

THE FORTUNES OF DELINQUENT COMMUNITY REINVESTMENT LOANS

Lei Ding, Roberto G. Quercia, Janneke Ratcliffe

Center for Community Capitalism
University of North Carolina, Chapel Hill
May 2007

**PRELIMINARY DRAFT
PLEASE DO NOT CITE WITHOUT PERMISSION**

ABSTRACT

The rise of delinquencies and foreclosures in a softening housing market calls for systematic studies of default behavior and efforts to minimize the default risks of these affordable mortgage products. Using a unique sample of community reinvestment mortgages made to low- to moderate-income and minority borrowers, this paper examines the experience of a sample of moderately and seriously delinquent mortgages and the impact of proactive counseling efforts. Over time, a delinquent borrower can either remain delinquent or exit delinquency through curing, prepayment, loan modification, or foreclosure. The results from the multinomial logit model suggest that the type of loan termination is impacted by many factors including equity in the home, time in delinquency, prior delinquency, borrower race, loan size, and local economic conditions. Notably, receipt of post-purchase delinquency counseling is found to be associated with a higher probability of curing but only well-timed, situation-appropriate counseling is effective and efficient.

Key Words: mortgages, default, delinquency, foreclosure, counseling

1. Background

The issue of foreclosure and loss mitigation is particularly important in the low- to moderate- income (LMI) market. In recent years more LMI families have become homeowners partly because of the widespread popularity of “affordable” mortgage products featuring more flexible underwriting (Quercia, McCarthy, and Wachter, 2003). However, the efforts to promote homeownership among the LMI population are inevitably associated with a higher risk of mortgage default, as LMI borrowers typically have smaller equity cushions and higher debt to income ratios but face increasingly volatile income swings (Gosselin, 2004). When unexpected shocks, such as a sudden drop or loss of income or an increase in expenses, create either short- or long-term insolvency problems, default and foreclosure become real possibilities for the financially constrained borrowers. With interest rates going up and the previously overheated housing market cooling off in most regions in the U.S, many homeowners were falling behind on mortgage payments and facing possible foreclosure.¹ The rise of delinquencies and foreclosures in a softening market highlights the need for systematic studies of default behavior and efforts to minimize the foreclosure rates of affordable mortgage products.

This paper provides new evidence of the transition of serious delinquencies by examining the loan termination outcomes of a sample of delinquent community reinvestment mortgage loans (CRA mortgages). A number of recent studies have investigated loan termination outcomes and losses for conventional, FHA, and subprime loans. These include Ambrose and Capone (1996, 1998); Capone and Metz (2003); Philips and VanderHoff (2004); Gjaja and Wang (2004); Capozza and Thomson (2005, 2006); Cutts

¹ More homeowners were falling behind on mortgage payments in 2006, with the delinquency rate for residential mortgage stood at 4.95 percent of all loans outstanding in the fourth quarter of 2006 (Mortgage Bankers Association (MBA), 2007), a record high since the second quarter in 2003. The increase was driven primarily by subprime and FHA loans. The percentage of mortgages in the foreclosure process was a record high of 0.54 percent of all loans outstanding in the fourth quarter of 2006 (MBA, 2007). It was estimated that about 885,000 properties were in different stages of the mortgage foreclosure process in 2005 and this number climbed to more than 1.26 million in 2006 (RealtyTrac, 2007). In the subprime market alone, the Center for Responsible Lending projects 19.4% of subprime loans issued during 2005-2006 will end in foreclosure (Schloemer, et al., 2006).

and Green (2005); Danis and Pennington-Cross (2005a; 2005b); Pennington-Cross (2006); and Quercia, Stegman, and Davis (2007). However, most studies are limited in the variety of options that borrowers hold in delinquency and in the factors that may impact the loan terminations. In particular, very few studies specifically consider the performance of conventional mortgages associated with community reinvestment programs, which serve as an important point of entry into homeownership for low-income homebuyers and borrowers in low-income neighborhoods.

To comply with federal community reinvestment regulations, many banks have introduced mortgage products characterized by more flexible underwriting standards in order to increase the supply of mortgage credit to low- to moderate-income borrowers.² CRA mortgages often carry higher risk because of flexible underwriting standards, including relatively low down-payment requirements, allowance of higher debt to income ratios, use of nontraditional proofs of creditworthiness, flexible employment standards, or lack of private mortgage insurance. A few studies investigating delinquency behaviors among CRA borrowers suggest that the delinquency rate of CRA mortgages is comparable to that of FHA loans after excluding loans with low loan-to-value ratios (LTV) (Calem and Wachter, 1999; Quercia, Stegman, Davis, and Stein, 2002). Because of their novelty and lack of data, none of these early studies has tracked the final outcomes of CRA mortgages and little is known about the long-term viability of the homeownership opportunities that these affordable products provide.

Because of the relatively higher risk associated with CRA lending, home-buyer education and post-purchase counseling are often offered to contain possible credit risk and especially to minimize the probability of foreclosure among delinquent loans. However, an empirical analysis of the role of servicing during the default process has been missing in most literature on foreclosure since most studies have primarily focused on the borrower's option to default with little attention to foreclosure prevention or loss

² According to Avery, Bostic, and Canner (2000, p.717), a CRA-related loan was defined to mean “any loan made within the banking institution’s CRA assessment area to a low-or moderate-income borrower (less than 80% area median income, regardless of neighborhood income) or in a low- or moderate-income neighborhood (regardless of borrower income).” Assessment areas are areas where CRA-regulated lenders maintain deposit-taking operations.

mitigation efforts by servicers. In fact, the mortgage servicing industry has experienced dramatic changes and has made many innovations in programs and policies that help homeowners preserve their homes (see Cutts and Green, 2005; Reid, 2006).

Comprehensive pre-purchase counseling educates borrowers on how to find the right product, manage a budget, pay the mortgage in time, and maintain a home after the purchase. The proliferation of credit scoring tools also enables servicers to identify risky borrowers and employ communications to prevent early delinquent borrowers from falling farther behind. For seriously delinquent borrowers, servicers may offer intensive counseling services, helping borrowers evaluate their financial conditions and offering home retention workout plans or other alternatives to foreclosure. Servicing may play a significant role in foreclosure prevention and some strategies may be more cost-effective than others; however, there has been little convincing empirical evidence to support this view.

In a recent study, Stegman, Quercia, Ratcliffe, Ding, and Davis (forthcoming) test several preventive servicing-related propositions in the transition from early delinquency (30-day) to default (90-day) using a group of CRA loans. They find that the key indicators of default risk at the time of underwriting (e.g. credit score and LTV) are generally insignificant in predicting whether an already delinquent loan will default. The most important finding is that the likelihood that a delinquent mortgagor will ultimately default varies significantly across loan servicers, even after controlling for loan and borrower characteristics. However, their study did not investigate servicing's specific role in the transition from default to foreclosure.

To fill the gap in the early literature and extend the work of Stegman et al. (forthcoming), this study empirically examines the period between moderate or serious delinquency and loan termination using a unique sample of CRA loans made to LMI and minority borrowers. The impact of a proactive delinquency counseling practice is also investigated. This analysis contributes to the existing literature in several ways. First, we focus on a group of CRA mortgages with high LTV serving LMI borrowers exclusively. This is an important contribution since it is unclear whether conventional CRA loans behave differently over time than ordinary prime loans, FHA loans, or subprime loans.

Second, we rely on a rich dataset that includes borrower and loan information at origination and a complete monthly payment history for each individual loan. Finally, since we have data on some servicing-initiated practices, such as post-purchase counseling for some delinquent borrowers and loan modifications, we are able to consider these servicers' practices in our analysis. This is also an important contribution since the servicing side of the affordable housing system becomes more critical than ever with the proliferation of affordable lending products.

2. Literature Review

There has been extensive literature on residential mortgage foreclosure since the 1960s. As summarized by Quercia and Stegman (1992), early foreclosure studies can be classified into three categories: from the lenders' underwriting perspective, from the borrower behavior perspective, or from the mortgage investors' perspective. Literature has documented that the amount of home equity plays a central role in determining the probability of default: when the market value of the mortgage exceeds the market value of the home, the borrower has a financial incentive to default on the loan. Recent literature starts to consider the options of default and prepayment in a competing risk framework (e.g. Deng, Quigley, and Van Order, 2000; Pennington-Cross, 2003) and include measures of borrower credit risk and trigger events in their models (e.g. Deng and Gabriel, 2006). Early literature generally considers foreclosure a one-step decision for the borrowers and equates any mortgage default with foreclosure. Borrowers' options are usually limited to the choices of losing the home (foreclosure), paying off the mortgage (prepayment), or remaining active.

However, recent studies have started to recognize that mortgage default and foreclosure are two separate events, and foreclosure is only one possible outcome of a delinquency episode (e.g. Ambrose and Capone, 1996). Most of the previous studies on delinquency transition focus on the final outcomes of serious delinquencies (90-day delinquencies). In this framework, a borrower first decides to technically default on the mortgage by not making a scheduled mortgage payment or not paying in full. This may result from a decision to exercise the put option or from a temporary financial crisis that causes the

borrower to delay mortgage payments in order to finance other expenditures. Ambrose and Capone (1998) classify two groups of defaulters based on the level of equity in the homes: defaulted borrowers desiring to exercise the implicit put option because of negative equity (current loan-to-value (CLTV) >1), and those experiencing trigger events, who do not necessarily desire to lose their homes (CLTV ≤ 1). When a borrower becomes delinquent, lenders may threaten foreclosure or actually initiate the foreclosure procedure because of nonpayment,³ but the borrower can simply fully reinstate, or “cure,” the mortgage by paying in full the past due amounts and any fees incurred by the late payments.

Foreclosure is the second stage of a default process, and delinquency does not necessarily end in foreclosure. Delinquent borrowers with negative equity are more likely to enter foreclosure, but trigger event defaults can also lead to foreclosure if the trigger event defaulters are unable to raise enough cash either to reinstate or sell their property, even with positive equity in the home (Ambrose and Capone, 1998). In addition to foreclosure, which is quite costly not only for erstwhile homeowners but also for investors, local governments, and neighborhoods,⁴ delinquent borrowers have another set of options, such as paying off the mortgage by refinancing or selling the property, or some other alternatives to foreclosure that allow the borrower to retain the home and reinstate the mortgage over time. When a borrower is no longer able to afford the mortgage and a regular sale would be too costly, voluntary title transfer is another option. Studies using data on FHA or conventional mortgages identify that termination option values (home equity level), borrower characteristics, local economic and housing market condition, and state foreclosure legislations affect default resolution probabilities (Ambrose and Capone, 1998; Capone and Metz, 2003; Philips and VanderHoff, 2004).

³ In industry practice, lenders are usually allowed to begin the foreclosure proceedings when a loan is more than 90 days late.

⁴ As indicated in Cutts and Green (2005), the total costs for lenders might range from \$44,000 for voluntary title transfer alternatives to \$58,759 for loans went through the full formal foreclosure process range. Reid (2006) reported that losses for local municipalities range from \$400 to \$34,000 per foreclosure. Foreclosures also have negative impacts on neighborhoods since foreclosures may result in a decline in nearby property values and vacant properties can become sites of crime and distress.

In the subprime market, there is some evidence that delinquent subprime loans are more likely to become Real Estate Owned (REO) than other loan products but usually take much longer to get there. Capozza and Thomson (2006) find that 90-day delinquent subprime loans are about twice as likely as prime loans to become REO but take about four times longer to reach that level. Their results, based on a multinomial logistic approach, suggest that lenders are more likely to be tolerant when the delinquent borrower has made some payments, when the payment to income ratio is high, when general economic conditions are favorable, or when the interest rate premium is high. Another important finding is that borrowers in bankruptcy procedures would delay the foreclosure, but this delay seldom helps the delinquent borrowers cure their delinquency.

Pennington-Cross (2006) focuses on the outcomes of 5,000 subprime loans that were in the foreclosure process as opposed to loans that were 90 days delinquent. The possible outcomes considered are 1) cure, 2) worse delinquency, 3) foreclosure including REO, 4) paid off. The results show that about half the loans terminated and became REO and about one-third were paid off. The study shows that the type of termination and the duration of foreclosures are impacted by many factors including contemporaneous housing market conditions, the level of prior delinquency, and the state-level legal environment. The results from the multinomial mixed logit also confirm the existence of unobserved heterogeneity among delinquent borrowers. This study follows a similar framework as in the Pennington-Cross study.

Diverging from studies focusing on the transition from serious delinquency to foreclosure, another group of studies investigates the transition matrices among all possible states of delinquency. Gjaja and Wang (2004) of the Citigroup analyze the delinquency transitions of fixed and hybrid pools of subprime mortgages of varying seasoning and origination credit quality. They study the determinants of loan transition between simplified statuses, i.e. current, delinquent (60+ days), foreclosures, and REO. Their work confirms that the best predictors of the transition from current into delinquency are origination FICO and seasoning, while loan balance and current LTV more effectively predict recovery from foreclosure. However, they do not report the estimation procedure.

An analysis conducted by a large servicer (Sjaastad, Vinar, Jones, and Prahm, 2005) examines 23,000 delinquency transitions—from current to delinquent, from delinquent to foreclosure or to cure, and from foreclosure to cure—within subprime loans from several different servicers over about four years. The analysis validates the predictiveness of such factors as FICO score, LTV, loan age, and payment history for each transition type. The major new finding of their study is that, even controlling for these traditional factors, “servicers can have specific, strong impacts on transition rates and delinquency duration times” in subprime mortgages (Sjaastad et al., 2005, 16). But how these servicers make such a difference is still an open question and again the estimation procedure is not reported in the paper.

Danis and Pennington-Cross (2005a) model the probability of transitioning into various statuses using multinomial and nested logit models with a random sample of fixed-rate subprime mortgages from the LoanPerformance database. Their results show the impact of loan characteristics, trigger events (area unemployment), and financial incentives on the probability of transitioning into delinquency or termination. Their findings generally support traditional expectations (e.g., higher origination FICO is associated with lower probabilities of default) but also indicate that variables associated with delinquency are different from those associated with foreclosure. For example, higher LTVs appear to be associated more with missed payments than with foreclosures, which seems to contradict the theory of the “ruthless” default behavior of higher LTV borrowers.

Consistent with the conceptual framework underpinning the above studies, some recent efforts have examined the impact of servicer-initiated activities on foreclosure prevention and loss mitigation. Cutts and Green (2005) provide an excellent review of servicing literature and Freddie Mac’s innovations in loan servicing and loss mitigation. They use Cox’s hazard model to investigate the impact of repayment plans on foreclosure incidence and loss mitigation based on a sample of 148,050 Freddie Mac loans 18 months after they entered into different level of delinquency (60-, 90-, or 120-day). They find that borrowers who enter a repayment plan have much lower probability of home loss (80% lower for borrowers overall and 68% lower for LMI borrowers). For FHA loans,

Capone and Metz (2003) find that an introduction of loss mitigation programs successfully lowered the foreclosure rate.

Quercia, Cowan, and Moreno (2005) examine the cost-effectiveness of community-based foreclosure prevention interventions using two proxy measures: time to resolution and rate of recidivism. They use data from more than 8,000 delinquent borrowers (60+ days), of whom over 4,200 received intense case management, post-purchase counseling and/or assistance loans. Their findings suggest that community-based foreclosure prevention services are cost effective in terms of the two measures (time-to-resolution and recidivism). They also find that pre-purchase counseling is cost-effective as well.

Collins (2007) focuses on borrowers' perceptions and assessments of counseling. He analyzes counseling provided to delinquent borrowers, including the marginal effects of additional hours of counseling and the effect of different modes of counseling on the client's preferences for counseling and assessment of the usefulness of services received. The results suggest that borrowers receiving more hours of counseling perceive counseling more favorably than those receiving less counseling. Borrowers receiving more intensive counseling are also less likely to lose their home in foreclosure. However, because of the small sample size and short follow up period (six months), their results on the incidence of foreclosure are only "suggestive but not conclusive," as the authors indicate.

This study falls within the group of studies that examine the transition from serious delinquency to foreclosure and other final outcomes. Building upon the insights gained in previous studies, we examine the experience of a sample of delinquent CRA loans. We consider five possible outcomes of serious delinquency: remaining delinquent, cure, loan modification, prepayment, and foreclosure. This study further contributes to the literature by providing some insight into the role of servicing in the transition of delinquent loans.

3. Data and Methodology

Data for this study come primarily from a subset of CRA home purchase loans originated by a group of lenders under the Community Advantage Program (CAP). CRA loans are typically held in lenders' portfolios because many CRA borrowers meet neither the underwriting guidelines used by secondary mortgage market institutions in their standard or affordable loan purchases nor the underwriting guidelines for FHA loans. However, under the CAP program, participating lenders are able to sell nonconforming CRA mortgages to the Self-Help Ventures Fund (Self-Help), which then securitizes or sells them to Fannie Mae. CAP loans are characterized by flexible underwriting, usually little or no downpayment, high debt burdens, nontraditional proofs of creditworthiness, and sometimes no requirement for mortgage insurance. CAP borrowers are either low-income borrowers or LMI minority borrowers, or LMI borrowers in low-income or minority neighborhoods.⁵

A subset of 25,725 CAP loans originated from 1998 to 2004 is used in this analysis (Table 1). All CAP loans in this sample are fixed-rate home purchase loans, 99% of which have a 30-year amortization period. The loans do not feature prepayment penalties or balloons. The average note rate is 7.2% and the average loan amount is about \$90,000. Loans in this sample are characterized by high original LTV: over 76 percent of loans have an original LTV of 95% or higher and over 67 percent of 97% or higher. This sample of CAP borrowers is characterized by low credit scores and low household income: about 42 percent of borrowers have an origination credit score of less than 660 or have no credit score at all; the median household income at origination was \$30,456, and the median backend ratio was 37 percent. About 47 percent of borrowers are minorities. This sample of CAP loans is national in scope and includes loans originated in 49 states, with 22 percent of loans in North Carolina.

⁵ To qualify for the CAP program, borrowers must meet one of three criteria: (1) have income under 80 percent of the area median income (AMI) for the metropolitan area; (2) be a minority with income below 115 percent of AMI; (3) or purchase a home in a high-minority (>30%) or low-income (<80% AMI) census tract and have an income below 115 percent AMI.

As Table 2 shows, most CAP loans (77%) never experienced any delinquency during the study period of January 1, 2003 to September 1, 2006. About 11 percent (2,835) of the sample had experienced at least one 60+day delinquency and almost 8 percent (2,027) had experienced at least one 90+day delinquency. To prevent early delinquencies from falling further behind and to reduce the rate of home loss in foreclosure among serious delinquencies, Self-Help suggests a specific servicing timeline for its subservicers to follow through a delinquency process, as summarized in Figure 1. Servicers get involved in the very early stage of delinquency (less than 30-day delinquency). In addition, Self-Help has been working with selected servicers to refer 45-day delinquent borrowers for delinquency counseling offered by an independent consumer credit counseling company since late 2002. When a loan reaches the 90-day delinquency, it may be referred for foreclosure. Other servicing efforts include sending out mailings in different states of delinquency: a late payment notice when the payment is 16-day late, a borrower notice of local HUD counseling services on the 45th day, a loss mitigation alternatives letter on the 50th day, and a breach letter on the 61st day. Of course, as indicated in Stegman et al. (2006), servicers differ in their actual delinquency management processes.

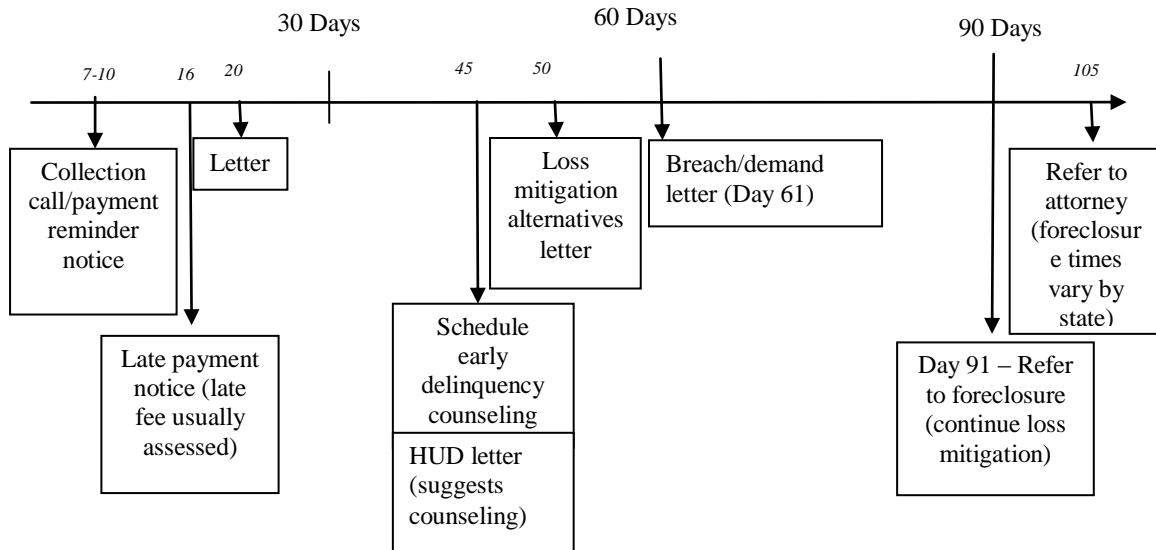


Figure 1 Self-Help’s Servicing Guideline⁶

Since lenders are usually not allowed to begin foreclosure proceedings until two payments are missed and the third is due, most previous studies have focused on the transition of 90-day delinquencies. However, since this analysis also reviews some default management effort for moderately delinquent loans, we focus on both moderately delinquent (60-day) and seriously delinquent CAP loans (90-day). Based on the payment history data, we are able to identify when a loan was 60 (or 90) days delinquent, which generates a “delinquency spell.” The delinquency spell starts from the first month that the loan was identified as delinquent (60-day or 90-day) during the study period and ends either the day the loan terminated or September 1, 2006, whichever comes first. Once a delinquent loan was cured, any subsequent 60-day (90-day) delinquency generated a new spell. We excluded delinquencies that occurred before 2003 which generally had no opportunity to receive the counseling service that began in late 2002. We also excluded loans that experienced their first 60-/90-day delinquencies after 2005, since they are too recent for us to observe their final outcomes. So, for each loan the period under examination is the first month during the study period that the loan was identified as

⁶ Beginning in 2007, loans that are 60-day delinquent, instead of 45-day, are referred for the early delinquency counseling.

delinquent (60-/90-day) until either the loan terminated or September 1, 2006 if the loan was still active.

After further excluding the loans that were returned to the original lenders⁷ and a few loans with missing data, we have a study sample of 1,380 90-day delinquency spells of 1,061 loans and 2,975 60-day delinquency spells of 1,688 loans. Most (78%) 90-day delinquent loans experienced 90-day delinquencies only once during the study period, while the remaining 22 percent experienced multiple 90-day delinquencies, with loans curing between delinquency spells. For 60-day delinquencies, 57 percent experienced only one 60-day delinquency during the study period, 24 percent experienced 60-day delinquencies twice, and the remaining 19 percent experienced 60-day delinquencies three or more times.

Each delinquency spell could be resolved in one of the following five ways:

CURED: The outcome of a spell is coded as “cured” if the delinquency status becomes current according to the payment records. The loans that were prepaid when they were current or in 30-day delinquency are also considered as “cured.”⁸

DELINQUENT: An active loan is considered “delinquent” if it was both active and delinquent (30+day) at the end of the study period.⁹

PREPAID (or “distressed prepayment”): If a loan was prepaid when it was 60+ days delinquent, it is considered a “distressed prepayment.”¹⁰

⁷ A number of delinquent loans (280 out of the 2,027 90-day delinquencies and 283 out of the 2,835 60-day delinquencies) were returned to the original lenders based on the “limited indemnity” rules, which require lenders to retain main recourse on the loan until 12 consecutive on-time payments are made. These delinquent loans were excluded from the analysis because Self-Help could not track their performance afterward. As a result, our study focuses on loans that had a generally good performance during the early stage after their originations (otherwise they would have been “returned”); this may be different from other studies where all the delinquent loans are included.

⁸ Since the payment history data suggests a number of early-stage delinquencies (30-day) may be driven by pending refinancing plans, we only treat as “distressed prepayments” those loans in moderate and serious delinquencies.

⁹ According to Self-Help, most of the borrowers in this category had filed for bankruptcy which allows them to remain in delinquency since foreclosure proceedings may not take place until after bankruptcies are settled. Unfortunately, we do not have a complete list of borrower who filed bankruptcy.

MODIFIED: If the terms of a mortgage loan were permanently changed and got approved by Self-Help, the outcome of the loan is recorded as MODIFIED. We treat loan modification as loan termination, even though we are still able to track a loan's performance after the modification.

FORECLOSURE: This category includes both loans for which the lender took title through foreclosure and pre-foreclosure sales, as they also result in the borrowers losing their home through title transfer.

As Table 3 shows, 46 percent of all 90-day delinquency spells cured. For the remaining 54 percent, the majority (29%) went into foreclosure, about 9 percent ended in distressed prepayment, 6 percent received loan modifications, and another 11 percent were still delinquent at the end of the study period. Among 60-day delinquencies, a much greater share cured (65%) and about 14 percent ended in foreclosure. The durations of delinquent spells vary significantly by the outcomes of the spell. The foreclosure process takes an average of 11 months after a loan is identified as 90-day delinquent, while the average duration for delinquencies that were cured or prepaid is about 8 months. On average, the 90-day delinquent borrowers that were still delinquent at the end of the study period had spent 25 months in delinquency. The spells that ended in foreclosure or remained in delinquency lasted much longer than those were cured, prepaid, or modified.

If we focus on the final outcomes of delinquent loans without considering those temporarily cured spells, among all 1,061 90-day delinquent loans in our sample, 395 (37%) went to foreclosure, 126 (12%) were prepaid (distressed prepayment), and 316 (30%) were cured. For the 1,688 60-day delinquent loans, 430 (25%) went to REO or foreclosure, 216 (13%) were prepaid (distressed prepayment), and 662 (39%) were cured. We notice that many seriously delinquent borrowers were able to pay off their mortgages, probably because of significant appreciation in the property value during the study period. Very likely these borrowers either refinanced or sold their homes to avoid foreclosure when they could not make their monthly payments. These borrowers

¹⁰ This term is from Dannis and Pennington-Cross (2005b), who find that delinquent borrowers are more likely to prepay than end in foreclosure and they call this type of prepayment "distressed prepayment."

inevitably experienced a loss in this process, since they were either forced to sell their houses or pay a higher interest rate on their new loans, such as subprime loans, because of their higher risk. As suggested in Schloemer, Li, Ernst, and Keest (2006), there might be a trade off between foreclosure rates and the rates of distressed prepayments since recent remarkable appreciation has increased the amount of equity in the homes and has enabled some delinquent borrowers to use this equity to refinance their mortgages or sell their houses. If there is no such strong appreciation many of the distress prepayments may find themselves in foreclosure instead.

Many factors may influence the outcomes of serious delinquencies. First, according to the option based theory, home equity plays a central role in determining the probability of foreclosure. If there is a substantial amount of equity in the home, the borrowers would be more willing to catch up with the mortgage payments or sell the house and pay off the loan to keep the equity, instead of waiting for foreclosure at which point all residual equity transfers to the lender. We calculate the value of the put option of a loan for each month using the unpaid mortgage balance and the estimated house price using the house price index (HPI) of the Office of Federal Housing Enterprise Oversight (OFHEO).¹¹ The value of the put option indicates the ratio of negative equity (unpaid balance minus estimated house price) to the original house price.

Second, to determine whether the call option is “in the money,” we compare the present discounted value of the current mortgage with the present discounted value of a prevailing market-rate mortgage.¹² Saving from refinancing is reported as a ratio, which

¹¹ Since the OFHEO house price index at MSA level is available quarterly, we assume each month in the same quarter has the same appreciation rate. If the property is located in an area outside of an MSA, we used state level HPI. Given the MSA house price index HPI_{i0} at origination and HPI_{it} in month t , the value of the put option for house i with an original purchase price P_{i0} can be calculated for each month, t .

$$put_{it} = \frac{(pb_{it} - P_{i0}) * (HPI_{it} / HPI_{i0})}{P_{i0}}$$

¹² Given the original balance of (OB_i), the term of the mortgage (TM_i), and the interest rate on the mortgage (R_i) for a fixed rate mortgage i , the monthly payments can be calculated:

$$PAY_i = R_i * OB_i \left[\frac{(1 + R_i)^{TM_i}}{(1 + R_i)^{TM_i} - 1} \right]$$

indicates the fraction of saving by taking a refinancing mortgage with the prevailing market rate. If interest rates have dropped significantly, which makes the call option substantially in the money, the borrower may have strong incentive to refinance. However, considering that these delinquent borrowers have a high credit risk because of their recent serious delinquencies, we would not expect that the delinquent borrowers would be able to respond to the prepayment option even when the call option is in the money.

Third, as Ambrose and Capone (2000) and Pennington-Cross (2006) suggest, past loan performance is predictive of future loan performance. We include a measure indicating the share of months in which a loan is in delinquency before reaching the 60-day or 90-day delinquency. On the one hand, prior extensive delinquency may indicate a higher credit risk for a borrower. But on the other hand, skilled borrowers may learn from previous successful delinquency experience and be less likely to end in foreclosure. We would expect that servicers may delay initiating foreclosure proceedings against habitually delinquent borrowers because they expect these borrowers to eventually catch up on their payments. Whether prior extensive delinquency increases foreclosure probability is an empirical question.

A borrower's ability to cure a delinquency or sell a property may also depend on local economic conditions. Delinquent borrowers in an area with a higher property appreciation should be more likely to retain their homes since they want to capture the home equity accumulated through past and future appreciation. We would expect

The future monthly payments (PAY_i) are then discounted by the interest rate (R_i) and prevailing interest rate (PR_i) separately. The Freddie Mac Primary Mortgage Market Survey (PMMS) is used to proxy for prevailing interest rates on prime, conventional, fixed-rate mortgages.

$$PDC_{cit} = \sum_{m=t}^{TM_i} \frac{PAY_i}{(1+R_i)^m} \qquad PDC_{rit} = \sum_{m=t}^{TM_i} \frac{PAY_i}{(1+PR_i)^m}$$

And the call option is defined as the difference in the present values of the payment stream at the mortgage note rate and the prevailing interest rate:

$$call_{it} = \frac{PDC_{rit} - PDC_{cit}}{PDC_{rit}}$$

See Deng, Quigley, and Van Order (2000) or Pennington-Cross (2003) for more details of the specification of the call option variable.

borrowers in regions with higher house price appreciation to be more likely to cure the delinquency or pay off the mortgages. The job market in a region may also impact delinquency outcomes, since delinquent borrowers are usually particularly vulnerable to negative trigger events, such as an unexpected job loss. We would expect that delinquent borrowers in a weak job market may be less likely to cure the delinquencies and more likely to end in foreclosure and distressed prepayments. To capture these local economic effects, we include the monthly area unemployment rate and the house price appreciation rate relative to the same quarter in the previous year as indicators of general economic conditions.¹³

In this analysis, we consider the variable of whether the property is located in a state requiring judicial foreclosure since, as the literature shows, a state's legal framework may have strong impacts on the outcomes of delinquencies and the duration of foreclosure spells (Phillips and VanderHoff, 2004; Pennington-Cross, 2006). Other variables considered in this analysis include loan size (measured by unpaid balance), time in delinquency (in months), and the borrower's race (black or non-black). Table 4 summarizes the descriptive statistics of the variables discussed above.

We use a multinomial logit to model outcomes with multiple possible states. In each month the loan can be in only one state or outcome (cured, delinquent, prepaid, modified, foreclosed, etc.). Since the sum of the probabilities of each outcome must equal one, the increase in the probability of one outcome necessitates a decrease in the probability of at least one competing outcome. Thus the multinomial logit model is a competing risk model (Allison, 1995). The probability of observing a particular loan outcome is given by:

¹³ Data on state unemployment rates are derived from Department of Labor: <http://www.bls.gov/lau/home.htm>. MSA house price appreciation rates are derived from Office of Federal Housing Enterprise Oversight (OFHEO): <http://www.ofheo.gov/HPI.asp>. If the property is located in an area outside of an MSA, we used the state-level house price index.

$$\Pr(y_{it} = j) = \frac{e^{\beta_j Z_{it}}}{1 + \sum_{k=1}^4 e^{\beta_k Z_{it}}} \quad \text{for } j = 1, 2, 3, 4$$

$$\Pr(y_{it} = j) = \frac{1}{1 + \sum_{k=1}^4 e^{\beta_k Z_{it}}} \quad \text{for } j = 0$$

where $j=0,1,2,3,4$ represents the five possible outcomes of a delinquency spell. Z contains a set of explanatory variables described above and β is the coefficient. Formally, the log-likelihood function is defined as:

$$\ln L = \sum_{t=1}^T \sum_{i=1}^n \sum_{j=0}^4 d_{ijt} \ln(\Pr(y_{it} = j))$$

where d_{ijt} is an indicator variable taking on the value 1 if outcome j occurs to loan i at time t and zero otherwise. We model the categorical outcomes using a multinomial logistic approach where the omitted category ($j=0$) is to remain in delinquent status. To control for the potential statistical problems associated with repeated events, we estimated the model using Stata's *mlogit* procedure with an adjustment to the standard errors for clustering by loan.

4. Empirical Results

Table 5 reports the results from the multinomial logit model on the transition of 60-day and 90-day delinquent loans. The possible outcomes include CURED, PREPAID, MODIFIED, and FORECLOSURE, where the category of DELINQUENT is set as the reference group. A positive coefficient means that the odds of the particular outcome rather than the reference group (remaining delinquent) increase as the independent variable increases; a negative coefficient means the odds decrease. In general, the reported results for 60-day delinquencies and 90-day delinquencies are similar in that coefficients for the explanatory variables are of the same signs and similar size. The notable differences include the significance of the time in delinquency variable (*dur*) for the outcome of foreclosure and the loan size variable (*lupb*) for the outcome of curing.

As expected, the results indicate that the amount of negative equity (or the value of the put option) has a significant impact on the risk of foreclosure. For both 60-day and 90-day delinquencies, borrowers with less or negative equity in the home are more likely to end in foreclosure vs. remain in delinquency. They are also more likely to undergo loan modifications, perhaps because this is the best option for a borrower with scant home equity who demonstrates a willingness and ability to retain his or her home. Conversely, for 60-day delinquencies, the results indicate that borrowers with more equity are more likely to prepay, relative to being delinquent. Generally, the results indicate that when there is low or negative home equity, delinquent loans are more likely to terminate through foreclosure or loan modification; when there is substantial equity in the home, delinquent borrowers are more likely to prepay.

The call option (*call*) does not have a significant effect on the probability of prepayment or foreclosure. As the call option is generally “in the money,” the probability of ordinary prepayments increases (e.g. Deng, et al., 2000). In contrast, the delinquent borrowers are unable to refinance their mortgages in the prime market and cure the delinquency because of their high credit risk, even when the call option is significantly “in the money.” Instead, these borrowers are more likely to be locked in delinquency and less responsive to the call option. The results suggest that the probability of “distressed prepayment” is more closely associated with local economic conditions, time in delinquency, equity in the home, and some borrower characteristics. The call option is inversely associated with the probability of curing or loan modification. One possible explanation is that a mortgage’s higher note rate may be regarded as a measure of credit risk, so borrowers holding loans with higher note rates may find it more difficult to receive loan modification or cure their delinquency.

The size of the unpaid balance also matters. Delinquent loans with relatively larger balances are more likely to be terminated through modification, rather than remain delinquent. The results based on the 60-day delinquencies also suggest that loans with larger balances are more likely to prepay but less likely to cure. Since there is usually a fixed cost associated with refinance, home sale, and loan modification, the relative cost

for loans with a larger unpaid balance should be lower; as a result, borrowers have a stronger incentive to payoff or modify the loans.

Previous delinquency behavior is a significant factor in predicting foreclosure and curing. After controlling for other factors, the frequency of prior delinquency is significantly and negatively correlated to the relative probability of foreclosure for delinquent borrowers. Loans that have been delinquent over longer periods prior to the current delinquency spells are less likely to terminate through foreclosure and more likely to cure relative to staying in delinquency. In other words, loans that are not delinquent for a long time but suddenly experience a serious delinquency (60-day or 90-day) are more likely to end in foreclosure than those that have lingered in delinquencies for some time. This result is in contrast with Pennington-Cross's (2006) finding that subprime loans that have been delinquent over longer periods are more likely to terminate through REO. One possible explanation is that borrowers who are able to recover from early delinquencies learn from their experience and are thus more likely to survive current delinquencies and avoid foreclosures. Another explanation is servicers' forbearance toward delinquent loans. Since servicers have shown considerable forbearance in the past, it is very likely that this pattern would continue.

For both 60-day and 90-day delinquencies, longer time in delinquency is found to be negatively associated with the probability of curing, prepayment, and loan modification. So a longer stay in delinquency is positively associated with the outcome of foreclosure or remaining in delinquency.¹⁴ This is understandable since the foreclosure process usually takes months or even years. Some recent studies also indicate the possibility that some mortgage borrowers are able to stop the foreclosure process and stay in mortgage delinquency for a long time by filing bankruptcy, especially by filing chapter 13 (Jacoby, 2007). The larger expenses incurred from a longer stay in delinquency would make it difficult for the borrower to cure the delinquency. Figure 2 illustrates the effect of time in

¹⁴ See detailed discussion about bankruptcy in (Jacoby, 2007) and Capozza and Thomson (2005). Many seriously delinquent loans were still active and delinquent at the end of the study period very likely because they filed bankruptcy which may automatically stop foreclosure proceedings until after bankruptcies are settled. Unfortunately, we could test this hypothesis empirically here since we do not have complete data on borrowers who filed bankruptcy.

90-day delinquency on the predicted probability of each outcome. The probability of each outcome is calculated with the estimated logit model and the mean value of all regressors (except *dur*). In 12 months, 43 percent of 90-day delinquencies would be cured, 17 percent of delinquencies would be foreclosed, while 31 percent are still delinquent.

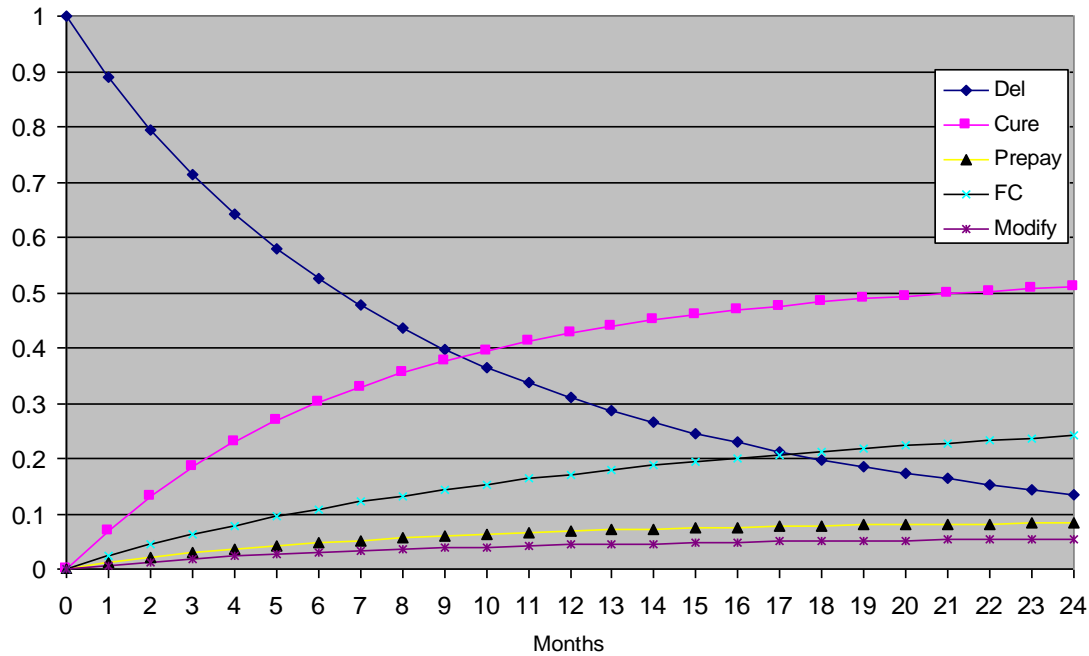


Figure 2 Time in 90-day delinquency and cumulative probability of outcome

Higher area housing appreciation rates are associated with higher probabilities of prepayment and loan modification. There is also some evidence that 60-day delinquencies in areas with higher appreciation are more likely to cure. In areas where property appreciation rates are high, delinquent borrowers are more likely to find alternatives to foreclosure to keep their home equity, including curing the delinquency, selling the home, or getting a loan modification. Area unemployment rates are positively associated with the probability of distressed prepayment and negatively associated with the probability of curing. In other words, relative to remaining in delinquency, higher unemployment rates lower the probability of curing and increase the probability of distressed prepayment. The results support our hypothesis that delinquencies in a weak job market are less likely to cure and are more likely to pay off the mortgages. When jobs

are difficult to find, delinquent borrowers may choose to remain in delinquency or go to foreclosure, and we do not find a significant difference in the impact of unemployment rates on the probability of these two outcomes.

Some other factors also matter. For example, seriously delinquent loans (90-day) in judicial foreclosure states are significantly less likely to cure, relative to remaining in delinquency. But we do not find any significant effects of state legal environment (judicial foreclosure requirement) on other outcomes of delinquency spells, such as foreclosure, prepayment, and loan modification. African Americans are significantly less likely to pay off the loan or go to foreclosure, relative to persisting in delinquency. It is possible that lenders tend to give minorities more time to work out their situation before commencing foreclosure. It is also possible that some unobserved characteristics are not captured by the model.

5. Servicing: Does Delinquency Counseling Help?

In this section, we examine one aspect of a lender/servicer-initiated strategy aimed at solving delinquency problems. In the traditional process, a borrower must take some initiative to get into a loss mitigation plan, either by contacting the servicer or a housing counselor, or by filling out an information packet, which the borrower receives by mail from the servicer. As CRA mortgages typically have higher credit risks because of the more flexible underwriting standards, servicers often offer proactive delinquency management programs. As Figure 1 shows, CAP borrowers may receive different levels of services during a delinquency process.

The focus of this analysis is the proactive delinquency counseling practice offered to a group of moderately delinquent borrowers. According to Self-Help, selected servicers (six servicers as of July 2006) refer all loans that go 45-day delinquent to an independent counseling company. Overall these servicers were handling 21 percent of all loans in this sample but they served 39 percent of all 60-day delinquencies. This is not surprising because Self-Help deliberately sought to provide delinquency counseling to portfolios with poorer performance. Loans managed by other servicers did not have the opportunity

to receive this counseling service. The counseling company is allowed to make up to three attempts to contact the borrower within 30 days of referral. We know the exact date and result of each contact. The result of contact may be:

- 1) borrower not reached;
- 2) contact, with brief introduction of counseling services;
- 3) longer conversation to help borrower assess financial information and tips on budgeting and debt management to avoid delinquency;
- 4) in-depth assessment, usually for an hour, of borrower's financial condition and options, and creation of a plan of action to get the borrower current.

We code the different levels of treatment 1, 2, 3, or 4, with treatment 1 being "none," since the servicer could not contact the borrower and the borrower received no counseling service. Treatment 2 is "contact only," since there was only a brief conversation and no intensive counseling. Treatment 3 and treatment 4 are very similar and are considered "counseling."

Not all referred borrowers can be reached and, moreover, not all borrowers who can be reached receive intensive counseling service. According to Self-Help, 1,435 loans were referred through July 1, 2006 and about 33 percent of the referred loans received more intensive counseling services. It is also possible that a borrower was contacted by the servicer several times, usually because the borrower experienced multiple 45-day delinquencies. Thirty-nine percent of the referred loans were referred once, while the rest were referred multiple times: 9.4 percent were referred twice, the remaining 42 percent were referred three or more times, and the total number of referrals was over 4,000. Because of serial referrals and different servicer practices, many borrowers were contacted at some point other than 45-day delinquency. For example, since the counseling company is allowed to contact the borrower within 30 days of referral, the

delinquency status may have been changed from 45-day delinquency by the time the borrower was actually contacted.¹⁵

Our focus is the impact of proactive counseling service on the transition of loans that had ever been 60-day delinquent during the study period. One interesting question here is whether proactive counseling services help the curing of 60-day delinquencies – that is, are delinquent borrowers who received intensive counseling more likely to reinstate or cure than similarly situated borrowers who do not receive the same service? Since a borrower may receive counseling services both before and after s/he enters into a 60-day delinquency, we would expect to find different effects of counseling depending on when the services are received. We created two set of dummy variables to indicate whether a borrower had received counseling services (*counsel_bef/contact_bef*) before the current 60-day delinquency spell or during the delinquency spell (*counsel_spell/contact_spell*). For borrowers that received multiple treatments, we used the highest level of treatment. Delinquent borrowers that were not referred are classified as “none.” To capture the unobserved heterogeneity for the servicers participating in the counseling program, we created a dummy for loans served by these servicers.

On the one hand, we would expect that the loans that received counseling service before the onset of delinquency would have a higher probability of curing than those that did not, since borrowers who were counseled in advance should have better knowledge and thus be better able to handle delinquencies. On the other hand, since this pre-delinquency counseling did not prevent delinquency, we might also expect that it would not help the borrowers cure the delinquency. However, counseling received during the current delinquency spell is expected to increase the probability of cure and reduce the risk of foreclosure, since a timely delinquent counseling should be more effective. Intensive counseling is also expected to be more effective than mere contact in helping borrowers assess their financial conditions and options.

¹⁵ We could not identify the 45-day delinquent loans based on our monthly dataset since our monthly records cannot identify the exact date of delinquency. What we can know is the number of months the borrower had missed making regular payments at the beginning of each month. According to our records, many delinquencies had already progressed to 60-day delinquencies at the time of contact, while others were current or 30-day delinquent when they were actually reached.

Among the 2,975 60-day delinquent spells, 924 (31%) were referred for counseling, among whom 238 (8%) were contacted only and 350 (12%) received intensive counseling services as of July 2006. Table 6 shows the outcomes of delinquency spells by when the counseling were received and by the different levels of counseling. For spells that had been counseled before the current delinquency, the prepayment and foreclosure rates are lower, but many of them (23%) were still delinquent at the end of the study period. Their curing rate for the counseled group is similar to that of the “contacted only” and the “none” groups (65%, 65%, and 66% respectively). Delinquencies that received intensive counseling service during the spells had a higher curing rate (72%) than those that did not receive any counseling service (65%) or those were contacted only (68%). But the delinquency and foreclosure rates are similar across different levels of counseling services. The descriptive statistics tentatively suggest that delinquent spells receiving prior counseling are more likely to stay in delinquency while spells receiving counseling after delinquency are more likely to cure.

Table 7 shows the results from the multinomial logit models which incorporate the counseling variables. The first model (left) only considers the impact of counseling services received before the current delinquency spell (*counsel_bef* and *contact_bef*). The other model (right) considers the impact of counseling services received after the onset of 60-day delinquency (*counsel_spell* and *contact_spell*). After introducing three counseling variables, the results for the other variables are generally consistent with the model without considering the new variables. The results of the servicer dummy variable (*program*) indicate that the delinquent loans served by the participating servicers are generally less likely to cure and prepay than loans served by other nonparticipating servicers, very likely because of the unobserved heterogeneity for these portfolios and servicer practices.

As to the impact of counseling, the coefficients for *counsel_bef* and *contact_bef* are insignificant except for a slight significance (at 0.1-level) on the outcome of distressed prepayment, suggesting that there is no significant indication of prior counseling curing probability and foreclosure risk. Although we could not observe the final outcomes for some delinquent loans, as they are still active, it seems that prior delinquency counseling

does not significantly improve the curing rate or reduce the foreclosure risk. However, when we focus on the counseling services received after the 60-day delinquency, we find significant evidence that intensive counseling service (*counsel_spell*) increases the probability of curing. For borrowers who received intensive counseling service, the odds of curing are 26 percent higher than for those that did not, relative to remaining in delinquency. The impact of the counseling practice “contact only” (*contact_spell*) is found to be insignificant for all outcomes. The difference in the results of these two models suggests that counseling services have a significant impact on curing only if the borrower receives the counseling after the delinquency. We also tried a few interactions of different counseling variables (such as *counsel_bef*counsel_spell*) and the results suggest that multiple treatments do not necessarily increase the curing probability.¹⁶ One possible explanation is that prior counseling services are not so effective in curing the current delinquencies. Borrowers would not have entered the new delinquencies if counseling had prevented early delinquent borrowers from falling further behind or had successfully reduced the risk of recidivism. Another explanation is that the effectiveness of counseling may diminish with time. The results also confirm the effectiveness of intensive counseling over a brief contact during a delinquency spell. Generally, the results support our hypothesis that counseling services provided immediately after the delinquency is incurred are effective in increasing the curing probability, but the same is not necessarily true for prior counseling or multiple treatments.

At the same time, we do not find significant evidence that loans that received counseling services are less likely to end in foreclosure or distressed prepayment; which may partly be due to the very small sample size and the relatively short observation period. It should also be noted that there might be some endogeneity issues in this analysis, since not all delinquent loans were referred for counseling and the treatment group was not selected randomly. The difference in the propensity to receive counseling services among the

¹⁶ When the interaction variable of *counsel_bef*counsel_spell* is added, its coefficient is negative and significant. Results not listed in Exhibit 9 but will be available upon request.

referred borrowers also makes it difficult to isolate the impact of counseling services. Further research may be needed to solve these problems.

6. Conclusion

The proliferation of community reinvestment mortgages with expanded eligibility criteria has enabled more LMI families to become homeowners. At the same time, increased lending to households with limited financial resources raises the likelihood of higher default rates. Current alarm over soft housing values and a rising tide of foreclosures are further reinforcing the need for systematic analysis of mortgage delinquency and strategies to preserve homeownership. With a unique dataset of CRA mortgages serving LMI borrowers, this paper empirically examines factors impacting the transition between delinquency and foreclosure, and investigates the impact of a delinquency counseling service designed to increase cure rates.

We found that within the CRA mortgage portfolio, which features high original LTV's, high debt to income ratios, modest incomes, and often less-than-stellar credit, the majority of mortgages that went delinquent did not result in foreclosure. In fact, 63% of serious (90-day) delinquencies found some solution other than foreclosure.

By following the transitions of the delinquent loans, we found several alternatives to foreclosure: curing, loan modification, extended delinquency, and distressed prepayment. Further, we identified factors that influence the paths of moderately (60-day) and seriously delinquent loans. Home equity plays a predominant role in determining who is more likely to reach foreclosure or seek a modification (those with less equity), or who will prepay (those with more equity). Strong housing appreciation may explain how a significant number of the delinquent borrowers (12% for 90-day and 13% for 60-day delinquencies) were able to pay off their mortgages. Loan payment history also affects outcomes: the longer the delinquency spell lasts, the more likely the loan will end in foreclosure and the less likely to cure. However, loans that have had more prior delinquencies are actually less likely to end in foreclosure, possibly because of lenders' forbearance and borrowers' learning curve effect. In markets with higher unemployment,

curing probabilities drop measurably and distressed prepayments increase, while foreclosures and modifications are not impacted. In sum, seriously delinquent, affordable loans can follow a variety of courses, and the ultimate fortune of these delinquent loans is impacted by a number of factors. Loss prevention interventions should take into account.

The research further explored the effectiveness of one such intervention strategy. Based on a sample of moderately delinquent loans, we do find some evidence that proactive counseling service successfully increases the probability of curing. Success appears to depend on timing; that is, counseling should address an active delinquency situation. Repeated counseling appears to have diminishing returns. These findings suggest that well-timed, situation-appropriate counseling is more effective and efficient in increasing the curing probability. This preliminary analysis does not find significant evidence that the counseling service has reduced the probabilities of foreclosure or distressed, which may partly be due to the small sample size and the relatively short observation period. While this study only focuses on the impact of counseling on 60-day delinquencies, further research would benefit from a more comprehensive analysis of the delinquency counseling program and an evaluation of the cost-benefit of counseling services provided in different stages.

Efforts to promote homeownership among LMI households will only be successful if accompanied by measures to control default rates and increase curing rates for borrowers already reaching delinquency. With the proliferation of credit scoring tools and the introduction of different home retention workout plans, servicers may interact with borrowers at several different stages during the life of a mortgage loan. This study provides some preliminary evidence but further studies are still needed to evaluate the effectiveness of servicing practices in different stages of the delinquency process.

References

Allison, P. D. *Survival analysis using the SAS system: A practical guide*. Cary, NC: SAS Publishing, 1995

Ambrose, B. W., and C. A. Capone. Do lenders discriminate in processing defaults? *CityScape*, 1996, 2:1, 89-98.

- Ambrose, B. W. and C. A. Capone. Modeling the conditional probability of foreclosure in the context of single-family mortgage default resolutions. *Real Estate Economics*, 1998, 26:3, 391-429.
- Ambrose, B. W. and C. A. Capone. The Hazard Rates of First and Second Foreclosure. *Journal of Real Estate Finance and Economics*, 2000, 13,105-20.
- Avery, R. B., R. W. Bostic, and G. B. Canner. CRA Special Lending Programs. *Federal Reserve Bulletin*, 2000, 86 (November), 711-31.
- Capone, C. A. and A. Meltz. Mortgage Default and Default Resolutions: Their Impact on Communities. Federal Reserve System Community Affairs Research Conference, Washington, D.C. March 27-28, 2003, Accessed April 2, 2007 at: http://www.chicagofed.org/cedric/files/2003_conf_paper_session2_capone.pdf
- Calem, P. S., and S. M. Wachter. Community reinvestment and credit risk: Evidence from an affordable-home-loan program. *Real Estate Economics*, 1999, 27:1, 105–134.
- Capozza, D. R., and T. A. Thomson. Optimal stopping and losses on subprime mortgages. *The Journal of Real Estate Finance and Economics*, 2005, 30:2, 115-131.
- Capozza, D. R., and T. A. Thomson. Subprime transitions: Linger or malingering in default? *Journal of Real Estate Finance and Economics*, 2006, 33:3, 241-258
- Collins, J. M. Exploring the design of financial counseling for mortgage borrowers in default. *Journal of Family and Economic Issues: A thematic issue on consumer finance*. Expected June 2007.
- Cutts, A. C., and R. K. Green. Innovative servicing technology: Smart enough to keep people in their houses? In *Building assets, building credit: Creating wealth in low-income communities*, edited by N. P. Retsinas and E. S. Belsky. Washington, DC: The Brookings Institution. 2005
- Danis, M. A., and A. Pennington-Cross. The delinquency of subprime mortgages. Working Paper 2005-022A, The Federal Reserve Bank of St. Louis. 2005a
- Danis, M. A., and A. Pennington-Cross. A dynamic look at subprime loan performance. *Journal of Fixed Income*, 2005b, 15:1, 28-39.
- Deng, Y., J. M. Quigley and R. Van Order. Mortgage terminations, heterogeneity and the exercise of mortgage options. *Econometrica*, 2000, 68, 275–307.
- Deng, Y., and S. Gabriel. Risk-based pricing and the enhancement of mortgage credit availability among underserved and higher credit-risk populations. *Journal of Money, Credit and Banking*, 2006, 38:6, 1431-1460.
- Gjaja, I. M., and J. J. Wang. Delinquency transitions in subprime loans: Analysis, model, implications. *Citigroup Asset-Backed Securities* March 17, 2004.
- Gosselin, P. G. The poor have more things today – Including wild income swings. *Los Angeles Times*, 12 December, 2004, Accessed April 2, 2007 at: <http://www.latimes.com/business/la-fi-poor12dec12,0,5347390.story?coll=la-home-headlines>.

Jacoby, M. B. Bankruptcy Reform and Homeownership Risk, *University of Illinois Law Review*, 2007, 323.

Mortgage Bankers Association (MBA). Delinquencies and Foreclosures Increase in Latest MBA National Delinquency Survey. March 13, 2007, Accessed April 2, 2007 at: <http://www.mortgagebankers.org/NewsandMedia/PressCenter/50974.htm>.

Pennington-Cross, A. Credit history and the performance of prime and nonprime mortgages. *Journal of Real Estate Finance and Economics*, 2003, 27:3, 279-301.

Pennington-Cross, A. The duration of foreclosures in the subprime mortgage market: A competing risks model with mixing. Working Paper, 2006, Accessed April 2, 2007 at: <http://research.stlouisfed.org/wp/2006/2006-027.pdf>.

Phillips, R. A., and J. VanderHoff. The conditional probability of foreclosure: An empirical analysis of conventional mortgage loan defaults. *Real Estate Economics*, 2004, 32:4, 571-587.

Quercia, R. G., and M. A. Stegman. Residential mortgage default: A review of the literature. *Journal of Housing Research*, 1992, 3:2, 341-376.

Quercia, R. G., M. A. Stegman, W. R. Davis, and E. Stein. The performance of community reinvestment loans: Implications for secondary market purchases. In *Low-income homeownership: Examining the unexamined goal*, edited by N. P. Retsinas and E. S. Belsky. Washington, DC: The Brookings Institution. 2002

Quercia, R. G., G. W. McCarthy, and S. M. Wachter. The impacts of affordable lending efforts to homeownership rates. *Journal of Housing Economics*, 2003, 12, 29-59.

Quercia, R. G., S. M. Cowan, and A. B. Moreno. The cost effectiveness of community-based foreclosure prevention. 2005. Accessed April 2, 2007 at: http://www.fhfund.org/_dnld/reports/MFP_Full-Report.pdf

Quercia, R. G., M. A. Stegman, and W. R. Davis. The impacts of predatory loan terms on subprime foreclosures: The special case of prepayment penalties and balloon payments. *Housing Policy Debate*, 2007, Forthcoming.

RealtyTrac. More than 1.2 Million Foreclosures Reported in 2006. Accessed 5 February 2007 at <http://www.realtytrac.com/ContentManagement/Library.aspx?ChannelID=9&ItemID=1855&acct=64847>

Reid, C. Preventing Foreclosure-Initiatives to Sustain Homeownership. *Community Investments* December 12, 2006, 10-14

Schloemer, E., W. Li, K. Ernst, and K. Keest. Losing ground: foreclosures in the subprime market and their cost to homeowners. Center for Responsible Lending Working Paper, 2006, Accessed 5 February 2007 at: <http://www.responsiblelending.org/pdfs/CRL-foreclosure-rprt-1-8.pdf>.

Sjaastad, J. E., J. Vinar, P. Jones, and J. Prahm. Delinquency dynamics: Servicer effects. *The Marketpulse*, 2005, 1, 1-16

Stegman, M., R., G. Quercia, J. Ratcliffe, L. Ding, and W. R. Davis. Preventive servicing is good for business *and* affordable homeownership policy. *Housing Policy Debate* (forthcoming)

Table 1
Descriptive Statistics of Origination Info for CAP Loans
Originated between January 1, 1998 and December 31, 2004

Number of Loans: 25,725		
Variable	Percent	Mean
Credit Score		
No Credit Score or missing	8.51%	
FICO < 620	13.42%	
FICO 620-659	20.40%	
FICO 660-719	30.12%	
FICO >=720	27.55%	
Loan Characteristics		
LTV		93.30%
Backend Ratio		36.25%
Origination Amount		\$89,903
Note Rate		7.16%
Borrower Characteristics		
Female Borrower	44.10%	
African-American Borrower	19.22%	
Hispanic Borrower	21.32%	
First-Time Homebuyer	41.04%	
Income at Origination		\$33,268
Geography		
Non-metropolitan Location	18.08%	
NC	21.64%	
CA	14.86%	
OK	8.77%	
FL	7.28%	
OH	7.25%	
Other States	40.20%	
Origination Year		
1998	9.27%	
1999	8.59%	
2000	13.77%	
2001	23.73%	
2002	18.78%	
2003	12.91%	
2004	12.96%	

Source: Self-Help Community Advantage and authors' calculations. Loans that were terminated before January 1, 2003 were excluded. Sample size may differ for different variables because of missing data.

Table 2
Worst Delinquencies during the Study Period (01/01/2003- 09/01/2006)

	Number of Loans	Percent
Never Delinquent	19,846	77.2%
30+ Days	5,879	22.9%
60+ Days	2,835	11.0%
90+ Days Delinquent	2,027	7.9%
120+ day Delinquent	1,599	6.2%
Total	25,725	

Source: Self-Help Community Advantage and authors' calculations

Table 3
Outcomes of Delinquencies

	Outcome of Delinquency Spells (as of September 1, 2006)			
	90-day Delinquencies		60-day Delinquencies	
	Frequency	Percent	Frequency	Percent
Cured	635	46.0%	1948	65.5%
Distressed PIF	126	9.1%	216	7.3%
Loan Modification	79	5.7%	94	3.2%
Foreclosure	395	28.6%	430	14.5%
Delinquent	145	10.5%	287	9.7%
Total	1,380	100%	2,975	100%

Source: From Self-Help and authors' calculations.

Table 4 Descriptive Statistics

Delinquency	Variable	Mean	Std. rr.	Min	Max	Description	
90-day delinquency: 1,061 loans; 1,380 spells 13,319 loan months	call	0.17	0.07	-0.09	0.39	call option	
	put	-0.31	0.21	-2.79	0.46	put option: (unpaid balance-house price)/original price	
	lupb	11.07	0.39	6.30	12.51	unpaid balance (in log)	
	af_american	0.42	0.49	0	1	African-American borrower share of observed months loan was delinquent prior to the 90-day delinquency	
	delinq	0.41	0.22	0.03	1	property in Judicial foreclosure state	
	judicial	0.32	0.47	0	1	state	
	dur	11.64	10.77	1	76	months after 90-day delinquency	
	unemp_rate	5.67	0.92	3.00	10.40	state unemployment rate	
	hpi_a	5.59	4.80	-3.13	43.32	MSA [†] house price appreciation rate: appreciate rate relative to the same quarter in the previous year	
60-day delinquency: 1,689 loans; 2,975 spells; 22,925 loan months	call	0.16	0.07	-0.10	0.39	call option	
	put	-0.31	0.21	-2.79	0.46	put option: (unpaid balance-house price)/original price	
	lupb	11.06	0.40	6.30	12.51	unpaid balance (in log)	
	af_american	0.43	0.49	0	1	African-American borrower share of observed months loan was delinquent prior to the 60-day delinquency	
	delinq	0.37	0.21	0.03	1	property in Judicial foreclosure state	
	judicial	0.29	0.46	0	1	state	
	dur	10.18	10.33	1	77	months after 60-day delinquency	
	unemp_rate	5.68	0.97	3.00	12.10	state unemployment rate	
		hpi_a	5.86	5.14	-3.13	43.32	MSA [†] house price appreciation rate: appreciate rate relative to the same quarter in the previous year
		counsel_spell	0.07	0.25	0	1	intensive counseling service during delinquency spell
		contact_spell	0.06	0.24	0	1	contacted only by servicer during delinquency spell
		counsel_bef	0.08	0.27	0	1	ever received counseling before the current delinquency spell
		contact_bef	0.06	0.23	0	1	ever contacted only by servicer before the current delinquency spell
		program	0.48	0.50	0	1	whether servicer participating the counseling program

Source: From Self-Help and authors' calculations.

[†]If the property is located outside an MSA, the state house price index is used.

Table 5
Multinomial Logit Model
Probability of Loan Modification/Cure/Prepay/Foreclosure vs. Remaining Delinquent

Risk	Variable	90-day		60-day	
		Coefficient	Std error	Coefficient	Std error
Cured	call	-2.292***	0.652	-1.520***	0.366
	put	-0.304	0.242	-0.186	0.164
	lupb	-0.158	0.124	-0.155**	0.067
	af_american	-0.206**	0.094	-0.121**	0.055
	delinq	0.813***	0.183	0.446***	0.120
	dur	-0.052***	0.005	-0.065***	0.004
	judicial	-0.256**	0.102	-0.033	0.061
	unemp_rate	-0.098**	0.047	-0.063**	0.028
	hpi_a	0.004	0.012	0.016**	0.006
Prepaid	call	-1.663	1.715	-1.241	1.183
	put	-0.227	0.555	-0.802**	0.380
	lupb	0.098	0.287	0.559**	0.249
	af_american	-0.750***	0.231	-1.109***	0.188
	delinq	0.299	0.436	-0.020	0.346
	dur	-0.044***	0.015	-0.036***	0.011
	judicial	-0.350	0.226	-0.136	0.168
	unemp_rate	0.246**	0.107	0.221***	0.075
	hpi_a	0.076***	0.019	0.054***	0.013
FC	call	-0.962	0.787	-0.665	0.734
	put	1.484***	0.410	1.618***	0.409
	lupb	-0.101	0.141	-0.033	0.137
	af_american	-0.686***	0.127	-0.715***	0.121
	delinq	-1.670***	0.284	-2.410***	0.315
	dur	0.007	0.005	0.031***	0.004
	judicial	-0.104	0.114	-0.023	0.109
	unemp_rate	-0.061	0.065	-0.080	0.060
	hpi_a	0.006	0.018	-0.010	0.018
Modified	call	-2.886*	1.611	-2.680**	1.444
	put	1.921**	0.793	2.148***	0.793
	lupb	0.764**	0.325	0.760***	0.289
	af_american	-0.335	0.263	-0.252	0.231
	delinq	0.333	0.537	-0.092	0.544
	dur	-0.036***	0.011	0.002	0.008
	judicial	-0.106	0.268	-0.096	0.247
	unemp_rate	0.008	0.121	0.064	0.109
	hpi_a	0.062**	0.028	0.068**	0.027
	Log likelihood	-5280.7***		-10071.7***	

Note: *** significant at 0.01 level; ** significant at 0.05 level; * significant at 0.1 level.
Please refer to Table 4 for a detailed description of the variables.

Table 6 Delinquency Counseling and Outcomes

	Counseling Received before 60-day Delinquency Spell			Counseling Received during 60-day Delinquency Spell		
	None	Contacted Only	Counsel ed	None	Contacted Only	Counsel ed
Cured	65.5	65.4	65.2	64.9	67.9	72.1
Distressed PIF	8.1	2.2	2.2	7.7	3	4.4
Loan Modification	3.3	1.7	2.6	3.4	2.4	0.6
Foreclosure	15.3	12.3	7.3	14.6	14.9	12
Delinquent	7.8	18.4	22.8	9.4	11.9	10.9
Total spells (#)	2,563	179	233	2,624	168	183

Note: based on a group of 2,975 60-day delinquent spells of 1,689 Community Advantage Program (CAP) loans during January 1, 2003 to September 1, 2006.

Table 7 Impact of Counseling on 60-day Delinquencies

	Variable	Coefficient	Std error	Variable	Coefficient	Std error
Cured	counsel_bef	-0.098	0.097	counsel_spell	0.233**	0.097
	contact_bef	-0.094	0.098	contact_spell	0.176	0.107
	program	-0.112*	0.061	program	-0.172***	0.060
	call	-1.412***	0.370	call	-1.440***	0.371
	put	-0.237	0.164	put	-0.207	0.165
	lupb	-0.163**	0.068	lupb	-0.167**	0.068
	af_american	-0.089	0.056	af_american	-0.100*	0.056
	delinq	0.453***	0.120	delinq	0.435***	0.120
	dur	-0.065***	0.004	dur	-0.066***	0.004
	judicial	-0.077	0.065	judicial	-0.065	0.065
	unemp_rate	-0.059**	0.028	unemp_rate	-0.047*	0.028
hpi_a	0.013**	0.007	hpi_a	0.014**	0.007	
Prepaid	counsel_bef	-0.811*	0.470	counsel_spell	0.041	0.375
	contact_bef	-0.873*	0.510	contact_spell	-0.449	0.468
	program	-0.343**	0.176	program	-0.447**	0.175
	call	-0.960	1.150	call	-0.933	1.163
	put	-0.875**	0.373	put	-0.837**	0.380
	lupb	0.484**	0.240	lupb	0.497**	0.243
	af_american	-0.963***	0.191	af_american	-1.004***	0.193
	delinq	-0.005	0.350	delinq	-0.092	0.350
	dur	-0.036***	0.011	dur	-0.034***	0.011
	judicial	-0.262	0.167	judicial	-0.254	0.168
	unemp_rate	0.212***	0.080	unemp_rate	0.225***	0.080
hpi_a	0.045***	0.013	hpi_a	0.047***	0.013	
FC	counsel_bef	-0.045	0.253	counsel_spell	-0.092	0.226
	contact_bef	0.258	0.217	contact_spell	-0.027	0.219
	program	0.026	0.124	program	0.056	0.121
	call	-0.704	0.741	call	-0.693	0.739
	put	1.673***	0.415	put	1.623***	0.410
	lupb	-0.038	0.138	lupb	-0.037	0.137
	af_american	-0.722***	0.122	af_american	-0.718***	0.122
	delinq	-2.410***	0.321	delinq	-2.396***	0.316
	dur	0.031***	0.004	dur	0.031***	0.004
	judicial	-0.008	0.119	judicial	-0.005	0.119
	unemp_rate	-0.080	0.061	unemp_rate	-0.085	0.061
hpi_a	-0.009	0.018	hpi_a	-0.009	0.018	
Modified	counsel_bef	0.244	0.447	counsel_spell	-1.625	1.034
	contact_bef	-0.269	0.612	contact_spell	-0.134	0.538
	program	-0.396	0.265	program	-0.293	0.267
	call	-2.298	1.491	call	-2.213	1.484
	put	2.039***	0.790	put	1.964**	0.778
	lupb	0.721**	0.291	lupb	0.713**	0.288
	af_american	-0.193	0.229	af_american	-0.162	0.227
	delinq	-0.164	0.561	delinq	-0.130	0.551
	dur	0.003	0.008	dur	0.003	0.008
	judicial	-0.218	0.262	judicial	-0.237	0.261
	unemp_rate	0.079	0.112	unemp_rate	0.054	0.113
hpi_a	0.061**	0.029	hpi_a	0.058**	0.028	
	Log likelihood	-10059.1***			-10057.7***	

Note: *** significant at 0.01 level; ** significant at 0.05 level; * significant at 0.1 level.