	-0.023**	-0.035**	-0.032**	-0.011**
	(-5.64)	(-4.73)	(-6.37)	(-5.48)	(-2.40)	(-6.28)	(-7.90)	(5.25)
FICO < 620 (d)	-0.063**	-0.069**	-0.053**	-0.071**	-0.080**	-0.053**	-0.039**	-0.016**
	(-6.71)	(-9.53)	(-7.89)	(-11.07)	(-10.66)	(-7.22)	(-5.78)	(-5.68)
620 <= FICO < 680 (d)	-0.018**	-0.013**	-0.003	-0.017**	-0.016**	-0.017**	-0.010	-0.003
	(-2.50)	(-2.25)	(-0.52)	(-3.64)	(-3.21)	(-3.61)	(-1.46)	(-1.09)
LTV	0.300**	0.077**	0.167**	0.310**	0.186**	0.077*	0.046	0.011
	(3.99)	(2.01)	(4.57)	(7.99)	(4.13)	(1.74)	(1.61)	(1.17)
LTV Squared	-0.241**	-0.039	-0.126**	-0.252**	-0.141**	-0.047	-0.027	-0.003
	(-3.56)	(-1.13)	(-3.93)	(-7.28)	(-3.48)	(-1.18)	(-1.06)	(-0.28)
Origination Amount	-0.006	-0.006	0.000	-0.004	-0.004	0.009**	-0.001	0.000
	(-0.68)	(-0.88)	(0.03)	(-1.04)	(-0.73)	(2.29)	(-0.35)	(0.02)
Origination Amount Squared	0.012	0.007*	-0.002	0.002	0.000	-0.006**	-0.001	-0.002
	(1.49)	(1.79)	(-0.23)	(0.65)	(0.07)	(-2.68)	(-0.36)	(-0.33)
Original Interest Rate	0.017**	0.007**	0.017**	0.016**	0.021**	0.009**	0.004**	0.002*
	(4.40)	(2.24)	(5.80)	(6.24)	(6.32)	(3.94)	(2.74)	(1.78)
FIX (d)	-0.043**	-0.038**	-0.023**	-0.026**	-0.016**	-0.024**	-0.012**	-0.010**
	(-5.41)	(-6.12)	(-4.14)	(-5.47)	(-2.41)	(-5.45)	(-3.20)	(-4.03)
15 Year Term (d)	0.016	-0.016	-0.049**	-0.015	-0.001	-0.035	0.071*	0.053*
	(0.62)	(-0.65)	(-3.64)	(-0.62)	(-0.02)	(-1.27)	(1.81)	(1.89)
20 Year Term (d)	0.071	0.050	-0.051	-0.041				-0.008
	(0.78)	(1.00)	(-1.55)	(-0.89)				(-0.45)
No Insurance (d)	-0.009*	-0.017**	0.001	0.002	0.006	0.004	0.003	-0.003
	(-1.79)	(-2.35)	(0.20)	(0.36)	(0.97)	(0.70)	(0.58)	(-1.29)
Insurance (d)	-0.010	-0.011	-0.012	0.017	-0.009	-0.025**	-0.007	-0.005
	(-0.81)	(-1.04)	(-0.94)	(1.28)	(-0.75)	(-2.93)	(-0.66)	(-1.05)
Age at Delinquency	-0.077**	-0.081**	-0.081**	-0.094**	-0.118**	-0.090**	-0.071**	-0.040**
	(-20.13)	(-24.13)	(-18.26)	(-52.36)	(-64.09)	(-58.98)	(-66.25)	(-24.61)
MSA Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	13,217	17,249	16,679	15,746	16,087	16,290	14,273	11,872

Table 6: Logit Regression of Default Conditional on 60+ Delinquency and Tough Liquidation Laws (All Loans)

This table reports the marginal effects of a logit regression. Coefficients on discrete variables represent the effect of moving from 0 to 1. Coefficients on continuous variables represent the effect of moving one standard deviation from the mean. A state is classified as having tough liquidation laws if the average foreclosure processing time is less than or equal to 117 days. The investor is the investor at the time of first 60+ days delinquency. Age at Delinquency is the age of the loan at the time of first 60+ days delinquency. The excluded variables are private investor, FICO >= 680, 30-year term and missing insurance information. Robust t-statistics are reported in parentheses. All loans in the sample are originated between 2005 to 2006. ***, ** and * represents significance at 1%, 5% and 10% respectively.

	2005 Q1	2005 Q2	2005 Q3	2005 Q4	2006 Q1	2006 Q2	2006 Q3	2006 Q4
Dependent Variable: Foreclosure								
Mean	0.2865	0.2831	0.2745	0.2954	0.3181	0.2792	0.2554	0.2229
Portfolio (d)	-0.048**	-0.057**	-0.056**	-0.080**	-0.087**	-0.080**	-0.092**	-0.069**
	(-5.98)	(-7.87)	(-6.26)	(-8.93)	(-8.47)	(-10.81)	(-9.74)	(-12.82)
FICO < 620 (d)	-0.135**	-0.171**	-0.173**	-0.187**	-0.202**	-0.179**	-0.164**	-0.125**
	(-8.90)	(-16.70)	(-19.79)	(-24.46)	(-20.42)	(-15.88)	(-18.58)	(-13.13)
620 <= FICO < 680 (d)	-0.028**	-0.050**	-0.052**	-0.050**	-0.057**	-0.038**	-0.041**	-0.033**
	(-2.46)	(-8.11)**	(-7.60)	(-7.01)	(-7.45)	(-5.34)	(-5.53)	(-4.43)
LTV	0.431**	0.254	0.402**	0.329**	0.410**	0.366**	0.081**	0.065**
	(5.39)	(4.05)	(5.88)	(4.91)	(5.98)	(4.81)	(2.93)	(2.79)
LTV Squared	-0.329**	-0.168**	-0.307**	-0.232**	-0.300**	-0.269**	-0.020	-0.017
	(-4.76)	(-2.97)	(-5.14)	(-3.80)	(-4.91)	(-3.96)	(-0.78)	(-0.81)
Origination Amount	-0.006	0.002	-0.002	-0.003	0.004	0.002	0.006	0.021**
	(-0.66)	(0.22)	(-0.16)	(-0.52)	(0.41)	(0.15)	(0.68)	(2.30)
Origination Amount Squared	0.010*	0.000	-0.002	-0.002	0.002	-0.007	-0.010	-0.021**
	(1.75)	(-0.03)	(-0.25)	(-0.33)	(0.28)	(-0.75)	(-1.32)	(-2.11)
Original Interest Rate	0.020**	0.020**	0.033**	0.029**	0.032**	0.033**	0.031**	0.030**
	(5.05)	(4.62)	(7.80)	(6.57)	(6.25)	(8.87)	(9.44)	(10.60)
FIX (d)	-0.105**	-0.093**	-0.082**	-0.083**	-0.082**	-0.060**	-0.055**	-0.040**
	(-14.46)	(-11.54)	(-15.04)	(-12.74)	(-7.81)	(-8.63)	(-7.05)	(-5.56)
15 Year Term (d)	0.011	-0.072**	-0.090**	-0.093**	-0.183**	-0.024	0.138**	0.077
	(0.24)	(-2.47)	(-2.11)	(-2.97)	(-7.07)	(-0.63)	(3.41)	(1.27)
20 Year Term (d)	-0.025	-0.127**	-0.089	-0.094	0.005	-0.128**	0.006	-0.108**
	(-0.31)	(-2.56)	(-1.43)	(-1.21)	(0.03)	(-2.08)	(0.05)	(-3.97)
No Insurance (d)	-0.023**	-0.013*	-0.004	0.004	0.019**	0.043**	0.025**	0.001
	(-3.11)	(-1.80)	(-0.48)	(0.55)	(2.13)	(6.00)	(2.38)	(0.12)
Insurance (d)	-0.022	-0.006	-0.013	-0.003	0.005	0.008	-0.017	0.000
	(-1.08)	(-0.37)	(-0.87)	(-0.11)	(0.13)	(0.23)	(-0.66)	(-0.01)
Age at Delinquency	-0.089**	-0.108**	-0.134**	-0.166**	-0.201**	-0.181**	-0.183**	-0.168**
	(-9.15)	(-12.72)	(-24.09)	(-27.41)	(-31.80)	(-41.92)	(-34.35)	(-54.37)
MSA Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	22,122	29,013	29,953	29,125	26,662	25,703	22,694	18,035

Table 7: Logit Regression of Default Conditional on 60+ Days Delinquency and Weak Liquidation Laws (High Quality Loans)

This table reports the marginal effects of a logit regression. Coefficients on discrete variables represent the effect of moving from 0 to 1. Coefficients on continuous variables represent the effect of moving one standard deviation from the mean. A state is classified as having weak liquidation laws if the average foreclosure processing time is greater than 117 days. The investor is the investor at the time of first 60+ days delinquency. Age at Delinquency is the age of the loan at the time of first 60+ days delinquency. The excluded variables are private investor, FICO >= 760, 30-year term and missing insurance information. Robust t-statistics are reported in parentheses. All loans in the sample are originated between 2005 to 2006. ***, ** and * represents significance at 1%, 5% and 10% respectively.

	2005 Q1	2005 Q2	2005 Q3	2005 Q4	2006 Q1	2006 Q2	2006 Q3	2006 Q4
Dependent Variable: Foreclosure								
Mean	0.1374	0.1518	0.1182	0.1211	0.1267	0.1093	0.1102	0.0352
Portfolio (d)	0.015	0.005	0.004	-0.028	0.020	-0.015	-0.068**	-0.001
	(0.49)	(0.24)	(0.31)	(-1.43)	(0.66)	(-0.88)	(-5.17)	(-0.17)
680 <= FICO < 720 (d)	0.057*	0.011	0.011	-0.008	-0.017	0.033	-0.009	-0.001
	(1.86)	(0.38)	(0.80)	(-0.38)	(-0.82)	(1.24)	(-0.41)	(-0.22)
720 <= FICO < 760 (d)	0.079	0.021	0.048**	-0.006	-0.030**	0.052	-0.002	-0.001
	(1.38)	(0.54)	(2.21)	(-0.26)	(-2.29)	(1.00)	(-0.10)	(-0.11)
LTV	0.305**	0.009	0.190**	0.115	0.316**	-0.020	0.062	-0.007
	(2.03)	(0.13)	(2.35)	(1.14)	(3.78)	(-0.32)	(1.06)	(-1.02)
LTV Squared	-0.258*	0.002	-0.160**	-0.081	-0.256**	0.039	-0.050	0.010
	(-1.84)	(0.04)	(-2.28)	(-0.91)	(-3.44)	(0.62)	(-0.78)	(1.35)
Origination Amount	-0.039	-0.007	0.028	0.034	0.018	0.040	-0.001	0.028*
	(-1.50)	(-0.43)	(1.18)	(1.57)	(0.57)	(1.27)	(-0.03)	(1.72)
Origination Amount Squared	0.032**	-0.002	-0.113**	-0.047*	-0.045	-0.037	0.002	-0.044*
	(2.30)	(-0.12)	(-2.65)	(-1.81)	(-0.61)	(-0.99)	(0.14)	(-1.85)
Original Interest Rate	0.020*	0.019*	0.009	0.024**	0.013**	0.027**	0.004	0.000
	(1.74)	(1.66)	(1.40)	(1.97)	(1.99)	(3.47)	(0.71)	(0.58)
FIX (d)	-0.016	-0.019	-0.007	0.003	-0.022	0.002	-0.010	0.000
	(-0.79)	(-1.13)	(-0.71)	(0.13)	(-1.41)	(0.09)	(-0.82)	(0.07)
15 Year Term (d)	0.029							
	(0.20)							
20 Year Term (d)		0.123						
		(0.79)						
No Insurance (d)	-0.011	-0.047**	-0.024**	-0.029	0.007	-0.011	-0.044**	0.002
	(-0.52)	(-2.47)	(-2.37)	(-1.39)	(0.43)	(-0.62)	(-2.54)	(0.47)
Insurance (d)	-0.014	-0.032	0.004	-0.034*	0.076	-0.036**	0.014	-0.001
	(-0.29)	(-0.99)	(0.17)	(-1.66)	(0.99)	(-3.82)	(0.31)	(-0.18)
Age at Delinquency	-0.064**	-0.071**	-0.034**	-0.056**	-0.058**	-0.057**	-0.067**	-0.009*
	(-8.78)	(-7.69)	(-2.80)	(-9.44)	(-4.76)	(-10.08)	(-7.46)	(-1.76)
MSA Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	582	929	696	634	520	588	486	313

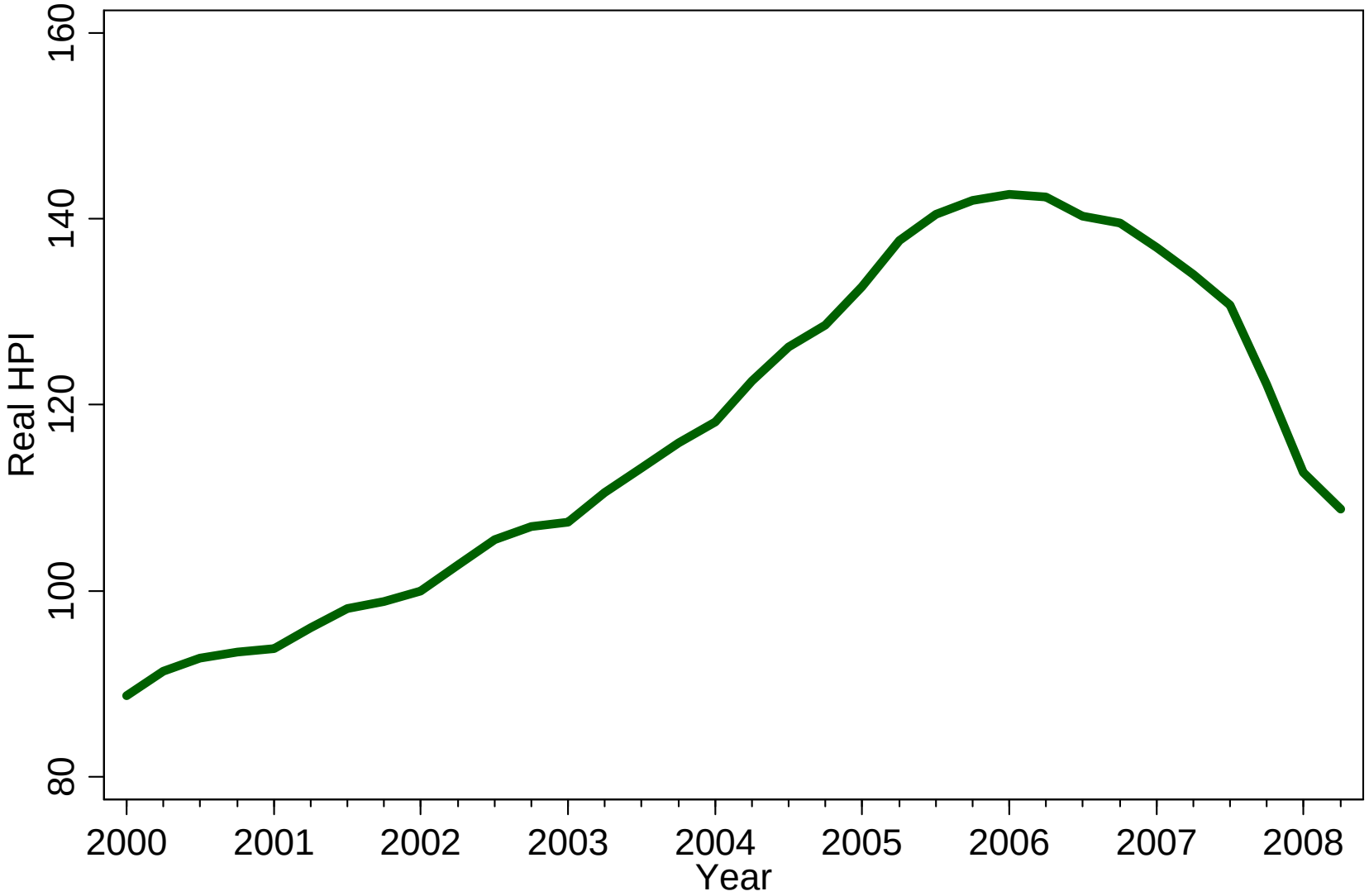
Table 8: Logit Regression of Default Conditional on 60+ Days Delinquency and Weak Liquidation Laws (High Quality Loans)

This table reports the marginal effects of a logit regression. Coefficients on discrete variables represent the effect of moving from 0 to 1. Coefficients on continuous variables represent the effect of moving one standard deviation from the mean. A state is classified as having tough liquidation laws if the average foreclosure processing time is less than or equal to 117 days. The investor is the investor at the time of first 60+ days delinquency. Age at Delinquency is the age of the loan at the time of first 60+ days delinquency. The excluded variables are private investor, FICO >= 760, 30-year term and missing insurance information. Robust t-statistics are reported in parentheses. All loans in the sample are originated between 2005 to 2006. ***, ** and * represents significance at 1%, 5% and 10% respectively.

	2005 Q1	2005 Q2	2005 Q3	2005 Q4	2006 Q1	2006 Q2	2006 Q3	2006 Q4
Dependent Variable: Foreclosure								
Mean	0.3189	0.3127	0.2468	0.2600	0.2959	0.2572	0.2028	0.2044
Portfolio (d)	-0.086**	-0.097**	-0.068**	-0.088**	-0.171**	-0.147**	-0.101**	-0.104**
	(-2.19)	(-3.16)	(-2.30)	(-3.32)	(-4.80)	(-4.75)	(-5.53)	(-4.04)
680 <= FICO < 720 (d)	-0.088**	0.005	0.064*	0.048	-0.028	0.024	-0.039	0.031
	(-1.97)	(0.14)	(1.68)	(1.37)	(-0.49)	(0.55)	(-1.04)	(0.53)
720 <= FICO < 760 (d)	-0.050	0.036	0.123*	0.051	0.019	0.031	-0.045	0.034
	(-1.12)	(0.84)	(1.85)	(1.33)	(0.29)	(0.63)	(-1.31)	(0.51)
LTV	0.649**	-0.025	0.522**	0.265*	0.276*	0.776**	0.200	-0.076
	(2.02)	(-0.28)	(4.09)	(1.75)	(1.74)	(4.47)	(1.58)	(-1.10)
LTV Squared	-0.538*	0.081	-0.405**	-0.173	-0.180	-0.680**	-0.129	0.093
	(-1.88)	(1.00)	(-3.58)	(-1.30)	(-1.22)	(-4.25)	(-1.05)	(1.43)
Origination Amount	-0.088	0.025	0.033*	0.067	-0.004	0.015	0.011	0.083
	(-1.11)	(1.20)	(1.65)	(0.99)	(-0.16)	(0.57)	(0.51)	(1.63)
Origination Amount Squared	0.339	-0.027*	-0.015	-0.221	0.022	-0.017	-0.012	-0.101
	(1.47)	(-1.91)	(-1.00)	(-1.18)	(1.04)	(-0.74)	(-0.54)	(-1.56)
Original Interest Rate	0.018	0.047**	0.030**	0.036**	-0.007	0.046**	0.022*	0.033**
	(0.86)	(3.23)	(2.02)	(2.92)	(-0.48)	(2.78)	(1.71)	(2.12)
FIX (d)	-0.137**	-0.177**	-0.072**	-0.089**	-0.104**	-0.003	-0.049**	0.005
	(-3.74)	(-7.23)	(-2.11)	(-3.47)	(-2.81)	(-0.14)	(-2.08)	(0.14)
15 Year Term (d)	-0.128	-0.190**	0.013	-0.141*		-0.137		0.037
	(-0.62)	(-1.98)	(0.06)	(-1.75)		(-1.60)		(0.25)
20 Year Term (d)		-0.015	-0.109	-0.032				
		(-0.09)	(-0.90)	(-0.21)				
No Insurance (d)	-0.011	-0.061	-0.008	-0.050*	-0.023	0.031	0.025	-0.002
	(-0.31)	(-1.64)	(-0.30)	(-1.83)	(-0.62)	(0.74)	(1.22)	(-0.05)
Insurance (d)	-0.039	-0.009	-0.080*	-0.097**	0.012	0.143	-0.061	-0.112**
	(-0.38)	(-0.15)	(-1.66)	(-2.31)	(0.11)	(1.31)	(-0.89)	(-2.84)
Age at Delinquency	-0.110**	-0.122**	-0.132**	-0.159**	-0.242**	-0.190**	-0.164**	-0.173**
	(-4.79)	(-7.55)	(-15.54)	(-12.25)	(-16.43)	(-19.82)	(-30.86)	(-20.28)
MSA Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	1,169	1,676	1,411	1,332	1,024	1,233	1,018	586

Figure 1: Real House Price Index

This figure reports the real House Price Index from the beginning of 2000 to second quarter of 2008. The figure clearly highlights the rapid increase in house prices from 2000 till about 2006 followed by a decline.



Current as of Quarter 2, 2008
Source: Case-Shiller and St. Louis Federal Reserve Economic Data
Real US Housing Price Index

Figure 2: Cumulative Prepayment Speeds

The figure presents the data for cumulative dollar balance of Voluntary Prepayments as a percent of the balance at the time of origination of the loans broken by Loan Age and Vintages. Voluntary Prepayments are described as the prior non-zero balance for those loans which paid out in full in the current month with a zero loss. Balance at the time of the origination is the original balance of all the loans that were originated in a particular vintage. As can be observed prepayment rates slow down radically in 2005 and 2006 as compared to periods immediately preceding this. This data is from 2001 to 2006 and comes from First American Loan Performance.

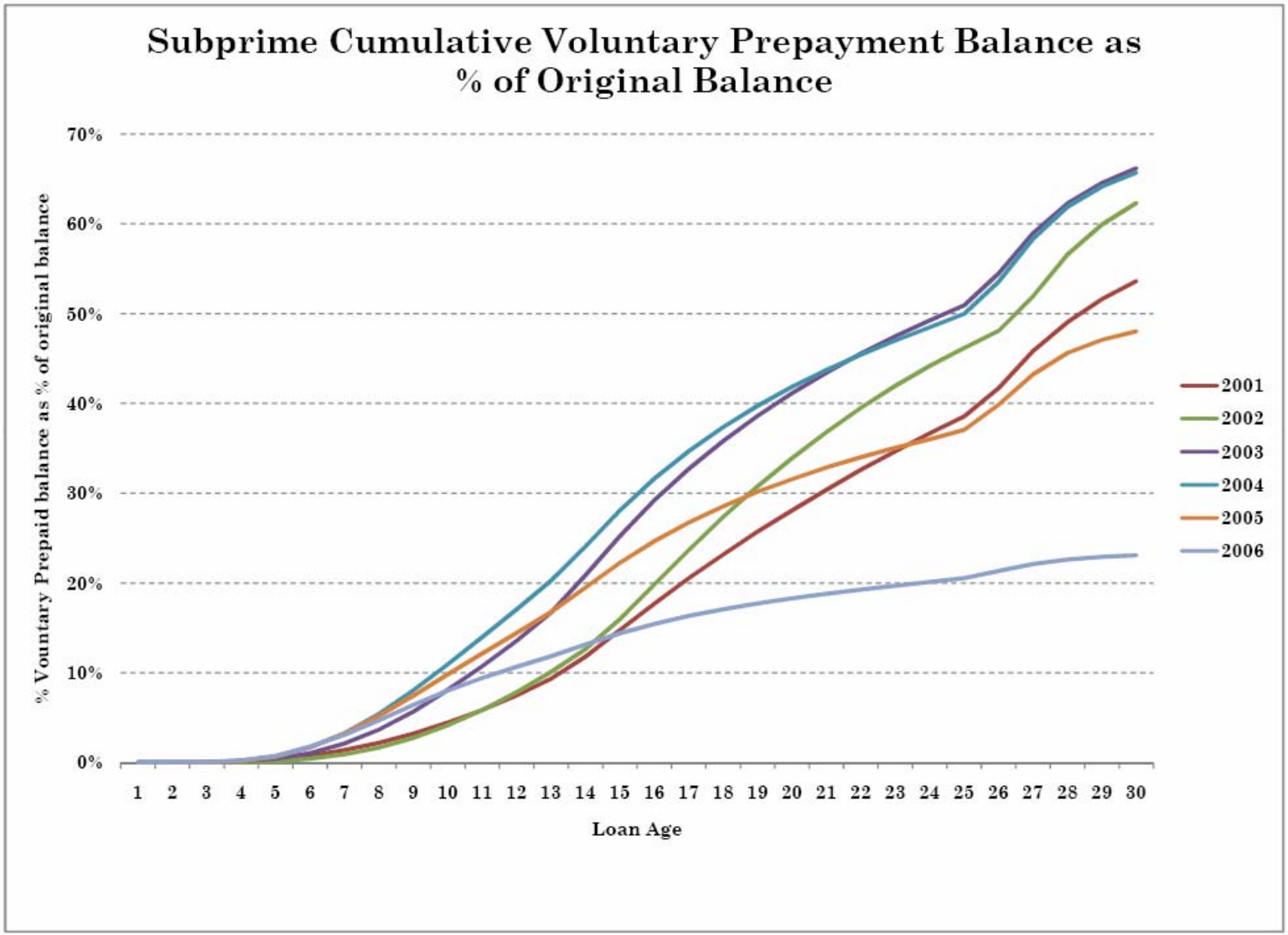


Figure 3: Estimates Using Credit Score *At* Time of Delinquency

This figure reports the estimate (marginals) on Portfolio dummy using a specification similar to Table 3. We use FICO scores *at the time* of delinquency instead of using credit scores at the time of origination as in Table 3. Also plotted in the graph are the 95% confidence interval bands around the estimate.