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Borrower- and Mortgage-Related Factors Associated with Foreclosure

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BORROWER- AND MORTGAGE- RELATED FACTORS

ASSOCIATED WITH FORECLOSURE

by

Amber C. Gallagher

A thesis submitted in partial fulfillment
of the requirements for the degree

of

MASTER OF SCIENCE

in

Family, Consumer, and Human Development

UTAH STATE UNIVERSITY
Logan, Utah

2004

ABSTRACT

Borrower- and Mortgage-Related Factors

Associated with Foreclosure

by

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Utah State University, 2004

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Department: Family, Consumer, and Human Development

The purpose of this study was to develop a conceptual model that could be used to aid in identifying which household factors contribute to an increased likelihood of foreclosure. More specifically, what borrower-related and mortgage-related factors are correlated with home foreclosure? This was achieved by studying a sample from an inventory of active and foreclosed Federal Housing Administration (FHA) homes in the state of Utah. The sample consisted of 179 cases. Characteristics of interest were extracted from data and divided into two categories: borrower-related factors and mortgage-related factors.

Bivariate, and multivariate analyses were conducted with the borrower- and mortgage-related factors. Among the major findings was the significance of race, front-end ratio, and interest rate in the likelihood of foreclosure. Similarly non-White borrowers were found as a concern group. Lastly, the presence of a first-time homebuyer and a high front-end ratio need to be viewed as potential factors leading to foreclosure.

(64 pages)

ACKNOWLEDGMENTS

I would like to thank the members of my committee for all of their time, effort, and input. Dr. Lucy Delgadillo has been a constant mentor and friend throughout my association with her. She is strong, passionate, and kind woman that I have grown to admire very much. I appreciate her ideas and countless hours of support with my thesis. I will always treasure her friendship. Dr. Jean Lown has been a driving force in my educational achievements. She has instilled in me a desire to exceed in many aspects of my life. Her love and enthusiasm for family finance is contagious. I consider myself privileged to have her as a friend and mentor. She will always hold a special place in my heart. Dr. Leona Hawks has also been a great support. I have been very impressed by her knowledge and kindness. I appreciate her input and time.

To the Foreclosure/Default Task Committee organized by HUD and the Family Life Center, I give my thanks for the opportunity to study a topic that I love. Committee members such as Deon Spilker, Richard Bell, Sterling Thomas, and Tamera Hinck have provided me with resources that have allowed me to accomplish this task. I appreciate their input and time in this matter.

Lastly, I would like to give special thanks to my family and friends. They have served as the "comic relief" throughout this time period. I appreciate their love and efforts to help me to remember to have fun. Thank you for all you have done. My husband, Adam, has been a tremendous support during this time. He has always helped me to stay motivated and worked to help me not lose sight of the "big picture." To him I give me sincere gratitude and love. Thank you. Finally, my parents have also been a driving force in my achievements. Their work ethic and continuous efforts to improve

have provided me with the foundation to succeed. One of the highest compliments one can pay me is to tell me how much I am like them. I love and admire them with all my heart. Thank you for all you have done.

Amber C. Gallagher

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CHAPTER I

INTRODUCTION

Problem Statement

For many Americans, homeownership is the pinnacle of achieving the "American Dream." In most cases, homeownership promotes social, economic, and psychological well being (Delgadillo, 2001; Joint Center for Housing Studies, 2002). Homeownership has also been one of the most "well supported domestic policy goals at all levels of government for more than fifty years" (Sullivan, Warren, & Westbrook, 2000, p. 200). This goal has recently become manifest in the home-buying explosion of 2000-2002. The record-breaking increase in first-time homebuyers this decade has made the American Dream a reality for many families and individuals. In fact, "the total number of U.S. households owning homes reached a new peak of 72.6 million in 2001—a record setting 67.8 percent" (Joint Center for Housing Studies). Historically low mortgage interest rates, low downpayment requirements, innovative financing alternatives, and relaxed lending standards have almost dissipated the barriers to homeownership. Individuals who would not have qualified for a home mortgage a decade ago are now being lent up to 100% of their home's value. While the increase in homeownership has been viewed as a good trend, there are also negative repercussions that follow any "boom" cycle.

In the midst of this millennium's home buying frenzy, little consideration has been given to the consequences of lending so freely and liberally to those who may not have the capacity to maintain a mortgage and other expenses related to homeownership.

Many of these new homebuyers find themselves obligated to housing expenses in excess of 40 percent of their net income, contrary to the government recommended guidelines of less than 30 percent. An obligation of this magnitude increases homeowner's financial instability making them prone to seek the protection of bankruptcy or more commonly, have their home go into default or foreclosure (Delgadillo, 2003). The Mortgage Bankers Association reported that in the third quarter of 2002, an all time high of 4.81% of mortgages in the United States were delinquent, while 1.15% of homes for that same quarter were foreclosed. Exceeding the national average, 5.24% of Utah mortgages were in default in the third quarter of 2002 and 1.92% of mortgages were foreclosed in that same period. Utah also leads its region in the percentage of defaults and foreclosures. In many cases Utah has a three times higher default and foreclosure rate than the other five states in the Western region which include Colorado, Montana, North Dakota, South Dakota, and Wyoming (Mortgage Bankers Association of America, 2002).

The rate of mortgage defaults and foreclosures is increasing. In fact, since the early 1980s to the late 1990s, the nation has experienced over a 300% increase in the number of foreclosures (Federal Deposit Insurance Corporation, 1996). While the national rate of foreclosure has remained stable since 1997, Utah has experienced a steep upsurge in foreclosures. More specifically, in 1997 in Utah 72 homes with mortgages insured by the Federal Housing Administration (FHA) were foreclosed, while in 2002, 1,391 FHA homes were foreclosed (Mitchell, 2003). This is an alarming increase of 1,832%. This trend will prove destructive to already financially unstable households that have limited capacity to meet current mortgage obligations and equally limited home equity or emergency reserves. Not only would an increase in foreclosures harm already

financially unstable households, but it could weaken communities, lower home price appreciation in surrounding areas, and decrease the overall wealth of many homebuyers (Baxter & Lauria, 2000).

The accumulation of costs incurred during foreclosure as well as any mortgage debt remaining after foreclosure may play a part in the high number of bankruptcy filings in the state of Utah. Elmer and Seelig (1998) concurred that a distinct correspondence exists between mortgage foreclosure and personal bankruptcy rates. Not only is bankruptcy a possible result of foreclosure, it is often used in lieu of foreclosure. Lown and Rowe (in press) stated that many homeowners seek Chapter 13 bankruptcy protection to bring their mortgage payments current and avoid foreclosure. Knowing that Utah is ranked number one in bankruptcy filings per household for the United States, may imply that many filers are homeowners seeking the protection of the bankruptcy court in an attempt to protect their homes from possible foreclosure.

Need for Study

The concerns listed above demonstrate the need for a better understanding of factors leading to foreclosure and default. Quercia and Stegman (1992) have acknowledged that the role of borrower-related factors in the default decision needs to be addressed in future research. Quercia, McCarthy, and Stegman (1995) observed that borrower-related factors and their role in the foreclosure process remain open to debate. Similarly, very little information exists about the role of mortgage-related characteristics in default and foreclosure. This study will contribute to our understanding of factors

contributing to foreclosure as it explores the relationship between borrower-related and mortgage-related variables.

It is also important to note that much of the literature focuses on mortgage delinquency and default—primarily because very little research exists about foreclosure. A home is considered to be in "default" when the homeowner is between 30 and 90 days late on their mortgage payment. Therefore, it can be assumed that mortgage default is a precursor to mortgage foreclosure, which can occur after a mortgage payment is more than 90 days late. This assumption allows for mortgage default literature to serve in place of foreclosure literature. Having a more comprehensive understanding of the role of loan characteristics and the role of borrower-related factors in default and foreclosure will be beneficial for both practical and theoretical reasons.

Purpose of the Study

The purpose of this study was to develop a conceptual model that could be used to aid in identifying which factors contribute to an increased likelihood of foreclosure and, more specifically, what borrower-related and mortgage-related factors contribute to home foreclosure. The information obtained will be beneficial to policy makers, lending and mortgage servicing institutions, as well as housing education specialists.

Specific Objectives of the Study

1. To develop a conceptual model of factors related to foreclosure.

2. To identify borrower-related characteristics that correlate with foreclosure.

3. To identify mortgage-related characteristics correlated with foreclosure.

4. To analyze how individual factors and the interactions of factors contribute to variation in foreclosure rates.

Contributions of the Study

This study contributes to the research literature by providing a conceptual model for understanding foreclosure and its relationship to borrower demographic and loan factors. By understanding the relationship between household characteristics and foreclosure, lending institutions may be able to better assess the risk involved in lending; policy makers may better ascertain the need for regulation in certain areas; and housing specialists will have a better understanding of the population that is at a greater risk of foreclosure so as to address the needs of these households.

The next chapter will present a review of foreclosure literature, including factors associated with increased foreclosure. The information provided will lay the foundation for the conceptual framework being used in this study. Hypotheses will also be presented in the next chapter.

CHAPTER II

LITERATURE REVIEW

The first part of the literature review explores borrower-related factors as well as mortgage- related factors correlated with default and foreclosure. The second part of the literature review incorporates findings from the first section to develop a conceptual model of factors related to foreclosure. Hypotheses will also be developed in the last section.

Factors Related to Foreclosure

Previous literature has explored two theories of default and foreclosure; the ability-to-pay theory and the home equity theory. The ability-to-pay theory suggests that default occurs when a borrower cannot make the monthly payments on the loan. This is perhaps due to certain trigger events in their life that have caused resources to become strained, consequently leading the borrower to default (Elmer & Seelig, 1998). Clauretie and Sirmans (2003) stated that research conducted to explain or predict default under this theory has focused on borrower characteristics such as family size, source of income, number of dependents, family earnings, etc.

Contrary to the ability-to-pay theory, which examines several borrower-related factors, the equity theory examines only the amount of equity in the property. This theory asserts that no borrower with substantial equity would default (Clauretie & Sirmans, 2003). To predict default under this theory the loan-to-value ratio is scrutinized. Unlike the ability-to-pay theory, which examines several characteristics, the equity theory is limited to equity as being its primary factor.

Studies of default and foreclosure have included factors that are expected to be related to both the equity theory and the ability-to-pay theory. The literature discussed below also presents factors related to both of these theories. While the ability-to-pay theory includes many factors, the equity theory only considers equity. In an attempt to develop a more comprehensive picture of mortgage characteristics, the discussion of the mortgage factors literature will not be limited to equity alone. It is also important to note that there is not a great deal of foreclosure literature, due to the fact that foreclosure data are difficult to obtain because most are proprietary. Therefore, literature on default will be substituted for foreclosure. This is possible because mortgage default is a precursor to mortgage foreclosure.

Borrower-related Factors

Age of mortgagor. Much inconsistency exists about the perceived effect of the age of a mortgagor in default and foreclosure. Ambrose and Capone (1998) justified why there is so much inconsistency. They explained that it is often expected that younger homeowners will have fewer resources to draw upon if they need to cure a default, thus they are more likely to experience default or foreclosure. However, they also noted that often times, younger homeowners may have a higher probability of faster reemployment after job loss, which may enhance their chances of getting their loan reinstated. Findings to support both schools of thought exist in previous studies.

Anderson and VanderHoff (1999) used national data on conventional mortgages from a New Jersey based savings and loan to estimate a default model. Their analysis confirmed that younger borrowers have a higher default probability than older borrowers.

Contrary to these findings, Webb (1982) found mixed results from a study based on mortgage servicing records. More specifically, the age of a borrower had different effects on the likelihood of default depending on the loan product. In some cases, a higher age was associated with a higher probability of potential delinquency, while in other cases; there were no significant differences in the number of potential delinquencies based on age.

Race of borrower. The race of a borrower has had different observed effects on the likelihood of default and foreclosure. In one study, Anderson and VanderHoff (1999) used conventional mortgage servicing and origination records from a New Jersey-based savings and loan to find that the default model used in their study indicated that Black borrowers had significantly higher default rates than white borrowers, controlling for differences in borrower and property characteristics.

Contrary to Anderson and VanderHoff's study, it has been argued by many that minorities are less likely to default or have their home go into foreclosure. Ambrose and Capone (1998) evaluated many borrower characteristics, including race, to determine their role in default and foreclosure. They hypothesized that that minority borrowers view their current mortgage as having greater value than White borrowers due to the perceived costs of obtaining new credit. Consequently, trigger-event-induced minority borrowers may have more incentive to reinstate their mortgage than White borrowers. The data support the author's hypotheses. Their findings indicate that minorities have higher probabilities of reinstatement and lower probabilities of foreclosure. While "minorities" is never defined in this study, it is implied that minorities includes all non-White borrowers.

Webb (1982) had similar findings to Ambrose and Capone (1998). Using the Panel Study of Income Dynamics developed by the Survey Research Center at the University of Michigan, Webb analyzed differences in borrower risk under alternative mortgage instruments. Findings of the study indicate that no difference exists between white and nonwhite borrowers in the probability of potential delinquency within various mortgage instruments.

Lastly, Quercia et al. (1995) used panel data from 1981 to 1987 from the Farmers Home Administration Section 502 program to study the default decision of low-income, subsidized rural borrowers. Minority borrowers exhibited a lower risk of default than nonminority borrowers.

First-time homebuyer. There has been much speculation about the role of first-time homebuyers in default and foreclosure. Some assert that first-time homebuyers are more susceptible to trigger events due to the fact that they are most often younger, have fewer savings, less well-established credit histories and are often more likely to be in child bearing years, which have higher expenses and often reduced incomes. Researchers have confirmed the higher risk for first-time homebuyers.

Delgadillo (2003) used a sample of 105 first time homebuyers from Northern Utah to develop a financial profile of first time homebuyers. Upon conducting t-tests, bivariate and multivariate analysis, Delgadillo found empirical evidence that first-time homebuyers are stretching their income and qualification ratios to enter the housing market. The study concluded that "having many first-time home owners stranded in homes they cannot afford would certainly lead to more foreclosures because it would

make it impossible for families to send their mortgage payment and property taxes which in turn could lead to more consumer debt and bankruptcy" (Delgadillo, p. 24).

Similar results were generated by Cunningham and Capone (1990) who used a multinomial logit model to find that those who were not previous homeowners were more likely to default. Perhaps the lack of previous homeownership experience was a weakness to these first time homebuyers who may have not known what to expect both financially and emotionally.

One of the only studies that did not find a relationship between first time homebuyers and default and foreclosure was Ambrose and Capone (1998). They indicated that first-time homebuyers in default are not statistically different from other groups of homebuyers—with respect to reinstatement rates.

Number of dependents. The number of children present in a household can have a dramatic effect on its finances. Previous researchers have studied the relationship between family size and housing cost burden. Chi and Laquatra (1998) found that those with three or more children are more likely to experience a higher housing cost burden. However, contrary to their findings, Noecker-Guadangno (1992) found that those with high housing expenses were about the same age, family size and had the same number of earners compared to other homeowners who did not experience a housing cost burden.

Evidence has been found that mortgagors with five or more dependents were much more likely to have loans that were delinquent or in foreclosure (Morton, 1975). However, much like the relationship between number of dependent's and amount of housing cost burden, there is contradicting evidence. In fact, Vandell and Thibodeau

(1985) concluded that the number of dependents was not significant in predicting mortgage default.

Homeownership counseling. Little research exists about the role of homeownership counseling in mortgage default and foreclosure. In fact, the only literature that could be found about homeownership counseling had unclear findings, therefore it is difficult to make any inferences about the effectiveness of pre-purchase counseling on mortgage default and foreclosure.

In their study, Hirad and Zorn (2001) used loans purchased by Freddie Mac under its Affordable Gold program to assess the effectiveness of pre-purchase homeownership counseling on the reduction of default risk. Their study found statistical evidence that the appropriate type of pre-purchase counseling does in fact effectively mitigate risk. More specifically, they found that borrowers who receive pre-purchase homeownership counseling under Freddie Mac's Affordable Gold program are on average, 13% less likely ever to become 60-days delinquent than borrowers with equivalent characteristics who do not undergo counseling. However, the authors also mentioned that not all counseling programs are equally effective. While counseling conducted in a classroom or individual setting is quite effective at reducing borrower default rates, neither home study nor telephone counseling has been found to have a significant impact.

Borrower's income. Traditionally, a fairly substantial and steady income was needed to obtain a home mortgage. Lower income households had great difficulty obtaining a mortgage loan. However, just as down payment requirements have become

more lenient, level of income is also no longer a barrier to homeownership. The Joint Center for Housing Studies (2001) reported:

> Despite the upward trend in prices, millions of lower-income households have made the transition to homeownership in recent years. Spurred by the strong economy, favorable interest rates and innovations in mortgage finance, the share of home purchase loans going to lower-income households and/or households living in lower-income communities increased steadily over the decade. (p. 1)

While the homeownership rates among lower- and middle-income households have increased, so have the default and foreclosure rates. Low- and middle-income households have been observed as being more prone to trigger events that lead them to foreclosure. In fact, income has been found to be of the variables most fundamentally related to default (Elmer & Seelig, 1998). Von Furstenberg (1969) also found that default rates rise rather significantly as mortgagor's income falls. Households who have seasonal or volatile incomes are especially susceptible to insolvency and foreclosure.

Low- and middle-income families are also more likely to experience a higher housing cost burden than higher income families (Chi & Laquatra, 1998; Joint Center for Housing Studies, 2002; Noecker-Guadagno, 1992). This fact is increasingly becoming a concern for many of these households, particularly the nation's 20 million lowest-income households who are subject to excessive housing cost burden (Joint Center for Housing Studies).

Mortgage Factors

Loan-to-value. In previous research loan-to-value ratio was by far the most prevalent factor relating to default and foreclosure. Evidence about the positive

relationship between loan-to-value ratio and mortgage default and foreclosure has accumulated over the past three decades. Morton (1975) used data collected from 24 financial institutions throughout the state of Connecticut during the summer of 1973 to analyze 545 cases of mortgage delinquency and foreclosure. Using discriminant analysis, Morton found that the loan-to-value ratio (LTV) was significantly related to an increase mortgage risk. Similarly, Vandell and Thibodeau (1985) found that the expected loan-to-value ratio consistently proved to be the most significant influence on default. Lastly, Cunningham and Capone (1990) also found the LTV ratio is a strong positive indicator of default risk. They conclude that borrowers are more likely to default if home equity is negative or low.

It is important to note that some researchers have been hesitant to blame high LTVs for default and foreclosure. In their research, Elmer and Seeling (1998) noted that FHA mortgages, which allow for high LTVs, have followed the same default and foreclosure pattern of conventional loans, which do not have the high LTVs that FHA loans do. Therefore, they conclude that high LTVs cannot serve as the primary contributor to default and foreclosure.

Front- and back-end ratios. The amount of money that a household spends each pay period on housing expenses can have a significant effect on the likelihood of default and foreclosure. Obviously a larger portion of a household's income going towards housing expenses can compromise monies for other basic living expenses. Traditionally, lenders and buyers on the secondary market have required that mortgage payments plus property taxes and insurance premiums not exceed 28-33% of a household's gross monthly income. This can be measured by observing a homeowners front-end ratio.

Similarly, a back-end ratio can be used to measure the amount of monthly mortgage obligations, as well as other monthly consumer debt obligations a household may assume. This ratio is recommended to not exceed 36-41% of a household's monthly income. However, these guidelines are quickly fading.

In her study, Delgadillo (2003) used a sample of Northern Utah first time homebuyers to examine monthly housing expenses. Delgadillo finds that many first time homebuyers in the study are applying up to 50% of their income to their regular mortgage payments and have no savings to afford maintenance, emergencies and/or repair costs in their new home. Delgadillo also stated "Having many first time homeowners stranded in homes they cannot afford would certainly lead to more default and foreclosures" (p. 24). This trend has also been observed by Quercia et al. (1995) who found that the ratio of housing cost to income exhibited a consistent significant positive effect on default. More specifically, households that experienced a 1% increase in payment-to-income ratio (front-end ratio) were found to be nearly 1.2 times more likely to default than other households. Studies that found front-end ratio to have little or no significant effect on default and foreclosure include Morton (1975) and Vandell and Thibodeau (1985).

Down payments. Traditionally homeowners had to have 20% cash for a down payment on a home. Today's down payment requirements, however, are much more lenient. It is now common to see 5% down as the average requirement. Lower down payments, contributions from third parties, acceptance of nontraditional credit histories, and higher debt-to-income ratios, among many other new innovations, have made homeownership more readily attainable (England, 2002; Simon & Higgins, 2002). The amount of down payment on a home has a direct effect on the total amount of mortgage

debt assumed. Generally, the larger the down payment, the less mortgage debt most consumers will have.

Previous works have speculated that those with lower down payments are more likely to be a constrained buyer and have a higher housing cost burden. Mayer and Engelhardt (1996) stated that those buyers who have less than 20% down and have an obligation ratio greater than 28% are considered a "constrained buyer." Constrained buyers are prime candidates for default and foreclosure because little money is left for basic living expenses, emergencies, or unplanned expenses.

In addition to size of down payment, the source of a down payment is also important to note. Much speculation, but little empirical evidence, exists about the role of gifted down payments in default and foreclosure. Mayer and Engelhardt (1996) have found that constrained buyers are more likely to turn to other sources such as gifts to obtain down payments, which has some implications on their future susceptibility to default and foreclosure. The authors also mention that recent evidence shows the first-time home buyers are relying more heavily on gifts and less on their own savings in accumulating a down payment. This was demonstrated by the decreased saving rate in these new homeowners.

Interest rate. The role of interest rates has been found to play a minor role in default and foreclosure rates. Elmer and Seelig (1998) discussed the role of interest rates in the default story. They purported that interest rates do not play a direct role in default. They argued that interest rates do not represent a primary determinant of default because rate fluctuations following a fixed-rate mortgage cannot independently cause otherwise-solvent individuals to become insolvent. However, it is important to note that borrowers

who are a better credit risk are often awarded lower interest rates, thus high interest rates could represent borrowers who are at a higher risk.

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A Conceptual Model for Understanding

Factors Related to Foreclosure

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The literature reviewed factors that have been found to be correlated with default and foreclosure. Based on this literature, two broad categories emerge that are commonly studied when observing relationships between certain factors and foreclosure. Both borrower-related factors and mortgage-related factors have been used and tested in previous studies as evident in the literature review. Many of these studies have found that foreclosure has been both positively and negatively correlated with these factors. A graphical representation of these relationships is presented in Figure 1.

The conceptual model suggests that each factor presented in the model is associated with foreclosure. The model also explores the interaction of factors, which may or may not produce stronger correlations.

<div align="center">

Hypotheses

</div>

Based on the review of literature and the conceptual framework, the following null hypotheses were tested in this research project.

1. The age of the borrower is not statistically significantly related to foreclosure.
2. There is no relationship between the race of a borrower and the likelihood of foreclosure.
3. There is no relationship between being a first-time homebuyer and foreclosure.
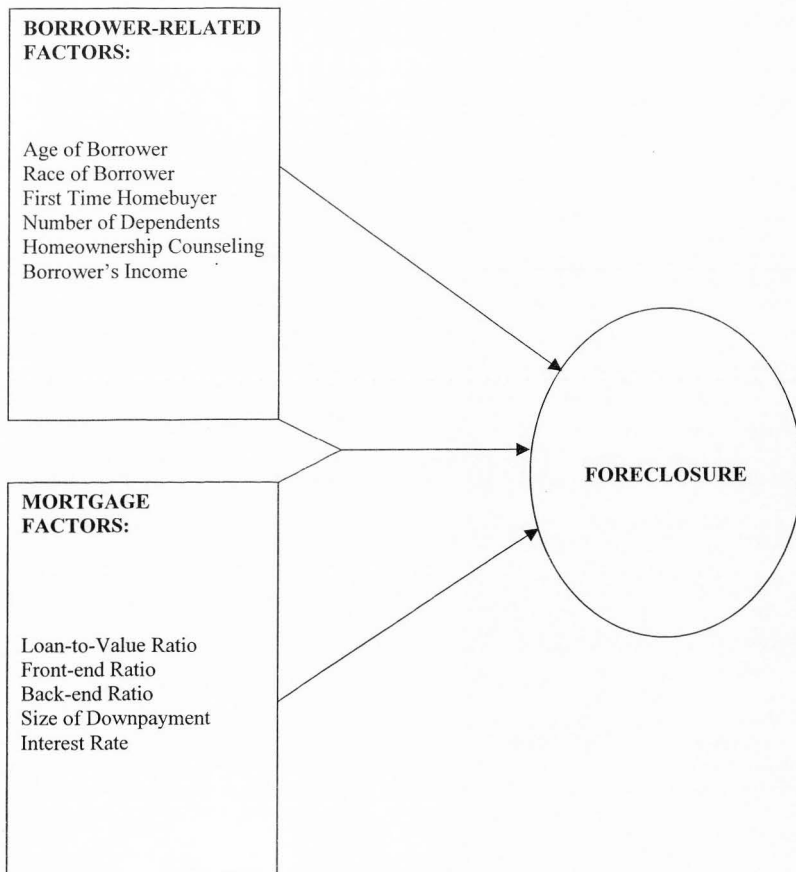
Figure 1. Conceptual model of factors related to foreclosure

4. The number of dependents in a household is not related to foreclosure.

5. There is no relationship between homeownership counseling and foreclosure.

6. There is no relationship between borrower's income and foreclosure.

7. Loan-to-value ratio is not statistically significantly related to foreclosure.

8. There is no relationship between front-end ratio and foreclosure.

9. Back-end ratio is not statistically significantly related to foreclosure.

10. There is no relationship between size of down payment and foreclosure.

11. Interest rate is statistically significantly related to foreclosure.

      The following chapter provides a description of the sample, a definition of variables being used in the conceptual model, procedures for collecting data, research questions, as well as the proposed data analysis for this study.

CHAPTER III

METHODS

This chapter presents the methods and procedures used in this study. A description of the sample, measure, research questions, and the proposed data analysis will also be presented in this chapter.

Description of Sample

Data for this study were drawn from an inventory of active and foreclosed FHA homes in the state of Utah. The inventory consisted of mortgage insurance applications from both current home loans and foreclosed homes. The original sample consisted of a total of 394 cases that had origination dates between January 1, 1994 and December 31, 2001. However, due to missing data and inconsistencies in reporting requirements of insurance companies, the sample was narrowed down to 179 cases that had origination dates between January 1, 2000 and December 31, 2001 to insure greater accuracy. Of the 179 cases selected, seventy-five of the cases represented never-delinquent borrowers. These files made up the "active" portion of the sample. The other 105 hundred cases made up the "foreclosed" portion of the sample. These cases were of homeowners who had had their home enter foreclosure between January 1, 2002 and January 30, 2003.

While it was not possible for this researcher to have full access to borrower files, mortgage insurance applications contain a comprehensive summary of borrower-related and mortgage-related characteristics. It is also important to mention that in order to assure confidentiality of the participants, the researcher was governed under the ethics of Utah State University's Institutional Review Board (see Appendix A).

Measures

The researcher's purpose in using these data was to gather information about foreclosed homeowners and their loans for the purpose of developing a model to predict future foreclosures. The measurement contains several factors that will aid in this process. Below is a description of the variables that were extracted from the data and used in this study for statistical analysis.

Dependent Variables

The dependent variable in this study is dichotomous. A dummy variable is measured as Foreclosed = 1 if the borrower(s) had their home foreclosed during the specified time period, and Active = 0 meaning that they are current homeowners who have never been behind on their mortgage obligation.

Independent Variables

There are a total of eleven independent variables in this study. Six are borrower-related variables including (a) age of borrower, (b) race of borrower, (c) first-time homebuyer, (d) number of dependents, (e) homeownership counseling, and (f) borrower's income. Age of borrower will be measured by number of years. First-time homebuyer, and homeownership counseling will be divided into two categories: yes or no. Race of borrower includes two categories: White and non-White. Lastly, borrower's income will be measured as gross yearly income as reported on their insurance application.

The other five independent variables being tested are mortgage-related variables including (a) loan-to-value ratio, (b) front-end ratio, (c) back-end ratio, (d) size of downpayment, and (e) interest rate. Loan-to-value ratio has been calculated by dividing

mortgage amount by the value of the home to obtain a percentage. Front-end ratio will be calculated by dividing monthly housing expenses by gross monthly income. Back-end ratio will be calculated by dividing total monthly housing obligation plus total monthly consumer debt obligations by gross monthly income. Size of down payment will be measured in dollars. Lastly, interest rate will be measured as a percentage.

Data Analysis

This study has been designed as a cross-sectional study, in which individual-level data will be used as the unit of analysis. Three research questions have been formulated to carry out this design. They are as follows:

1. How are borrower-related factors related to foreclosure?

2. How are mortgage-related factors related to foreclosure?

3. What interactions of borrower-related and mortgage-related factors are statistically significant predictors of foreclosure?

Research Questions 1 and 2

To answer research questions one and two, "How are borrower-related factors related to foreclosure," and "How are mortgage-related factors related to foreclosure," data were analyzed with descriptive and correlation analyses. Pearson correlation (r) analysis was used to determine the correlations between the dependent variable, $(0 - 1)$ with each independent borrower-related variable (age of borrower, race of borrower, first-time homebuyer, number of dependents, homeownership counseling, and borrower's income) as well as with each independent mortgage-related variable (loan-to-value ratio,

front-end ratio, back-end ratio, gift amount and interest rate). Alpha levels of 0.05 and 0.01 were used to define statistical significance.

Research Question 3

To answer research question three "What interactions of borrower-related and mortgage-related factors are statistically significant predictors of foreclosure?" logistic regression with a stepwise method was used to determine significant predictors of foreclosure. Logistic regression was selected for the preferred method of analysis for many reasons. First, logistic regression allows for the dependent variable to be a dichotomous variable, which works well for the dependent variable in this study, which has two possibilities, 0 = Active or 1 = Foreclosed. Second, it can assess the amount of change in a dependent variable for one unit of difference in an independent variable. Lastly, multiple regression can tell us the effect of each independent variable in its contribution to variation in the dependent variable (Kachigan, 1986).

This chapter described the methods and procedures used in this study. A description of the data used and the procedure for collecting the data was discussed. Measure characteristics, research questions, and the proposed data analysis were also addressed in this chapter. Accordingly, the following empirical statistical model will be followed based on the proposed data analysis, where F = foreclosure and f = function of:

$F = f$ (borrower-related factors)

$F = f$ (mortgage-related factors)

$F = f$ (borrower-related factors*mortgage-related factors)

It is also important to note that all of the proposed data analysis in this chapter was analyzed using Statistical Package for the Social Sciences 11.5 (SPSS 11.5). The following chapter will discuss the results of the proposed data analysis.

CHAPTER IV

RESULTS

This chapter presents the results of the descriptive, bivariate, and multivariate analyses used to explain borrower- and mortgage- factors associated with foreclosure. The first section shows the results of research question one. Results of hypotheses derived from research question one will be addressed with descriptive statistics and correlations. The second section presents results of descriptive analyses and correlations used to answer hypotheses derived from research question two. Finally, the last section answers research question three by presenting the multiple logistic regression results.

Research Question One

How are borrower-related factors related to foreclosure? This question was answered in a series of steps. First, characteristics of borrower-related factors are reported based on descriptive analysis (Table 1). Among the homeowners in the U.S. population, the average age of a homebuyer is around 38 years old (Master Files: Directory Assistance and Individual Reference Database, n. d.). The mean age of the sample was 31.69 years ($SD = 11.01$), indicating a sample slightly younger than the general population. The mean for years spent at current job was 2.81 years ($SD = 3.69$). There were more White respondents (59.2%) in this study than non-White participants (36.3%). The majority of the non-White population was Hispanic with only a few cases of Asians and Native Americans present. There were no Black respondents in this data. The majority of the respondents were first-time homebuyers (90.5%), while only 9.5 percent were not first-time homebuyers. The number of dependents per household was

Table 1

Descriptives for Independent Variables (Borrower-Related Factors)

Variables	n	(%)	Minimum	Maximum	Mean	(*SD*)	Median
Age of borrower	141	(78.8)	18.00	69.00	31.69	(11.01)	28.00
Years at job	179	—	0.00	25.00	2.81	(3.69)	2.00
Race of borrower							
White	106	(59.2)	—	—	—		—
Non-White	65	(36.3)	—	—	—		—
First-time homebuyer							
Yes	162	(90.5)	—	—	—		—
No	17	(9.5)	—	—	—		—
Number of dependents							
0	107	(59.8)	—	—	—		—
1	32	(17.8)	—	—	—		—
2	25	(14.0)	—	—	—		—
3	9	(5.0)	—	—	—		—
4+	6	(3.4)	—	—	—		—
Homeownership counseling							
Yes	15	(8.4)	—	—	—		—
No	163	(91.1)	—	—	—		—
Borrower's income	152	(84.9)	1040.00	8900.00	3207.85	(1143.46)	3057.50

N = 179

lower than expected, primarily due to the fact that Utahns are known to have larger
families. In this sample, 59.8% reported no dependents at the time of purchase, 17.9 had
one dependent, 14.0% had two dependents, 5.0% had three dependents and 3.4% had
over four dependents. However, this finding could be attributed to the idea that many
homeowners may purchase a home before starting a family. Only 8.4% of the sample
had received homeownership counseling, leaving 91.1% of the sample to have gone
without homeownership counseling. Lastly, according the U.S. Bureau of the Census
(2002), the median monthly income for Utah is $4044.75. Respondents in this study
reported a lower mean income of $3207.85 ($SD$ = 1143.46) and a median monthly
income of $3057.50.

In addition to descriptive analyses, bivariate analyses were used to answer
research question one and its related hypotheses. Results of the bivariate analyses were
achieved by using Pearson (r) correlations. By using Pearson (r) correlations, a
summary of the linear relationship between the dependent variable, status of home, and
each independent variable was derived. Pearson's (r) is expressed as a number ranging
from –1.0 to 1.0, with stronger correlations existing at opposite ends of the spectrum.
More specifically, a coefficient of –1.0 indicates a perfect negative relationship, zero
indicates no relationship, and 1.0 indicates a perfect positive relationship (Knoke,
Bohrnstedt, & Mee, 2002). Table 2 shows the correlation results of the dependent
variable, status of home, with the borrower-related independent variables. Findings from
the correlations conducted with borrower-related factors show that only two variables are
statistically significantly related to the likelihood of foreclosure: borrower's race and
first-time homebuyer. The correlation coefficient for borrower's race and status of home

was $r = .302$, $p< .01$, indicating a moderately strong positive relationship between the
two variables, indicating that non-White households are more likely to default, similar to
Anderson and VanderHoff's (1999) study that found Black borrowers to have a
significantly higher default rate than White borrowers.

First-time homebuyer and foreclosure status of home yielded a correlation
coefficient with a moderate positive relationship ($r = .154$, $p < .05$), suggesting that first
time homebuyers are more likely to experience foreclosure than repeat homebuyers. This
finding supports the idea that many first-time homebuyers often have fewer resources to
draw on in difficult times, consequently making them more likely to experience
foreclosure. The remaining borrower-related factors did not show a statistically
significant correlation with the dependent variable, status of home. Correlation
coefficients for these variables can also be found in Table 2.

Table 2

Correlation Matrix of Borrower-Related Factors (Independent Variables)

and Status of Home (Dependent Variable)

Borrower-Related Factors	Pearson's (r)
Age of borrower	-.122
Race of borrower	.302**
First-time homebuyer	.154*
Number of dependents	.073
Homeownership counseling	.051
Monthly income	-.146

*$p <.05$ ** $p <.01$

Hypotheses Tested in Research Question 1

The age of the borrower is not statistically significantly related to foreclosure.

The correlation coefficient calculated to test this hypothesis was $r = -.122$, indicating that

as the age of the borrower increased, the likelihood of foreclosure decreased. However, the relationship was not statistically significant. Thus, the null hypothesis is retained.

There is no relationship between the race of a borrower and the likelihood of foreclosure. Race of borrower was related to foreclosure; this hypothesis was rejected. The correlation coefficient produced ($r = .302, p < .01$) suggests that White borrowers are not as likely to experience foreclosure as non-white borrowers, who were found to be more susceptible to foreclosure.

There is no relationship between being a first-time homebuyer and foreclosure. The correlation coefficient calculated to test this hypothesis was ($r = .154, p < .05$), indicating that first-time homebuyers were more likely to experience foreclosure. Thus, this hypothesis was rejected because being a first-time homebuyer was statistically significantly related to foreclosure.

The number of dependents in a household is not related to foreclosure. The correlation coefficient for number of dependents in household and foreclosure showed a positive association ($r = .073$), but with no statistical significance. Thus, the null hypothesis was retained.

There is no relationship between homeownership counseling and foreclosure. While a positive relationship was found between having received homeownership counseling and foreclosure ($r = .051$), it was not statistically significant, therefore, the null hypothesis was retained.

There is no relationship between borrower's income and foreclosure. The correlation coefficient for borrower's income and foreclosure was negative ($r = -.146$), indicating that an increase in borrower's income decreases the likelihood of foreclosure,

however, this relationship was not found to be significant. Thus, the null hypothesis was retained.

Research Question Two

How are mortgage-related factors related to foreclosure? This research question was addressed the same way research question one was answered. First descriptive analyses were conducted to provide a detailed description of the sample characteristics. Results of these statistics can be found in Table 3. Among the findings were: the average loan-to-value ratio was 96.88 ($SD = 1.21$), while the median was 97.00%, reflecting the typical "3% down payment" required for FHA loans. The front-end ratio was found to be as low as 14.42%, while the maximum front-end ratio revealed as much as 51.80% of a respondent's monthly income was going towards housing expenses. Overall, the mean front-end ratio was 29.42% ($SD = 7.25$), which would be considered affordable by many lending standards. The back-end ratio revealed that the minimum amount reported was 15.50%, while the maximum amount reported was 58.14%. The mean back-end ratio was 38.53%, which would also be considered affordable according to government guidelines. In the sample, 46.9% received a gifted down payment for their home purchase, while 53.1% did not. Of those who received a gifted down payment, the mean amount was $3959.67 ($SD = 1989.25$). Those receiving gifted down payments were provided with the majority of their funds from non-profit agencies (22.9%), while a similar percent (21.8%) received gifted funds from relatives. Only 2.2% received gifted money from government programs. Lastly, the mean interest rate was 7.56% ($SD = 0.83$).

Table 3

Descriptives for Independent Variables (Mortgage-Related Factors)

Variables	n	(%)	Minimum	Maximum	Mean	(SD)	Median
Loan-to-value ratio	178	(99.4)	84.54	97.65	96.88	(1.21)	97.00
Front-end ratio	151	(84.4)	14.42	51.80	29.42	(7.25)	28.85
Back-end ratio	152	(84.9)	15.50	58.14	38.53	(0.07)	38.21
Gift amount							
Received gift	84	(46.9)	200.00	12,048.00	3,959.67	(1989.25)	3,590.00
Did not receive gift	95	(53.1)	—	—	—		—
Gift source[a]							
Relative	39	(46.4)	—	—	—		—
Non-profit	41	(48.9)	—	—	—		—
Government assistance	4	(4.7)	—	—	—		—
Interest rate	178	(99.4)	5.25	9.50	7.56	(0.83)	7.50

$N = 179$

[a]Only those cases that used gifted money, ($N=84$),
in their home purchase were examined for gift source.

Correlations of mortgage-related factors and the dependent variable were conducted after descriptive analyses. Results of these correlations can be found in Table 4. Among the correlation coefficients produced, two variables were found to be statistically significantly related to foreclosure: front-end ratio and interest rate. When correlated with the dependent variable, front-end ratio yielded a correlation coefficient of $r = .173$, $p < .05$, indicating a moderate positive relationship. Interestingly, the other statistically significant variable detected in the correlations was interest rate, which had a moderately strong correlation $(r = .451$ $p < .01)$. As interest rates increases, the likelihood of foreclosure also increases other things being equal. This positive correlation is consistent with literature on default and foreclosure.

Table 4

Correlations of Mortgage-Related Factors (Independent Variables)

and Status of Home (Dependent Variable)

Mortgage-related factors	Pearson's (r)
Loan-to-value ratio	-.019
Payment-to-income ratio (front-end ratio)	.173*
Back-end ratio	-.038
Size of down payment	.067
Interest rate	.451**

$*p < .05$ $**p < .01$

Hypotheses Tested in Research Question 2

Loan-to-value ratio is not statistically significantly related to foreclosure. The correlation coefficient achieved in this analysis was not statistically significant ($r = -$ .019). Therefore, the null hypothesis was retained.

There is no relationship between front-end ratio and foreclosure. The correlation

coefficient calculated to test this hypothesis was ($r = .173, p < .05$), indicating the higher the front-end ratio, the more likely a borrower is to experience foreclosure. Because this coefficient was significant, the null hypothesis was rejected.

Back-end ratio is not statistically significantly related to foreclosure. Surprisingly, the coefficient for back-end ratio and status of home was negative ($r = -.038$), therefore the null hypothesis was retained. This was unexpected primarily because it is anticipated that those borrowers who have higher monthly debt payments in comparison to their income, as manifested in the back-end ratio, would be more likely to experience foreclosure.

There is no relationship between size of down payment and foreclosure. The test of this hypothesis generated a correlation coefficient of $r = .067$. While this value alluded to a positive relationship, it was not sufficient to be considered statistically significant; therefore, the null failed to be rejected.

Interest rate is statistically significantly related to foreclosure. Lastly, and most surprisingly, interest rate ($r = .451, p < .01$) was found to be statistically significantly related to foreclosure. A moderately strong and positive relationship was discovered; therefore, the null hypothesis was rejected.

Research Question Three

What interactions of borrower-related and mortgage-related factors are statistically significant predictors of foreclosure? This research question was answered by using logistic regression with a stepwise method. This process involved the use of two models: a simple logistic regression model and a multiple interaction logistic

regression model. Similar to the results obtained by the bivariate correlations conducted earlier, the simple logistic regression model was used to identify what borrower- and mortgage- related variables were strongly associated with foreclosure, and in turn which variables would be appropriate to include in the multiple interaction logistic regression model. The latter tested the interaction of borrower- and mortgage- related factors and the effect on the likelihood of foreclosure. Results of both models are discussed below.

Simple logistic regression model. Since including a large number of independent variables in a regression model is never a good strategy, unless there are strong reasons to suggest that they all should be included, variables were carefully evaluated for inclusion. Therefore, variables identified as having a high number of missing values were not selected for the simple logistic model. It was evident that the variable downpayment had to be excluded from the analysis because of missing data and inconsistency in the way the insurance companies collected the information.

Logistic regressions using a stepwise procedure were then run with both the borrower-related variables and the mortgage-related variables. Results of the simple logistic regression model for borrower- related variables are presented in Table 5. Results show that the only statistically significant borrower-variable was race with a significance level of $<.01$. The relationship between race and foreclosure was positive, indicating that when race changes from 0 (White) to 1 (non-White), and the values of the other independent variables remain constant, the odds of foreclosure increased by a factor of 2.8.

Table 5

Simple Logistic Regression Model (Borrower-Related Factors)

Borrower-related factors	B	S. E.	Exp (B)
Age of borrower	-.010	.018	.990
Race of borrower	1.033	.420	2.810**
First-time homebuyer	1.284	.841	3.612
Number of dependents	.208	.193	1.231
Homeownership counseling	-.126	.746	.882
Borrower's income	-.240	.184	.787
Model chi square	17.6**	–	–
N	129	–	–

Note. **$p<.01$

Results of the simple logistic regression for mortgage-related variables are presented in Table 6. Two mortgage-related variables were found to be statistically significantly associated with foreclosure, they were: front-end ratio and interest rate. As shown in Table 6, one can see that the estimated probability of foreclosure increased by a factor of 1.07 for every 1-unit change in the front-end ratio, other things being equal. By the same token, a 1% change in interest rate increased the odds of foreclosure by a factor of 3.8, ceteris paribus. Overall the patterns observed in the regression equations provide evidence that the model is consistent with previous research.

Multiple interaction regression model. An initial analysis of regression equations with the statistically significant variables from the simple logistic regression model plus all interaction terms was performed. An interaction model allows one to determine how the relationship between two variables (interest rate and front-end ratio) varies as a function of a third variable (race). Results of the initial multiple interaction analysis can be found in Appendix B. Findings indicate that only one statistically significant

Table 6

Simple Logistic Regression Model (Mortgage-Related Factors)

Mortgage-related factors	B	S. E.	Exp (B)
Loan-to-value ratio	-.113	.147	.893
Front-end ratio	.076	.029	1.079**
Back-end ratio	-.026	.027	.975
Interest rate	1.340	.284	3.819***
Model chi square	37.42***	–	–
N	149	–	–

Note. **$p<.01$, ***$p<.001$

interaction: the interaction between race and front-end ratio. The interaction of race and interest rate was not statistically significant ($p = 0.86$), which implies that the effect of interest rate is much the same for both White and non-White borrowers in the likelihood of foreclosure.

Table 7 provides the results of the multiple interaction regression model with three main effects (race, interest rate and front-end ratio) and the one interaction term that was statistically significant in the initial model. Results indicate that the interaction of race with front-end ratio was statistically significant ($p= 0.008$), which suggest that the effect of front-end ratio differs between Whites and Non-whites. For Whites, the likelihood of foreclosure increases as front-end ratio increases, but for non-Whites the relationship with front-end ratio is nonsignificant.

Further analysis was performed to better depict how the data supports the statistical relationship for white and non-White borrowers presented in Table 7. Figures 2 and 3 show the estimated probability of foreclosure for Whites and non-Whites as a function of interest rate and front-end ratio. For Whites (Figure 2), (estimated) probability of foreclosure is approximately 25% for almost any combination of interest

Table 7

Multiple Interaction Regression Model (Borrower- and Mortgage- Related Factors and

Interaction Factor)

Independent variables	B	S. E.	Exp (B)
Race of borrower	5.257	1.845	191.998**
Front-end ratio	0.111	0.035	1.117**
Interest rate	1.370	0.323	3.935***
Race of borrower*front-end ratio	-0.158	0.060	0.854**
Model chi square	47.065***	–	–
N	142	–	–

Note. **$p<.01$, ***$p<.001$

rate below about 7.5% and front-end ratio at or below 30%. Foreclosure probability then

rises significantly with either increasing interest rate or increasing front-end ratio, or

both. For example, foreclosure for whites is almost certain for any combination of

interest rate above 9% and front-end ratio above 40%. The figure for non-Whites (Figure

3) incorporates the non-significant effect of front-end ratio mentioned above, and hence

the estimated probability is constant with respect to front-end ratio. However, as the

model of Table 7 indicates, probability of foreclosure does rise significantly for non-

Whites as for Whites as interest rate increases. Overall, the non-White estimated

foreclosure probability surface is higher than that for Whites at any combination of

interest rate and front-end ratio because of the much higher overall foreclosure rate for

non-Whites versus Whites, although there is effectively no difference between White and

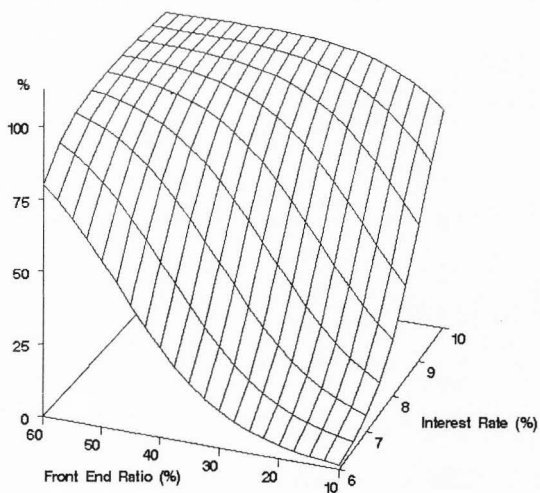non-White borrowers at high interest rates and front-end ratios.

Figure 2. Surface plot of estimated foreclosure probability for White borrowers
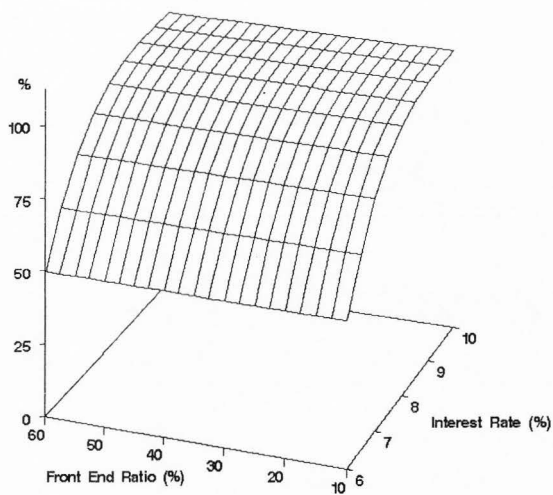
Figure 3. Surface plot of estimated foreclosure probability for non-White borrowers

Summary of Findings

This chapter presented the results of the descriptive, bivariate and multivariate analyses used to explain the borrower- and mortgage-related factors associated with foreclosure. The first section showed the results of research question one, "How are borrower-related factors related to foreclosure?" To answer this question, bivariate correlations using Pearson's (r) were used. Borrower-related factors found to be statistically significantly associated with foreclosure included: race of borrower ($r = .302$, $p<. 01$) and first-time homebuyer ($r = .154$, $p<.05$). Both factors indicated a moderately strong positive relationship.

Similarly, research question two, "How are mortgage-related factors related to foreclosure?" was answered by using Pearson's (r) correlations. Findings of these analyses concluded that two variables were found to be statistically significantly related to foreclosure. They were front-end ratio ($r = .170$, $p<.05$) and interest rate ($r = .451$, $p <.01$); where both relationships were moderately strong and positive. In total four of the twelve null hypotheses were rejected due statistical significance.

To answer research question three "What interactions of borrower-related and mortgage-related factors are statistically significant predictors of foreclosure, logistic regression with a stepwise method was used in three different models. The first model conducted logistic regression with all borrower-related factors. Race of borrower was found to be a statistically significant predictor of foreclosure. The second model used stepwise regression with all the mortgage-related factors. Findings from this analysis showed that front-end ratio and interest rate were statistically significant predictors of foreclosure. The third model tested for the main effect by including the three significant

factors from model 1 and model 2 with interaction terms. Findings indicate that the interaction of race and front-end ratio is a statistically significant predictor in foreclosure. This relationship was explored more with surface plots of White borrowers and Non-white borrowers to examine the effect of front-end ratio.

CHAPTER V

DISCUSSION

As the foreclosure rate continues to grow, it is expected that many families, neighborhoods, and housing markets will suffer. Despite this fact, little empirical research exists about the basic characteristics of those individuals who will experience foreclosure. This study attempted to add insight to the basic understanding of the borrower- and mortgage-related factors associated with foreclosure.

In revisiting the two primary theories on mortgage default and foreclosure: the ability-to-pay theory and the equity theory, this study derives results consistent with the ability-to-pay theory. As reviewed by Clauretie and Sirmans (2003), the ability-to-pay theory asserts that borrower-characteristics such as family size, income, number of dependents, etc. can be used to help explain or predict default and foreclosure, such as the case with this study. Front-end ratio, first-time homebuyers, borrower's race, and interest rate all were found to have statistical significance. No findings in this study supported the equity theory.

Similar to the findings of Quercia and colleagues' (1995) study, this study found that the ratio of housing cost to income exhibited a consistent significant positive effect on the likelihood of foreclosure. This finding conveys the importance of adhering to the recommended guidelines of affordability and being aware that those individuals who exceed 28%-33% percent in monthly housing expenses are "constrained buyers" (Mayer & Englehardt, 1996). While different front-end ratios fit different situations, it has been found in both this study and previous research that the more monies going towards monthly housing obligations take away from precious monies needed for other basic

living expenses. In severe cases, monies tied up in housing obligations can lead a family to become insolvent, which is the primary motivation for mortgage default (Elmer & Seelig, 1998).

Another important finding of this study was the positive relationship between first-time homebuyers and foreclosure. This finding implies that many first-time homebuyers may not be financially stable enough to support their housing obligations. Assuming that many first-time homebuyers have fewer resources to draw upon, a financial hardship, income fluctuation, or unplanned expense may trigger a household to experience foreclosure. This finding coupled with Elmer & Seelig's (1998) results on the effect of "trigger events" creates an awareness of the susceptibility of first-time homebuyers.

Another possible risk worth mentioning is the combination of a high front-end ratio and a first-time homebuyer. In her study, Delgadillo (2003) stated that "having many first time home owners stranded in homes they cannot afford would certainly lead to more foreclosures because it would make it impossible for families to send their mortgage payment and property taxes which in turn could lead to more consumer debt and bankruptcy" (Delgadillo, p. 24). Greater caution should be taken in preparing first-time homebuyers for their homeownership obligations.

Borrowers' race showed a positive correlation with the likelihood of foreclosure. In addition to being statistically significant, this finding has a lot of practical significance. Many studies have documented the fact that non-White borrowers in general, and Hispanic borrowers in particular (as is the case in this study where 35.8% of the sample was Hispanic), often have trouble understanding the home buying process in the United

States. Factors such as different lending systems, language differences, and lack of credit and payment plan knowledge may all be barriers to a non-White borrower when purchasing and maintaining a home. Perhaps placing a greater emphasis on pre- and post- purchase homeownership counseling may decrease the likelihood of non-White borrowers falling victim to foreclosure.

Interest rate was also found to have a significant relationship with foreclosure. Perhaps this finding is indicative of more than just a "numbers game." Interest rate could be an indicator of the likelihood of paying back money owed on a loan—primarily because it is based on credit rating which reflects payment history. It is also important to note the possibility of high interest rates reflecting either predatory lending practices, particularly among minority borrowers, or extra premium charges to borrowers who are perceived by lenders to be high risk. A recent article in *The Salt Lake Tribune* stated that Utah was one of worst areas in the country for deceptive loan practices. In Utah, many lenders have been accused of engaging in fraud by promising reasonable interest rates and terms while delivering loans loaded with excessive fees and high interest rates (Mitchell, 2003). While excessively high interest rates may not have been present in this sample, due to the fact that the sample consists of FHA loans, the impact of high interest rates on the likelihood of foreclosure can be confirmed by the results of this study.

Lastly, one surprising result of this research is that many of the factors associated with default and foreclosure in the literature were not significant predictors when included simultaneously in the logit models. For example, neither age of borrower nor number of dependants are significant predictors in any of the models. Neither are loan-to-value ratio or back-end ratio significant predictors.

Limitations

Although the interaction modeling used in this study provided a greater insight into factors associated with foreclosure, the study is also subject to several limitations that need to be noted. First, the data used in this study were cross-sectional data from 2000 and 2001. Originally, data were collected from as early as 1994, however, lack of reporting requirements in the housing industry caused data from 1994 to 1999 to often be incomplete. Therefore, to assure the greatest amount of accuracy in this study, data were limited to 2000 and 2001, thus representing only home loans that were originated during those two years.

Another limitation to this study is that the data used only represents approximately 14% of the total 1286 foreclosed FHA homes in Utah for 2000 and 2001. Therefore, this sample is not representative of all foreclosures involving FHA loans and cannot be generalized to all types of FHA loans or any conventional loan products. Lastly, findings can only be generalized for the state of Utah. Data collected also did not allow for open-ended responses, which would have allowed for the researcher to study the effect of trigger events in the role of foreclosure. In addition, there was no information in the data set that addressed the role of the lender, appraiser, or underwriter in the homebuying process. Mitchell (2003) speculated that a lot of cases of foreclosure are a result of unethical lenders, appraisers, and underwriters. This facet would have been nice to study. Lastly, this study was cross-sectional in nature, which allowed the researcher to only observe the respondents at one point in time.

Recommendations for Future Research

Based on the findings of this study, it is evident that more funding needs to be allotted for education and research during the homeownership process. Valiant efforts in educating homebuyers prior to purchasing their homes and after purchasing their homes may result in a decrease in the number of foreclosures a community experiences.

A suggestion for future research would be to use a national, longitudinal, data set. This would allow for the data to be generalized to larger populations and it would allow the researcher to study the foreclosure process over a longer period of time. As previously mentioned a limitation to this study is that it only allows for a snapshot of a specific point in time. The research had no way to measure changes in borrower- and mortgage factors such as back-end ratio, number of dependents, etc. Almost all borrower- and mortgage related factors are subject to change throughout time. Measuring these different factors and different points in time would allow the researcher capture the effects of time in the foreclosure process.

Other studies would benefit from a data set that is designed with a mixture of open-ended and close-ended responses. By introducing open-ended responses into the study, the researcher will be able to study the role of trigger events in the foreclosure process. This will take into account life factors such as divorce, job loss, etc. that cannot always be measured in closed-ended questionnaires.

Finally, this study would benefit from an aspect that would assess the role of outside parties in the foreclosure process, for example, the role of the loan officer, underwriter and appraiser. There has also been much speculation about the role of downpayment grant agencies in the foreclosure process. While this study was not able to

examine these factors, future research would be greatly enriched by exploring the role of these factors in the foreclosure process.

REFERENCES

Ambrose, B. W., & Capone, C. A. (1998). Modeling the conditional probability of
foreclosure in the context of single-family mortgage default resolutions. *Real
Estate Economics, 26*(3), 391-429.

Anderson, R., & VanderHoff, J. (1999). Mortgage default rates and borrower race.
Journal of Real Estate Research, 18(2), 279-289.

Baxter, V., & Lauria, M. (2000). Residential mortgage foreclosure and neighborhood
change. *Housing Policy Debate, 11*(3), 675-699.

Chi, P., & Laquatra, J. (1998). Profiles of housing cost burden in the United States.
Journal of Family and Economic Issues, 19(2), 175-193.

Clauretie, T. M., & Sirmans, G. S. (2003). *Real estate finance: Theory and practice.*
Mason, OH: Thomas Learning.

Cunningham, D. F., & Capone, C. A. (1990). The relative termination experience of
adjustable to fixed-rate mortgages. *Journal of Finance, 45*(5), 1687-1703

Delgadillo, L. (2001). A model of factors correlated to homeownership: The case of
Utah. *Family and Consumer Sciences Research Journal, 30*(1), 3-36.

Delgadillo, L. (2003). A financial profile of first time homebuyers in Northern Utah.
Housing and Society, 30(1), 86-104.

Elmer, P. J., & Seelig, S. A. (1998). Insolvency, trigger events, and consumer risk
posture in the theory of single-family mortgage default. *Journal of Housing
Research, 10*(1), 1-25.

England, R. (2002, February). Giving it 100 percent. *Mortgage Banking*, 67-76.

Federal Deposit Insurance Corporation. (1996). *The rising long-term trend of single-*

family mortgage foreclosure rates. Retrieved February 25, 2003, from

http://www.fdic.gov/bank/analytical/working/98-2.pdf

Hirad, A., & Zorn, P. M. (2001). *A little knowledge is a good thing: Empirical evidence of the effectiveness of pre-purchase homeownership counseling.* Retrieved March 12, 2003, from Harvard University, Joint Center for Housing Studies Web site: http://www.jchs.harvard.edu/publications/homwon/liho01-4.pdf

Joint Center for Housing Studies. (2002). *The state of the nation's housing.* Retrieved March 11, 2003, from Harvard University, Joint Center for Housing Studies Web site: http://www.jchs.harvard.edu/publications/markets/Son2002.pdf

Kachigan, S. K. (1986). *Statistical analysis: An interdisciplinary introduction to univariate & multivariate methods.* New York: Radius Press.

Knoke, D., Bohrnstedt, G., & Mee, A. (2002). *Statistics for social data analysis.* Itasca: F. E. Peacock.

Lown, J. M., & Rowe, B. R. (in press). A profile of consumer bankruptcy petitioners. *Journal of Law and Family Studies.*

Mayer, C., & Engelhardt, G. (1996). Gifts, down payments, and housing affordability. *Journal of Housing Research, 7*(1), 59-77.

Mitchell, L. (2003, February 27). Foreclosures brisk in Utah. *The Salt Lake Tribune,* pp. E1, E2.

Master Files: Directory Assistance and Individual Reference Database. (n.d.). *MasterFiles National New Homeowner File.* Retrieved July 1, 2003, from http://www.masterfiles.com/products/homeowner.html.

Mortgage Bankers Association of America. (2002). *National delinquency survey*

state press release [Data file]. Available from Mortgage Bankers Association of America Web site, http://www.mbaa.org/marketdata/

Morton, T. G. (1975). A discriminant function analysis of residential mortgage delinquency and foreclosure. *AREUEA Journal, 3*(1), 73-90.

Noecker-Guadagno, M. (1992). Families with high housing expenditures: A comparison of homeowners and renters. *Family Economics Review, 5*(2), 2-11.

Quercia, R. G., McCarthy G. W., & Stegman, M. A. (1995). Mortgage default among rural, low-income borrowers. *Journal of Housing Research, 6*(2), 349-369.

Quercia, R. G., & Stegman, M. A. (1992). Residential mortgage default: A review of the literature. *Journal of Housing Research, 3*(2), 341-380.

Simon, R., & Higgins, M. (2002, June 12). Stretched buyers push mortgage levels to a new high. *The Wall Street Journal*, pp. D1, D3.

Sullivan, T. A., Warren, E., & Westbrook, J. L. (2000). *The fragile middle class.* New Haven, CT: Yale University Press.

U.S. Bureau of the Census. (2002). *Median household income by state*. Retrieved October 4, 2003 from

http://www.census.gov/hhes/income/income02/statemhi.html

Vandell, K. D., & Thibodeau, T. (1985). Estimation of mortgage defaults using disaggregate loan history data. *AREUEA Journal, 13*(3), 292-316.

Von Furstenberg, G. (1969). Default risk on FHA-insured mortgages as a function of the terms of financing: A quantitative analysis. *Journal of Finance, 24*, 459-477.

Webb, B. G. (1982). Borrower risk under alternative mortgage instruments. *Journal of Finance, 37*(1), 169-183.

APPENDICES

Appendix A. Institutional Review Board Approval

UtahState
UNIVERSITY

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3/17/2003

MEMORANDUM

TO: Lucy Delgadillo
        Amber Gallagher

FROM: True Rubal, IRB Administrator

SUBJECT: Factors Affecting the Likelihood of Foreclosure Among UT Homebuyers

Your proposal has been reviewed by the Institutional Review Board and is approved under exemption #4.

X   There is no more than minimal risk to the subjects.
        There is greater than minimal risk to the subjects.

This approval applies only to the proposal currently on file for the period of one year. If your study extends beyond this approval period, you must contact this office to request an annual review of this research. Any change affecting human subjects must be approved by the Board prior to implementation. Injuries or any unanticipated problems involving risk to subjects or to others must be reported immediately to the Chair of the Institutional Review Board.

Prior to involving human subjects, properly executed informed consent must be obtained from each subject or from an authorized representative, and documentation of informed consent must be kept on file for at least three years after the project ends. Each subject must be furnished with a copy of the informed consent document for their personal records.

The research activities listed below are exempt from IRB review based on the Department of Health and Human Services (DHHS) regulations for the protection of human research subjects, 45 CFR Part 46, as amended to include provisions of the Federal Policy for the Protection of Human Subjects, June 18, 1991.

4. Research, involving the collection or study of existing data, documents, records, pathological specimens, or diagnostic specimens, if these sources are publicly available or if the information is recorded by the investigator in such a manner that subjects cannot be identified, directly or through identifiers linked to the subjects.

Appendix B. Additional Table

Table B1

Multiple Interaction Regression Model (Borrower-Related Factors, Mortgage-Related

Factors, and the Interaction of Borrower-Related and Mortgage-Related Factors)

Interaction of factors	B	S. E.	Exp (B)
Borrower's race	15.066	5.810	3491545.90**
Front-end ratio	-.460	.407	.631
Interest rate	-.444	1.602	.641
Race*front-end ratio	-.191	.064	.826**
Race*interest rate	-1.183	.689	.306
Front-end ratio*interest rate	.080	.056	1.083
Model chi square	52.074***	–	–
N	179	–	–

Note. **$p<.01$, ***$p<.001$