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Valentina Hartarska and Claudio Gonzalez-Vega

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Credit Counseling and Mortgage Termination by Low-Income Households

Valentina Hartarska and Claudio Gonzalez-Vega *

Abstract

Published research on credit counseling and mortgage termination is surprisingly scarce, despite substantial growth in this industry. While the purpose of counseling is to help low-income borrowers to handle better debt, and thus prevent default, counseling could also improve these borrowers understanding of their financial positions and thus affect prepayment. This paper shows that evaluations of counseling programs with a narrow focus on default may miss an important effect that counseling may have on prepayment. We use a competing risks framework to study the effects on both default and prepayment of a counseling program implemented in several Mid-West states. Our results indicate that the default hazard was not lower for the graduates of the counseling program but that the prepayment hazard was higher. Overall, counseling seems to affect lenders' profits but the net effect should be evaluated both in terms of prepayment and default.

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* Valentina Hartarska is Assistant Professor in the Department of Agricultural Economics and Rural Sociology, Auburn University, 210 Comer Hall Auburn, AL 36849, Phone: 334-844-5666, Fax: 334-844-5639, Email: hartarska@auburn.edu; Claudio Gonzalez-Vega is Professor and Director of the Rural Finance Program, Department of Agricultural, Environmental and Development Economics, The Ohio State University, 2120 Fyffe Road, Ag. Administration Building, Columbus, OH 43210, Phone: 614-292-6376, Fax: 614-292-7362, Email: gonzalez.4@osu.edu. Financial support for this research was provided by Paul Taylor & Associates and Fannie Mae.

Credit Counseling and Mortgage Loan Termination by Low-Income Households

1. Introduction

Many lending initiatives, usually termed "affordable lending" promote lending to low-income households by using flexible underwriting guidelines and new mechanisms for risk mitigation such as counseling. The ostensible purpose of credit counseling is to help low-income borrowers estimate better the amount of debt they would be able to service and, thus, prevent default. Counseling, however, improves low-income borrowers' understanding of their financial position as well as their understanding of mortgage loan markets and, therefore, it may have an affect on borrower prepayment.

Counseling is a growing industry but little is known about its effectiveness. Previous studies have focused primarily on homeownership, default and delinquency, but none have explored how credit counseling may simultaneously affect both default and prepayment. Understanding how counseling may affect prepayment is important, because the cost of a mortgage loan includes a significant premium to compensate for prepayment risk. Some evidence suggests that low-income households have higher default hazards but lower prepayment hazards, perhaps because their propensity refinance is dampened by income and collateral constraints and because, financially, these households are less endowed and less sophisticated (Archer, Ling and McGill*,* 1996; Peristiani, Bennett, Monsen *et al.,*1997; Goldberg and Harding, 2003).

This paper studies the effect of counseling on both prepayment and default by adopting a competing risks approach to mortgage termination. Using data on a counseling program implemented in several, mainly Mid-West, states during the 1991-2000 period, we explore the idea that counseling affects borrower behavior and that counseled borrowers may default less often but may also prepay more often than non-counseled borrowers. The results suggest that the counseling program examined indeed graduates borrowers who differ in both prepayment and default patterns. The findings also show that a narrow focus on the effects of counseling on default may provide misleading results on the overall effectiveness of various programs.

2. Discussion of the literature

At present, there is no systematic body of research that clearly demonstrates that counseling influences default on mortgage loans (McCarthy and Quercia, 2000). Studies of counseling programs in California in the mid- and late-1970s show both positive and no effect on homeownership rates, and a study of counseling programs in Detroit shows long–term negative effects of counseling on default (Mallach, 2001). There is evidence that credit counseling improves the subsequent use of credit, but this result cannot be readily extended to home purchase counseling, which often deals with both the housing and the financing decisions (Mallach, 2001; Ellienhausen, Lundquist, and Staten, 2003).

Counseling programs vary by method of delivery, desired outcomes, characteristics of the counselors (stake in the transaction and qualifications), and program content. In terms of content, credit counseling programs usually include topics on credit issues and financing including financing of a home. Homeownership counseling programs include these topics but may add topics such as finding a home and maintaining the property. This complexity requires that the research methodology be adjusted to address the specific characteristics of each program.

The lack of published research is also due to data scarcity. In 2000, Price Waterhouse Coopers abandoned a project to study the effectiveness of counseling after a feasibility study concluded that lenders either do not collect or collect very limited data about borrowers who have undergone counseling (Mallach, 2001). Data availability is an important issue because even when such data are available, they are often proprietary and, thus, less accessible to external researchers. In addition, since many affordable loan programs require counseling as part of the loan qualification requirement, is it hard to find an adequate control group.

This is one of the challenges that Hirad and Zorn (2002) encounter in their, to date, most comprehensive study on the effectiveness of homeownership counseling. They use a sample of 40,000 mortgages originated under the Freddie Mac's Affordable Gold program to assess how pre-purchase homeownership counseling affects delinquency rates. As a quasi-control group they use loans in the Affordable Goal loans that qualified for exemption from counseling. The qualities of these borrowers that made them qualify as an exception may, the authors state, make them somewhat different from the counseled borrowers. Hirad and Zone attempt to control for this endogeniety by using a nested logit model and find that after this correction counseling still decreases the 90 day delinquency rate and that different type of counseling vary in their effectiveness.[1] However, after these adjustments the study fails to confirm the effectiveness of some types of counseling like individual in person counseling and home-study counseling.

Hirad and Zorns' study focuses on delinquency and uses a logit model, where the explanatory variables are controls for counseling, borrower characteristics, and loan and property characteristics. Quercia and Watcher (1996) suggest that innovative methodology to study the effectiveness of counseling would come from recent developments in the literature on default. The modern literature on default views default as the exercise of an option.

According to option-based theory, the decision to terminate the mortgage (through default or prepayment) is a purely financial decision, independent of the housing decision. The value of a mortgage loan consists of the present value of scheduled payments by a borrower and the value of the options granted to the borrower to terminate the mortgage either by prepayment or default. When deciding on how to act on the loan obligation, a borrower faces several choices. The borrower has the choice to (1) make the payment on the loan and continue in good standing as a debtor, (2) pay in full the remaining balance on the loan, by refinancing (prepayment, or call option), or (3) surrender the house to the lender in exchange for cancellation of the debt (put, or default option). Thus, prepayment and default are two actions that borrowers undertake to increase their wealth.

Furthermore, a series of papers developed the theoretical arguments that emphasize the importance of the *jointness* of the prepayment and default options (Kau, Keenan, Muller *et al.,* 1992 and 1995). At least partially, this development was motivated by the observation that default rates predicted by the option theory differed from observed default rates. Failure to exercise the default option, researchers reasoned, could indicate that borrowers may expect that this option could have even higher value in the future. Moreover, borrowers may not exercise the default option when it is in-the-money because they may expect that in the future the prepayment option would be more valuable.

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[1] Without adjustment for endogeniety, Hirad and Zorn (2002) find that delinquency rates were the lowest in individual homeownership counseling programs, followed by classroom counseling, with telephone counseling being least effective.

As a result of these theoretical developments, mortgage termination is now being specified in a competing risks framework, where the values of the prepayment and default options are included and where borrower heterogeneity, trigger events and transaction costs are controlled for (Deng, 1997; Deng and Gabriel, 2002; Deng, Quigley and Van Order, 2000; Clapp, Goldberg, Harding *et al.,* 2001; Pavlov, 2001; and Archer, Ling and McGill, 2003).

A competing risk approach is appropriate to study the effect of credit counseling because counseling may improve the borrowers' level of financial sophistication, as it introduces concepts such as the present value of money and annualized interest rates. As interest rates and property values change, borrowers who have undergone counseling may have a better understanding of how these changes affect the value of their loan obligations. This better knowledge may improve the borrowers' ability to "price" their options. At the same time, counseling may improve creditworthiness of borrowers who already are financially sophisticated and thus more likely to prepay. If this is the case, lenders need to be aware that the potential benefit of lower default rates must be weighted against the potential cost of higher prepayment rates. Thus, exploring its effects on both prepayment and default will most fully account for the consequences of counseling.

3. Description of the credit counseling program

The Community Mortgage Loan Program studied here was part of a larger Community Centered Banking program, organized by a major bank in Columbus, Oh to fulfill this bank's CRA requirements and provide financial services to underserved communities. This larger program targeted low-to-moderate income households who did not routinely use the banking system and who typically were declined loans. The objectives of the Community Centered Banking program were to improve the integration of the financial products offered in a community and to enhance opportunities available to low-to-moderate income households. The program was organized in collaboration with Community Churches and a local consulting firm with experience in implementing community outreach programs.[2] Potential clients were approached through a series of seminars organized by the Community Churches. Through this program, low-income households gained access to a full range of banking services—checking and savings accounts, student and consumer loans, and educational services.

As the bank learned more about the financial needs of the target population, it identified a substantial need for mortgage loans and the *Community Mortgage Loan Program* (CML) was initiated in 1992. The purpose of this program was to provide cost-efficient mortgage loans to low-income households, in a fashion profitable to the bank. The program was designed for this specific market. Borrowers could get mortgage loans for up to $75,000 with a down payment of the lesser than 5 percent of the loan or $1,000 down payment with gifts and grants accepted as alternative source of down payment.[3] The bank offered eased credit restrictions, one percent origination fee, no discount points, the bank could also negotiate to pay mortgage insurance, and when applicable, it would pay for counseling services. To cover its costs the bank charged interest rate of 150 points above the Fannie Mae 60 days average rate on 80% LTV conforming loans.

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[2] The community churches and the outreach consulting firm collaborated not only on the CCB project where the bank was their third partner but also in other areas such as education, employment, alcohol and substance abuse, healthcare, community relations and crime. This collaboration relied on and improved the social capital in the community and helped the bank recruit more creditworthy borrowers (Hartarska and Gonzalez-Vega, 2003).

[3] In 12 cases, the bank granted loans bigger than $75,000 to customers recruited through the Community Churches.

At the beginning of the program, counseling was not available in all regions, or at all times in areas where the bank was organizing seminars and offering its services and therefore some borrowers received counseling and some did not. In fact, according to the bank representatives counseling services were offered quite randomly prior to 1996 because of the lack of systematic agreements with counsel providers and because of various pressures to fulfill lending targets. Since 1996 Fannie Mae became a partner in the program by offering to buy non-delinquent loans seasoned for at least three years. Since 1996, counseling became an obligatory part of the qualification for mortgage loans with this program. All borrowers recruited through the seminars organized in collaboration with Community Churches were required to meet with a counsel provider at lest once.

Counseling was provided by the Consumer Credit Counseling Services (CCS), an organization with several decades of experience. They offered a product based on proximity to, and knowledge of, the potential clientele. To address the specific needs of each borrower, the amount of counseling was individually determined. Each potential borrower provided preliminary information, on the basis of which a counselor determined how many sessions each person had to attend. Counseling included some traditional topics such as improving spending habits, correcting problems on non-sufficient funds checks, improving the use of credit, debt consolidation. Potential clients discussed with a counselor where they lived, whether they have changed job or income. Depending on the client, counseling could last sometimes up to 2 years.[4]

Some parts of the counseling program were different from the traditional counseling offered by the CCS. On recommendations of the consulting firm that helped bring together Community Churches and the bank, counselors focused on the cash flows of potential borrowers. Potential borrowers learned how to keep track of their living expenses, measure their level of debt, and calculate whether the expected mortgage loan could be sustainable. Graduation from the counseling program was granted only to those participants who, given an interest rate and a loan amount, could generate zero or positive cash flow, based on a thorough verification and calculation of their actual living expenses and debt. Loan amounts adjusted by these criteria do not always correspond to those resulting from the standard financial ratios used as a screening device.[5] Households who cannot become homeowners did not graduate from the counseling program and were not able to get mortgage loan. Graduation made borrowers eligible to apply for a loan at the bank and the bank had a final say in who is granted a credit and who is denied.

The Community Mortgage Program also combined counseling with some financial assistance. If the borrower could not afford the lesser than five-percent or $1,000 down payment, she was granted a consumer loan to make this possible. The extra debt was accounted for in the calculation of the household cash-flow constraints.

The expertise of the counselors, combined with a conservative approach to maximum sustainable debt estimation could be important advantages of counseling in reducing defaults. Since the program improved low-income households understanding of the way mortgage loans affect their welfare, counseling may have affected prepayment behavior as well.

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[4] All counseling was pre-purchase counseling, the focus was on the credit side of the mortgage loan and counseling did not include topics on responsibilities of homeowners.

[5] In the absence of credit scoring methods, the estimation of standard debt ratios and borrower net worth was among the most important determinants of creditworthiness, as perceived by the bank. The banks started using credit scores only in 1998 and that is why credit scores cannot be used in this analysis.

4. Methodology

We study the prepayment and default behavior of counseled and non-counseled borrowers in a competing risks framework. Prepayment and default are two actions driven by the value of the underlying prepayment (call) and default (put) options that borrowers undertake in order to increase their wealth. Since by exercising one option the borrower gives up the other, the extent to which one option is in the money affects the exercise of the other. For instance, the probability of prepayment is a function of the extent to which the default option is in the money. This jointness of the two options is captured well in the competing risks framework.

The option-based theory stipulates that when a payment on the mortgage loan becomes due, depending on the value of the put and call options, and given transaction costs and trigger events, the borrower decides whether to default on the loan, prepay or remain current. Let default and prepayment be termination events, and let loans that remain current be observations that were censored at the time of data collection. To develop the competing risks model, we first consider a hazard function for default and a hazard function for prepayment defined as

$$\lambda_j[t; X(t)] = \lim_{h \to 0} h^{-1} P(t \le T < t + h \mid J = j) \qquad \text{for } j=1,2 \tag{1}$$

where j=1 for default and j=2 for prepayment, T is continuous termination time, $x(t)$, $t \geq 0$ is a vector of possibly time-dependent covariates, $X(t) = \{x(u) : 0 \leq u < t\}$, that is $X(t)$ is the history of the covariates prior to time t. Here $\lambda_j[t; X(t)]$ represents the instantaneous rate of termination (by default or by prepayment), given $X(t)$. If only one termination type can occur, that is, if the borrower could either prepay or default, then

$$\lambda[t; X(t)] = \sum_{j=1}^{2} \lambda_j[t; X(t)] \tag{2}$$

Applying the specification of the Cox model, the termination specific hazard function is

$$\lambda_j[t; X(t)] = \lambda_{0j}(t) \exp[Z(t)'\beta_j] \qquad \text{for } j=1,2 \tag{3}$$

Here, $Z(t)$ is a p derived vector of possibly time-varying covariates defined as a function of $X(t)$, where $X(t)$ is left continuous with right hand side limits; the baseline hazard $\lambda_{0j}(t)$ and the regression coefficients β_j can vary arbitrary over the termination types, that is, the baseline hazard of default and prepayment and the estimated coefficients on are allowed to be different as required. The overall survivor function S (which is nothing else than one minus the *cdf*) is defined as

$$S[t; X(t)] = \exp - \sum_{j=1}^{2} \int_0^t \lambda_{0j}(u) \exp[Z(u)'\beta_j] du \tag{4}$$

The individual *pdf* for each termination type is

$$f_j[t; X(t)] = \lambda_j[t; X(t)] S[t; X(t)] \qquad \text{for } j=1,2 \tag{5}$$

and the overall density function is

$$f[t;X(t)] = f_1[t;X(t)] + f_2[t;X(t)] \tag{6}$$

If t_{ji}<… <t_{jki} denote the k_j time of type j termination and Z_{ji} denote the regression be function for the individual that terminated the loan at t_{ji}, then the Loglikelihood to be maximized is

$$LogL(\beta_1, \beta_2) = \sum_{j=1}^{2} \left\{ \sum_{i=1}^{k_j} \left[\exp[Z_{ij}(t)\beta_j] - \sum\nolimits_{l \in R(t_{ji})} \exp[Z_l(t_{ji})' \beta_j] \right] \right\} \tag{7}$$

where β_j for j=1,2 are the estimated coefficients and $R(t_{ij})$ is the set of all individuals who have not terminated and are still under observation just prior to t. The baseline hazard is eliminated and not estimated in this model but it is allowed to vary by termination type, that is, is can be different for prepayment and for default. [6]

This paper uses the specifications introduced in Deng, Quigley and Van Order (1997 and 2000) and used in studies on mortgage terminations (Ambrose and Capone, 2000; Pavlov, 2001) to measure of the influence of the put and call options on mortgage termination. The first variable measures the probability that the put option is in-the-money, that is, the probability that defaulting has value, PROBNEQ is defined as:

$$\text{PROBNEQ}_{i,k_i} = prob(E_{i,k_i} < 0) = \Phi\left(\frac{\log V_{i,m_{j,\tau_i+k_i}} - \log M_{i,k_i}}{\sqrt{w^2}} \right) \tag{8}$$

where E_{i,k_i} is the equity in the house for the ith individual, evaluated k periods after origination, $\Phi(.)$ is a cumulative standard normal distribution function; $V_{i,m_{j,\tau_i+k_i}}$ is the value of the present value of the outstanding loan balance at $m_{\tau_i+k_i}$ market interest rate, w^2 is the estimated variance from repeat (paired) sales, by state, provided by the Office of Federal Housing Oversight (OFHEO). Here, M_{i,k_i} is the market value of property, purchased at cost C_i at time τ_i and evaluated k_i months thereafter is

$$M_{i,k_i} = C_i \left(\frac{I_{j,\tau_i+k_i}}{I_{j,\tau_i}} \right) \tag{9}$$

where the term in parenthesis follows a log-normal distribution and I_{j,τ_i} is an index of house prices by state j, at time τ_i. The higher the value of PROBNEQ, the higher the probability that the equity in the house is negative and the more profitable it is to default.

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[6] For more detail see Kalbfleisch and Prentice (2002) and Crowder (2001).

To study whether the call option influenced prepayment, this paper uses PREPAY, which is equal to one minus the ratio of the present value of the unpaid mortgage balance at the current market interest rate $m_{\tau_i+k_i}$, relative to the value discounted at the contract interest rate. That is

$$PREPAY_{i,k} = 1 - \frac{V_{i,m_{j,\tau_i+k_i}}}{V^*_{i,r}} \tag{10}$$

where

$$V_{i,m_{j,\tau_i+k_i}} = \sum_{t=1}^{TM_i-k_i} \frac{P_i}{(1+m_{\tau_i+k_i})^t} \tag{11}$$

$$V^*_{i,r_i} = \sum_{t=1}^{TM_i-k_i} \frac{P_i}{(1+r_i)^t} \tag{12}$$

and where P_i is the monthly payment in principal and interest and r_i is the contract interest rate. Positive values would indicate that the option is *out-of-the-money*, that is, it is not to the borrower's advantage to prepay; the option will move *in-the-money* as it becomes negative because negative values indicate that contract rate is greater than the market rate and it will be more profitable to refinance.

Other time-variant events that affect termination are divorce and shocks to income (Quigley and Van Order, 1995; Elmer and Seelig, 1999). These have been characterized as trigger events because they may trigger termination through either default or prepayment. We control for this event through a time-variant dummy SHOCK.

The time-invariant covariates included are value of the loan, monthly payment and value of the house which serve as a proxy of borrower income level and wealth; mortgage insurance paid by the bank, property type (single unit, two-unit), origination year and loan-to-value ratio at time of origination, which serves as a proxy for the down payment.[7]

This specification controls for the characteristics of the loan contract, property type and shock events. A significant coefficient on the dummy for counseling on both prepayment and default, after controlling for these variables, would indicate that lenders should not ignore the effect of counseling on prepayment.

We define loans in default as loans for which foreclosure took place, loans tied up in bankruptcy procedures and/or loans for which a loss was realized, as well as loans coded as DIL, (dead-in-lieu or foreclosure), and PRS (presale/short sale). Default is recorded at a time when these loans became 90 days overdue. Regarding prepayment, the information available is less detailed. The bank has not collected information on the reason for prepayment—refinancing or moving. This may affect the results. Clapp, Goldberg, Harding *et al.* (2001) report that prepayment due to refinancing and prepayment motivated by a move are affected by different factors.

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[7] Monthly pay and loan amount are not necessarily equivalent and are both included because although most of the loans were 30 year fixed rate loans, on occasion the bank granted fixed-rate loans for 10, 15, 20 or 25 years. No information on these outliers was available, however.

5. The Data

The complete dataset consists of 1,338 loans originated from 1992 to 2000 to borrowers mainly in Ohio but also to few borrowers from Florida, Indiana, Kentucky, Michigan, and West Virginia (Table 1). Thirty two observations were deleted because origination data were incomplete, thus the final number of loans is 1306. The sample of loans originated prior to 1996, when counseling was offered in some and regions and period, contains 919 loans. Of them, 410 are to counseled borrowers and 509 are to non-counseled clients (Table 1). During the period from 1996 to 2000, when counseling was obligatory for everybody recruited through the Community Mortgage Loan Program, the bank originated 387 loans.

Repayment records in the sample expand up to nine years with most loans still outstanding. The characteristics of the portfolio presented in Table 2. It is organized in two panels, with Panel A presenting data for the complete portfolio and Panel B presenting data for all loans that were originated prior to 1996. Clearly, using only loans originated prior to 1996 is better because the relatively random availability of counseling makes the group of non-counseled borrowers an appropriate control group for two reasons. First, counseling was not mandatory during the period so counseling was done somewhat random, and second, these loans were given in relatively similar economic conditions (Graph 1 and Graph 2).

This data are interesting to analyze because counseling is often made obligatory for some low-income categories of borrowers as a precondition of getting a mortgage loan and there are rarely adequate control groups. Analysis of sample of loans originated prior to 1996 and the portfolio with loans originated after 1996 allows to study not only whether counseling affects termination but also what are the consequences of making counseling mandatory to everybody in a population of low-income borrowers, who do not use the banking system and who may be categorized as less creditworthy.

Comparison of the characteristics of the loan performance of the two groups (Table 2) reveals that their prepayment patterns prior to 1996 do not differ while default is slightly higher for the counseled borrowers. If non-counseled borrowers are compared to all counseled borrowers including those who received a loan after 1996, when it became mandatory to have counseling, then counseled borrowers have lower both default and prepayment rates.

Table 3 presents definition of the variables used in the analysis. The database does not contain information of borrower characteristics, which have been found to be related to termination. Loan amount, house value and monthly payment and LTV at time of origination are used to proxy the level of housing that each household could afford and may, to a limited extent, proxy for household income and wealth. Loan-to-value at origination can be used to control for the amount of down payment and as argued by Pavlov (2001) for borrower heterogeneity as he includes LTV in the group of variables that proxy borrower heterogeneity.

Table 4, presents the means and standard errors of the variables in the portfolio by various groups—all loans, loans originated prior to 1996, counseled borrowers and non-counseled borrowers. The data reveal that the two groups are very similar. As expected, the probability of negative equity has increased at the time of default for all groups. Counseled borrowers had higher values of the probability of negative equity at both time of origination and at time of termination. As expected, loans were repaid when the value of the prepayment option was in-the-money, as indicated by the negative sign of this variable at termination. Compared to non-counseled borrowers, counseled borrowers started with higher value of the prepay option.

A trigger event was the reason for default for half of the counseled borrowers, while only thirty percent of the non-counseled borrowers reported a shock event as a reason for default. This difference may be due incorrect reporting of the reason for delinquency, as it may be that counseled borrowers were more involved in the program and more willing to reveal why they are defaulting on the loans as opposed to non-counseled borrowers who did not interact with counselors and were less comfortable sharing the reasons of their default. A larger percentage of the non-counseled borrowers qualified for a loan without mortgage insurance (9.7 percent, versus 5.9 percent). Mortgage loans were used to buy mainly single family houses, with counseled borrowers buying slightly higher proportion. Perhaps because of this both loan amount and house values are slightly higher for the counseled borrowers. On average they also paid slightly lower down payment.

The data on origination indicates how the program progressed as the share of the non-counseled borrowers decreases while that of counseled increases. Overall, the differences in the loan and property characteristics of the two groups are every similar and indicate that the non-counseled borrower could serve as a reasonable control group.

6. Discussion of Results

The results show that counseling must be evaluated in terms of its effects on both prepayment and default. Borrowers who graduated from the counseling program did not necessarily have lower default hazard but they do seem to have a higher prepayment hazard.

Model 1 in Table 5 presents the results of a model which uses data for all loans prior to 1996. Although counseled borrowers did not default less than non-counseled borrowers (the coefficient on the default hazard is insignificant), they did prepay more-often than non-counseled borrowers.

The same result is obtained with data from the complete portfolio in a Model 2 in Table 5, which also includes dummies for years of origination prior to 1996. Counseled borrowers still prepay more often but this result is attenuated, as the coefficient is now significant only at 10 percent (p value is 0.09). The effect of counseling on prepayment seems to be affected by the fact that all borrowers recruited though church seminars since 1996 were asked to go through counseling. In this model, counseled borrowers default less often but the coefficient is not statistically significant.

Results also indicate that the competing risks framework is appropriate to study mortgage termination by low-income households. As expected, and in both models, default is affected positively and significantly by the probability of negative equity and by the value of the prepayment option. Also as expected, and in both models PREPAY affects significantly prepayment, that is, the more negative PREPAY is, the more profitable it is to prepay. As, expected, the sign on PROBNEQ is negative in Model 2 but it is not significant. Surprisingly, this sign is positive and significant in Model 1, indicating that borrowers prepaid when the probability that their equity was negative was high. This result could indicate that low-income borrower’s reputation was so important that they might have taken a financial loss (by selling the house or refinancing) and prepaying even if defaulting for pure financial considerations would have been wealth increasing.

As expected, the variable that approximates the effect of trigger events is significant in the default hazard in both specifications, and it is even negative and significant in the prepayment hazard of Model 2. Borrowers who bought single family or two-family houses were less likely to default but property type did not affect prepayment hazard.

For the low-income borrowers who participated in this program, larger loan size increased the chance that the mortgage would have been terminated. The value of the property did not affect prepayment but borrowers who bought higher valued houses had lower default hazards. Loans with higher monthly payment were less likely to be prepaid but more likely to become in default. It is widely accepted that loans with higher LTV (smaller down payment) are more risky. The results show that this was not the case for the low-income people in the portfolio. On the contrary, borrowers with higher LTV have lower default hazards. Such result is not unusual in lending to low-income households. MFIs have discovered that in low-income communities, the poorer the borrower, that is the less collateral he/she has, the more important the reputation becomes and this translates into fewer defaults in the poorest of the poor (ref with the most prestigious journal).[8]

6. Conclusions

Published research on credit counseling and mortgage termination is surprisingly scarce, despite substantial growth in this industry. Counseling is usually an obligatory requirement for the low-income to qualify for a mortgage loan, it is expensive, and it is important to understand how it affects mortgage termination. This paper shows that evaluations of counseling programs with a narrow focus on default miss important an effect that counseling may have on prepayment. We use a competing risks framework to study the effects on both default and prepayment of a counseling program implemented in several Mid-West states. The paper shows that the default hazard was not lower for the graduates of the counseling program but that the prepayment hazard was higher. Overall, counseling seems to affect lenders' profits and this effect should be evaluated both in terms of prepayment and default hazards and the higher prepayment hazard should be accounted for through an adequate prepayment premium.

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[8] Borrowers in our sample are less wealthy, with the average loan amount of $46,000, than borrowers in the comparable study of the effect counseling on delinquency by low income borrowers conducted by Hirad and Zorn, (2002), where the average loan for comparable period (1993-1998) was $94,000.

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Table 1.Geographic distribution of the loans by year [a]

Year	OH	FL	IN	KY	MI	WV
1992	100[b]					
1993	100					
1994	100					
1995	89.1	3.9	2.3	0.0	1.6	3.1
1996	86.5	1.9	1.9	5.8	0.0	3.8
1997	92.0	0.9	1.8	1.8	0.0	3.6
1998	89.4	2.1	0.0	4.3	1.1	3.2
1999	93.1	1.4	1.4	2.8	0.0	1.4

[a] all loans to non-counseled borrowers are to borrowers from Ohio.

[b] percentage of loans originated in the current year.

Table 2. Description of the Portfolio.

Panel A: All loans in the portfolio

Loan Status	Non-Counseled		Counseled		Total	
	Number	%	Number	%	Number	%
In Default	42	8.3	55	5.6	97	7.4
Prepaid	81	15.9	124	12.7	205	15.7
Current	386	75.8	800	81.7	1004	76.9
Total	509	100	979	100	1306	100

Panel B: Loans originated prior to 1996

Loan Status	Non-Counseled		Counseled		Total	
	Number	%	Number	%	Number	%
In Default	42	8.3	38	9.3	80	8.8
Prepaid	81	15.9	63	15.4	124	13.6
Current	386	75.8	309	75.4	705	77.6
Total	509	100	410	100	909	100

Table 3. Variable definition

Variable Name	Description of the Explanatory Variables
COUNSELED	1 if the borrower was counseled, zero otherwise
PROBNEQ	Probability that the borrowers' equity is negative (as in Deng *et al.,* 2000)
PREPAY	1 minus the ratio of discounted value of the remaining mortgage payment at current market rate to the discounted value of the remaining mortgage payment at the contract interest rate
LTV	Loan-to-value ratio at time of origination
SFHOUSE	Property is a single unit house
DFHOUSE	Property is a double unit house
SHOCK	1 if the borrower has indicated that a shock event has caused the delinquency, 0 if no reason was indicated
LAMOUNT	Loan amount
HVALUE	House value at time of loan origination
MPAY	Monthly payment on the loan (principal and interest, does not include insurance and taxes)
NMI	1 if the loan did not need/have mortgage insurance
ORIGIN92	The mortgage was originated in 1992
ORIGIN93	The mortgage was originated in 1993
ORIGIN94	The mortgage was originated in 1994
ORIGIN95	The mortgage was originated in 1995

Table 4. Means and standard errors of the regression variables by groups

	All loans (prior to 1996)	Non-counseled	Counseled (prior to 1996)	Counseled (all loans)	All loans
COUNSELED[a]	0.446				0.610
	(0.497)				(0.488)
PROBNEQ	0.386	0.261	0.588	0.629	0.427
	(0.347)	(0.243)	(0.398)	(0.401)	(0.370)
PROBNEQ[b]	0.520	0.361	0.696	0.738	0.575
	(0.330)	(0.279)	(0.294)	(0.261)	(0.327)
PREPAY	-0.036	0.021	-0.1011	-0.131	-0.073
	(0.101)	(0.053)	(0.102)	(0.083)	(0.105)
PREPAY[b]	-0.161	-0.115	-0.219	-0.209	-0.172
	(0.101)	(0.068)	(0.105)	(0.093)	(0.096)
REASON[c]	0.400	0.309	0.500	0.491	0.412
	(0.493)	(0.468)	(0.507)	(0.505)	(0.495)
NMI	0.077	0.097	0.059	0.165	0.134
	(0.267)	(0.296)	(0.235)	(0.372)	(0.341)
SFHOUSE	0.929	0.917	0.978	0.961	0.943
	(0.257)	(0.276)	(0.220)	(0.194)	(0.233)
TFHOUSE	0.042	0.047	0.036	0.031	0.038
	(0.202)	(0.213)	(0.186)	(0.174)	(0.190)
LAMOUNT	44,237	43,295	45,692	48,806	46,326
	(11,242)	(10,619)	(12,192)	(14,806)	(13,477)
HVALUE	48,204	47,226	49,083	52,693	50,564
	(12,223)	(12,094)	(12,244)	(15,561)	(14,449)
MPAY	349.969	326	379	394	370
	(9.852)	(81)	(106)	(119)	(112)
Log (RINCIPAL)	10.657	10.640	10.680	10.731	10.696
	(0.305)	(0.280)	(0.372)	(0.347)	(0.328)
Log(HVALUE)	10.746	10.727	10.762	10.823	10.787
	(0.287)	(0.275)	(0.301)	(0.329)	(0.311)
Log(MPAY)	5.814	5.752	5.982	5.932	5.863
	(0.316)	(0.280)	(0.328)	(0.343)	(0.336)
LTV	91.843	91.883	92.488	91.636	91.728
	6.434	(5.896)	(7.898)	(8.136)	(7.696)
ORIGIN 92	0.214	0.326	0.077	0.039	0.151
	(0.411)	(0.469)	(0.266)	(0.194)	(0.358)
ORIGIN 93	0.366	0.529	0.179	0.089	0.258
	(0.482)	(0.499)	(0.379	(0.285)	(0.438)
ORIGI N 94	0.249	0.140	0.426	0.218	0.183
	(0.433)	(0.347)	(0.495)	(0.413)	(0.387)
ORIGIN 95	0.168	0.020	0.324	0.160	0.123
	(0.374)	(0.044)	(0.468)	(0.413)	(0.329)

[a] all values are at origination unless indicated otherwise

[b] values at termination

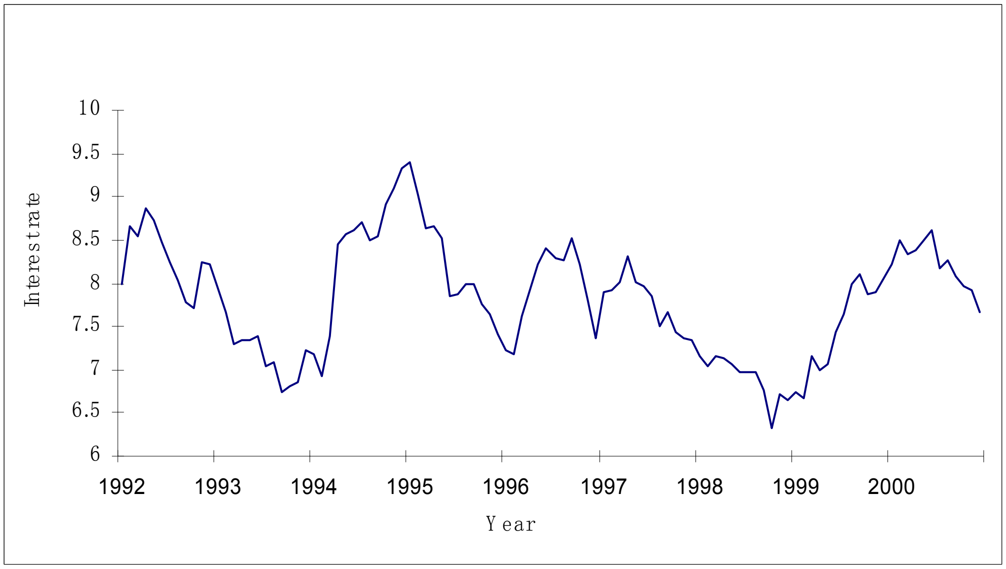
[c] values at default

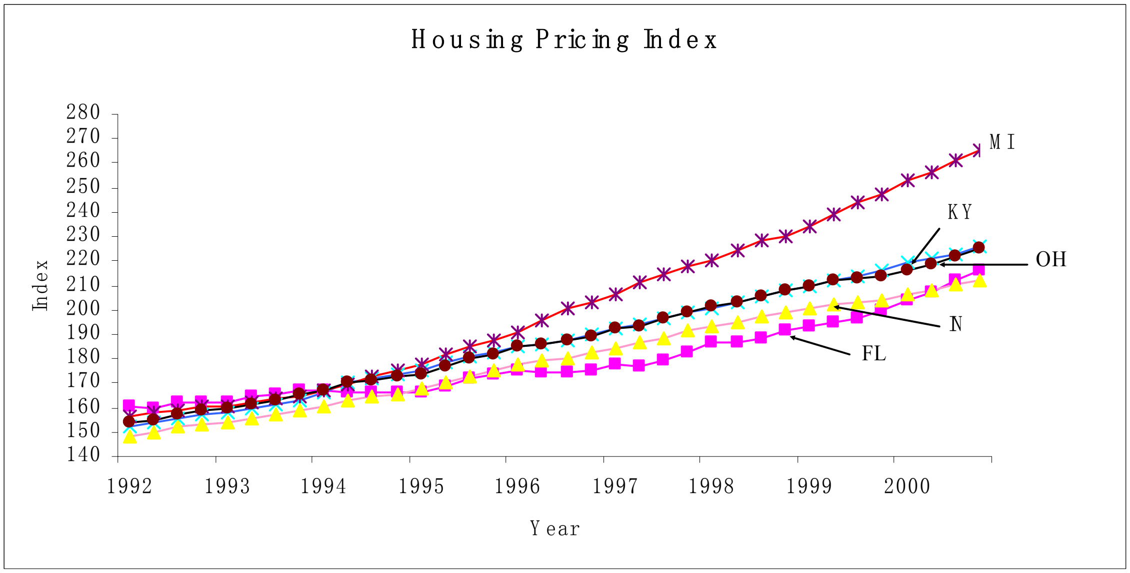
Table 5. Maximum likelihood estimates of a competing risks model of mortgage prepayment and default

	Model 1		Model 2	
	Prepay	Default	Prepay	Default
COUNSELED	0.817	0.255	0.346	-0.291
	(4.31)	(0.91)	(1.67)	(0.92)
PROBNEQ	2.11	7.062	-1.195	8.824
	(1.91)	(4.54)	(1.11)	(6.55)
PREPAY	-13.953	18.411	-23.255	18.488
	(-7.28)	(5.04)	(-11.37)	(6.05)
NMI	-1.073	-0.432	0.153	-0.227
	(2.76)	(0.74)	(0.41)	(0.38)
SHOCK	-0.549	1.678	-0.654	1.793
	(1.45)	(6.99)	(2.10)	(8.23)
LTV	-0.078	-0.667	-0.006	-0.706
	(1.45)	(3.08)	(0.11)	(3.23)
SFHOUSE	-0.129	-1.822	0.060	-1.826
	(-0.17)	(2.91)	(0.06)	(3.05)
TFHOUSE	0.189	-1.552	-0.329	-1.966
	(0.21)	(1.85)	(0.31)	(2.30)
LAMOUNT	11.214	33.032	18.359	40.446
	(3.92)	(1.86)	(2.499)	(2.33)
HVALUE	-2.007	-42.107	0.265	-44.076
	(0.78)	(2.45)	(0.14)	(2.51)
MPAY	-8.693	10.338	-18.217	3.649
	(4.90)	(3.30)	(9.53)	(1.75)
ORIGIN92			-8.499	-2.776
			(16.46)	(5.56)
ORIGIN 93			-6.877	-2.034
			(15.43)	(4.39)
ORIGIN 94			-5.089	-0.790
			(14.07)	(2.08)
ORIGIN 95			-4.040	-0.385
			(9.96)	(-1.00)
Log likelihood	-1967		-2552.987	
No. observations	919		1306	

t-values are in the parentheses.

Figure 1. Fannie Mae 60 days averages for 30 year fixed rate mortgages.



Figure 2. Housing price index by state.