

### **The Proof: Pre-Purchase Homebuyer Education and Successful Homeownership**

Tennessee Housing Development Agency (THDA), like many HFAs across the country, invests heavily in pre-purchase homebuyer education for potential homebuyers. Our training partners, who work with homebuyers every day, know their counseling helps households find good homes and make wise homeownership decisions. This is not limited to Tennessee, housing counselors across the country know – and see first-hand – the impact that good education programs can have on potential homebuyers. However, this on-the-ground knowledge notwithstanding, empirical studies of the effectiveness of homebuyer education have been few and fraught with methodological challenges. To rectify this problem, THDA partnered with a graduate student from Vanderbilt University, Scott Brown, to provide one of the most methodologically sound analyses of homebuyer education yet undertaken.

The results were striking: controlling for a host of household and loan characteristics, THDA's homebuyer education reduced the odds of foreclosure by as much as 97 percent.

The study looked at the impact of homebuyer education in two separate THDA loan programs: one that provides downpayment assistance (Great Start) and one that has THDA's lowest interest rate (Great Rate). Brown used THDA's extensive data on borrowers, loans, and homebuyer education to construct a dataset that was unique in the field for several reasons.

1. It was able to make two important types of comparisons:
  - a. A comparison between those borrowers in the Great Rate program who took homebuyer education voluntarily versus those who did not.
  - b. The second comparison took advantage of a natural experiment to compare Great Start borrowers in a 2002 loan cohort who took homebuyer education as a precondition for down payment assistance, and those who received the down payment assistance without taking homebuyer education during the first few months of the program before the homebuyer education network was fully developed.
2. The homebuyer education was based on a standardized curriculum for all participants. Previous studies concluded that the delivery method of pre-purchase counseling affects the outcome. Thus, this study was able to reduce estimation problems associated with differences in the curriculum, duration, and format of homebuyer education.

The results of this study showed that THDA's approach to homebuyer education is working.

The 337 homebuyers in the Great Rate loan program in 2005 and 2006 who voluntarily took homebuyer education courses had a 50 percent reduction in the odds of foreclosure compared to the 3,379 Great Rate buyers who did not take the homebuyer education courses.

**Agency: Tennessee Housing Development Agency**  
**2012 Entry: Special Achievement**

In the first year of the Great Start program (2002), the 252 participants who received homebuyer education reduced the odds of foreclosure by 97 percent when compared to the 478 participants for whom homebuyer education was not available. This finding was particularly impressive as, unlike in the Great Rate study, access to homebuyer education was not a choice, but based on its availability in the early days of the program. This means we can be confident that the connection between homebuyer education and lower rates of foreclosure is due to participation in the class, rather than some other confounding variable. Today, all Great Start borrowers benefit from homebuyer education.

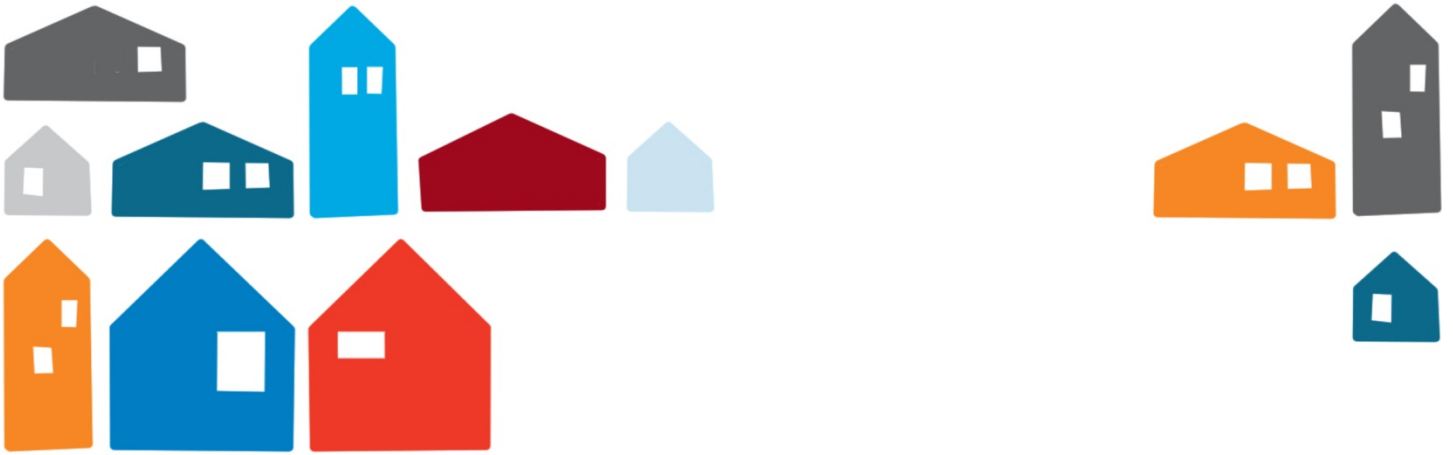
THDA has developed an efficient and effective pre-purchase counseling delivery system that is available for all mortgage borrowers. THDA requires pre-purchase counseling with all of its downpayment assistance mortgage loans and commits substantial resources to supporting our counseling network in providing this training. Brown's study shows that this commitment of resources, and the attendant program requirements, were justified by producing lower delinquency rates in the participants.

THDA's mission is to provide safe, sound, affordable housing opportunities and this is achieved through reducing each homeowner's likelihood of foreclosure. However, the communities in which they reside also stand to benefit greatly from reductions in foreclosure rates. Further, Brown's study also shows that THDA's investment in homebuyer education is a wise decision for THDA's portfolio. Every foreclosure prevented saves THDA a significant amount of money. Thus, only a slight decline in foreclosure rates is necessary for homebuyer education for every loan applicant to be a worthwhile investment.

These findings should be relevant and useful to all state HFAs. Moreover, THDA believes that this study is possibly the only one to specifically study the sustainable positive impact of the counseling during the time of the collapse of the housing market – an important public policy finding for everyone involved in this business. We believe these findings support expanding the role of homebuyer education in our mortgage programs and throughout the state. We further believe that doing so can impact the success of first-time homebuyers in Tennessee and other states.

The master's thesis that Mr. Scott Brown completed as a result of this work is the main product, and a copy is attached. THDA has also produced a Summary of Findings which is accessible for a much wider audience, posted on THDA's site: [www.thda.org](http://www.thda.org).

Supporting Documentation: Summary of Findings; complete thesis.



# Risk Reduction and Sustainable Lending: **The Effect of Pre-Purchase Homebuyer Education on Mortgage Foreclosure**

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2010

## Summary of Findings



## Introduction

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Pre-purchase homebuyer education is viewed as a strategy to prevent foreclosures and delinquency among new homebuyers. However, there are few analyses about the effectiveness of homebuyer education initiatives. Scott Brown's study uses lending data from the Tennessee Housing Development Agency to explore whether there is a reduction of foreclosure among homebuyers receiving homebuyer education versus those who do not receive the education. The study, using the loans originated between 2002 and 2006, looks at the impact of homebuyer education in two separate THDA loan programs: one that provides downpayment assistance (Great Start) and one that has THDA's lowest interest rate (Great Rate).

## The Findings

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The 337 homebuyers in the Great Rate loan program who voluntarily took homebuyer education courses had a 50 percent reduction in the odds of foreclosure compared to the 3,379 Great Rate buyers who did not take the homebuyer education courses.

In the first year of the Great Start program (2002), the 252 participants who received homebuyer education reduced the odds of foreclosure by 97 percent when compared to the 478 participants for whom homebuyer education was not available. This finding was particularly impressive as, unlike in the Great Rate study, access to homebuyer education was not a choice, but based on its availability in the early days of the program. This means we can be confident that the connection between homebuyer education and lower rates of foreclosure is due to participation in the class, rather than some other confounding variable. Today, all Great Start borrowers benefit from homebuyer education.

This research shows that homebuyer education, as required by the Tennessee Housing Development Agency, was able to substantially reduce the likelihood of foreclosure among the two comparison groups (Great Rate and Great Start borrowers used in the analysis). These results were strong across voluntary and mandatory homebuyer education initiatives. It is important to note this study is perhaps the only one done with a sample that includes the time of the housing bubble collapse. To see that homebuyer education maintains its mitigating effect on foreclosure even in a time of significant distress in the housing market and in the economy overall is compelling.

## Previous Research on Homebuyer Education

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Homebuyer education has been found by several studies to reduce the likelihood of foreclosure and delinquency. However, previous research has limitations that stem from the fact that lending data is housed in one place, whereas counseling is housed elsewhere, often without the ability to use and/or link the two together. Brown's study addressed this issue by using a dataset that contains both lending and counseling data.

Hirad and Zorn (2001) conducted a large study of 40,000 Freddie Mac loans. Homeownership counseling among Freddie Mac Affordable Gold loans was associated with a 19 percent decrease in



the likelihood of ever being 90 days or more delinquent (Hirad and Zorn, 2001). The course delivery method was also examined, with their final analysis showing an effect present only for classroom counseling as opposed to individual counseling. Hartarska and Gonzalez-Vega (2006) looked at a pre-purchase credit counseling program affiliated with a bank. The counseled borrowers had a 39 percent lower hazard for default. However, the study was conducted with a small sample (233 loans) and was related to credit counseling rather than homebuyer education, which can offer additional housing-specific curriculum.

## Tennessee Housing Development Agency's Homebuyer Education Initiative

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The Tennessee Housing Development Agency (THDA) started the Homebuyer Education Initiative in 2002. This also becomes the start date for the analysis presented in this study. The curriculum covers four basic content areas: 1) Budgeting and Credit, 2) Shopping for a Home, 3) Getting a Mortgage Loan, and 4) Keeping Your Home and Managing your Finances (including instruction on home maintenance). The homebuyers are required to receive eight hours of training, which is predominantly classroom-based, though one-on-one instruction is offered on a limited basis in some rural areas.

There are several advantages to the THDA program and data being used to analyze the effectiveness of homebuyer education in preventing foreclosure. First, both the counseling participation and lending information are present in the data. Second, there are curriculum and instructional method standards that must be adhered to in order to be a part of THDA's program. The type of classes, the depth and duration of instruction, and other course specific information is consistent across providers and across geographic areas.

The ability to look at the impact of homebuyer education across two different loan programs strengthens the analysis. Borrowers in the Great Rate program can voluntarily sign up for homebuyer education. So borrowers who participated in the homebuyer education program can be compared to those who did not. Second, borrowers in the down payment assistance program, Great Start, are required to take homebuyer education. However, in 2002, when the program began, courses were not available statewide so some Great Start borrowers did not take the course. This allows for a comparison of similarly positioned borrowers who had different exposure to the homebuyer education courses.

## The Analysis

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To examine the effectiveness of THDA's homebuyer education program in preventing foreclosure, three potential outcomes were examined for each borrower: 1) the loan remains active (as of October 15, 2009), 2) the mortgage resulted in foreclosure, or 3) the homeowner sells the home (prepays the mortgage). Using a multinomial regression model, the likelihood for each of these outcomes is estimated, controlling for the age of the loan, borrower demographics (age, race, gender, household size) and underwriting and mortgage characteristics (e.g. LTV, credit score, down payment, voluntary vs. required homebuyer education).



## Limitations

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While this study was able to utilize relatively strong comparison groups for a non-experimental study, particularly with the 2002 Great Start group, in the absence of random selection into homebuyer education, the extent to which unobservable factors, such as borrower motivation or previous financial knowledge, biased the estimates of the effect of homebuyer education is unclear. Second, this study implicitly assumed that the borrowers who took homebuyer education received the full eight hours of instruction and could not control for variables such as instructor quality and fidelity to the curriculum. However, receiving less than the full number of hours or subpar quality of instruction would bias the effects of HBE downward and thus would not account for the positive effects observed. This study was also unable to measure whether homebuyer education was received prior to finding a home or not, so it is unclear whether homebuyer education is actually influencing the home and mortgage selection process. Third, the smaller sample size for the 2002 Great Start cohort limited the number of factors that could be included in the model without compromising statistical power. Fourth, there was no indication as to whether borrowers received some form of post-purchase counseling or whether pre-purchased education influenced help-seeking behavior if they experienced trouble in meeting their mortgage payments. Fifth, THDA loans tend to be safer and more closely monitored than the loans in the subprime mortgage databases utilized in other foreclosure studies, which may limit the degree to which the results of this study can be generalized to lower quality loan pools. Finally, a reexamination of the data using “event history” or “survival analysis” statistical techniques may provide a more reliable and valid set of results.

This study was completed with the cooperation of the

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RISK REDUCTION AND SUSTAINABLE LENDING: THE EFFECT OF  
PRE-PURCHASE HOMEBUYER EDUCATION  
ON MORTGAGE FORECLOSURE

by

Scott Ransom Brown

Thesis

Submitted to the Faculty of  
Peabody College of Vanderbilt University  
in Partial Fulfillment of the Requirements  
for the Degree of

MASTER OF EDUCATION

in

Community Development and Action

May 2010

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Major Professor

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## ACKNOWLEDGMENTS

This work would not have been possible without the support of the Tennessee Housing Development Agency. I appreciate of the support and assistance provided by Laura Sinclair, Director of Single Family Housing, Bettie Teasley, Assistant Director of Research and Planning, John Hubard, Systems Analyst, Ed Lozier, Single Family Production Coordinator, and Vickie George, Homebuyer Education Specialist. I also greatly appreciate the feedback and guidance I have received from my advisor Professor Susan Saegert and my reader Professor Beth Shinn. Additional thanks to Professor Tony Brown for his input on statistical methodology and resources on using R to conduct the statistical analyses.

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## CHAPTER I

### INTRODUCTION

In the wake of the recent housing market bust, there is renewed interest over whether pre-purchase homebuyer education is effective as a tool for promoting sustainable homeownership. However, strikingly little is known regarding whether homebuyer education is positively affecting mortgage outcomes. The earliest roots of homebuyer education and counseling stemmed from the U. S. Department of Housing and Urban Development's (HUD's) instituting foreclosure and post-purchase counseling as an after-the-fact corrective measure to the wave of foreclosures that came out of HUD's Section 235 Program, which provided mortgage insurance and interest subsidies to lower income homebuyers (Quercia & Wachter, 1996). However, in the mid-1990s with the emergence of low-income lending mandates for Fannie Mae and Freddie Mac, stricter enforcement of the Community Reinvestment Act, and President Clinton's goal of increasing homeownership in the US by 2.5 percentage points, new measures were needed if federal goals were to be met without significant increases in default rates (Quercia & Wachter, 1996). Pre-purchase homebuyer education re-emerged out of this context, offering a preventative measure for decreasing default risk by preparing previously untapped segments of the population to be first-time homeowners and a means to increase homeownership by functioning as a cost-effective sorting mechanism for helping banks find qualified borrowers in these new markets.

The intuitive logic of homebuyer education—educated homebuyers should have better loan outcomes than non-educated homebuyers—has a strong appeal. However, there has been a notable dearth of empirical studies on the effects of pre-purchase homebuyer education on homeowners' long-term mortgage outcomes, especially given the extent to which it has become an essential tool of state and federal housing policy. Discerning the effect homebuyer education has on homeownership outcomes, particularly among lower-income and higher credit risk populations who were the main targets of efforts to increase homeownership rates, is also of prime importance in understanding how to move forward in shaping the future of US housing policy. Despite interest in gaining a greater understanding of the effectiveness of homebuyer education, a multiplicity of data, research design, and ethical challenges (detailed later in this paper) have stymied most research attempts to date. Thus, the effects of homebuyer education, which has become a key tool in low-income lending because of its wide ranging use, practicality, and perceived utility in reducing foreclosure risk, have been relatively untested. This paper is an effort to lay out a conceptual model for how homebuyer education may contribute to sustainable homeownership and to contribute to the empirical knowledge base of the effects of homebuyer education.

This study is divided into three parts. The first part develops an understanding of the chain of causal linkages between homebuyer education and mortgage outcomes by proposing a synthesis of implicit causal models used in the research literature. This causal model provides a working framework for assessing what is currently known about homebuyer education and mortgage default. The second part contains empirical analysis of loans originated between 2002 and 2006 held by the Tennessee Housing Development

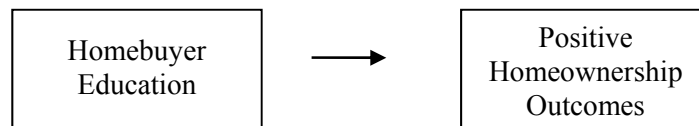
Agency to determine the effects of homebuyer education on foreclosure and prepayment rates. The final part examines the strengths and weaknesses of the study and provides methodological and substantive recommendations for future research and policymaking.

## CHAPTER II

### LITERATURE REVIEW

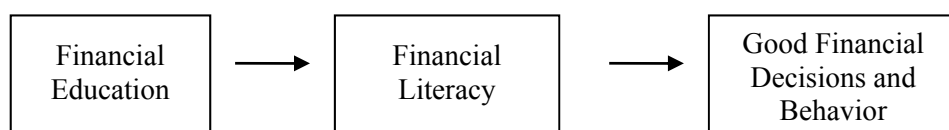
The subtitle of Hiras and Zorn's (2001) frequently cited study of the relationship between homebuyer education and 90 day delinquency, "A Little Education Is A Good Thing," essentially frames an underlying causal model and justification for providing homebuyer education that has been used in empirical studies to date:

**Figure 1: Implied Casual Model of Homebuyer Education**



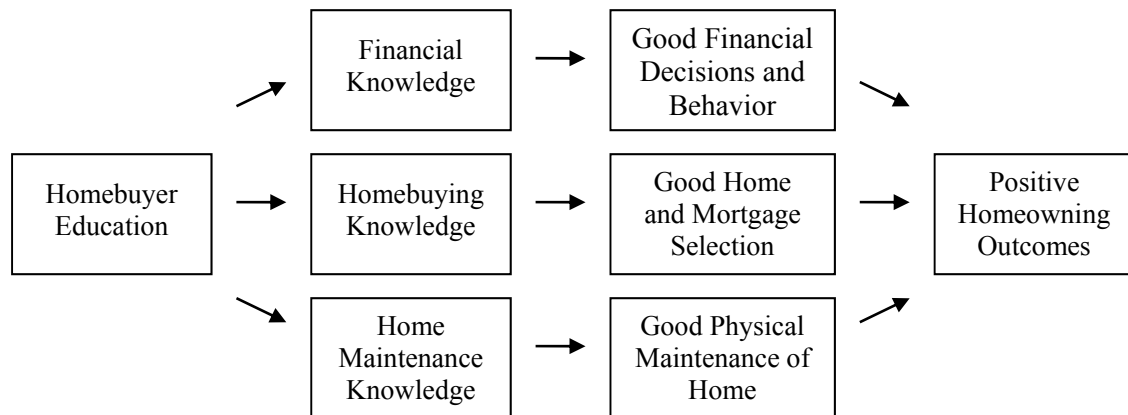
Willis (2009), looking more narrowly at financial education, outlines an implicit model of what an effective financial education program does that serves as a useful building block toward framing a more complete model to serve as a heuristic device for assessing the current status of the literature on homebuyer education and suggesting directions for future research:

**Figure 2: Implied Casual Model of Financial Education**



The following represents an integration of these two models and a more nuanced reading of the different elements of a homebuyer education program to establish a basic causal framework for understanding how homebuyer education affects homeownership outcomes:

**Figure 3: Proposed Causal Model for Pre-Purchase Homebuyer Education**



Studies of the impact of homebuyer education on homeownership outcomes to date have directly examined the link between homebuyer education and mortgage outcomes, treating the intermediate linkages of obtaining knowledge and knowledge producing changes in behavior as a black box. Other studies have more narrowly focused on a general link between financial education and financial behavior. To date, no studies have been conducted examining the linkages between homebuying knowledge and home and mortgage selection or between the home maintenance portion of homebuyer education and maintenance outcomes. Additionally, no outcomes studies to date have had sufficient data to be able to account for the intermediate linkages. This study is unable to resolve this problem, given the data available, and utilizes the black box approach of

Figure 1 while recognizing the need for future research designs to consider a more comprehensive approach.

To assess the research literature in the context of this proposed model, I begin by highlighting the methodological and data challenges and constraints that have limited research on homebuyer education to date. I then examine both the limited number of studies on the relationship between homebuyer education and mortgage outcomes and the broader group of studies focusing more narrowly on the intermediate link between financial education and financial behavior. Finally, I survey the more extensive mortgage default literature to identify key factors other than homebuyer education that influence mortgage outcomes to control for in the present study, and identify the gaps this study addresses in the context of these three bodies of literature.

### *Challenges in Researching Homebuyer Education*

The challenges in studying homebuyer education can be divided into two main categories: data problems and methodological problems, with a third category of ethical challenges being interwoven throughout. With respect to data problems, a PricewaterhouseCoopers feasibility study conducted in 1999 (in Mallach, 2001) found that lenders did not have specific data on counseling, that loan performance data were nearly impossible to link to origination data due to securitization and sale of loan packages, and that little to no demographic data were available from lender sources. The problems that PricewaterhouseCoopers discovered also highlight how data needed to conduct a homebuyer education study is typically siloed such that education providers have detailed demographic and counseling-related information while lenders have comprehensive data on loan origination and performance. Additionally, collecting data

solely from housing counseling agencies usually fails to provide for an adequate comparison group, as all their clients have received the intervention. By using data from a state housing finance agency that records both loan and homebuyer education information (though with more detail on the former) this study provides a unique opportunity for overcoming the data hurdles that have limited previous attempts to study homebuyer education.

Methodological problems in studying homebuyer education abound. The most perplexing challenge is the non-standardized nature of the homebuyer education industry in a variety of categories: curriculum, duration of program, teacher or counselor experience and training, delivery method, types of providers, and size of providers. A second critical problem is an inability to eliminate selection bias in establishing a reasonable comparison group in the absence of experimental designs. Homebuyer education often is required in order to receive various forms of financial assistance with a mortgage, eliminating contrasts between those who received education and those who did not, confounding homebuyer education with the effects of financial assistance, and potentially creating an ethical dilemma in withholding education in the absence of alternate provisions. In cases where homebuyer education is voluntary, the potential effect of selection bias may be large, as Hiram and Zorn's (2001) study will demonstrate. Added to these challenges is the fact that wide variation in housing market conditions and economic conditions across local areas make it difficult to generalize study findings outside of the areas where the study sample was located. Also, referring back to Figure 3, different components of homebuyer education content can also have differential effects on outcomes, but these potential differences have been left unexplored due to data siloing

between financial institutions and homebuyer education providers as well a lack of longitudinal data on changes in homebuyer's financial behavior. Finally, the definition of success in a homebuyer education program is contingent on the stakeholder perspective being used. From the borrower's perspective, foreclosure may actually be the optimal decision if the home is deep in negative equity, but foreclosure is not considered a successful loan outcome by most lenders. Similarly, providing financial education to borrowers in homebuyer education may provide them with a greater understanding of when it is to their advantage to refinance their home, which would also produce a less favorable result for lenders.

#### *Homebuyer Education*

Hirad and Zorn (2001) completed the largest study to date on pre-purchase homebuyer education, using a two-stage logistic regression model to analyze a sample of almost 40,000 Freddie Mac Affordable Gold loans. They found that homeownership counseling was associated with a 19% decrease in the likelihood of a borrower ever becoming 90-days delinquent. This study also examined whether the delivery method and borrower assignment or selection explained varying effectiveness. Prior to controlling for borrower selection, individual counseling was found to be most effective with a 34% reduction in the likelihood of ever becoming 90-days delinquent, while classroom counseling was associated with a 26% reduction. A two-stage least-squares analysis to control for borrower selection demonstrated that not all of the observed effect was due to selection, but that only classroom education still had a significant effect among the program types after accounting for selection bias.

The results of the study are slightly misleading though, as the measure of homebuyer education's effectiveness that was proposed in the hypothesis was 90-day delinquency rates, but the actual analysis is of whether homeownership counseling reduces the likelihood of *ever* becoming 90 days delinquent over the course of the loan to the present time. A 90-day delinquency rate is the number of active loans 90 days or more delinquent at a given point in time, which produces a smaller count than assessing whether a loan has *ever* been 90 days delinquent, as seriously delinquent borrowers can still "cure" their loans by becoming current on their payments. An additional factor to consider in the findings are that the program mix of the sample used was weighted toward less personal and less effective forms of homebuyer education: 77% of the sample had home or telephone study, while 10% and 9% received individual and classroom counseling respectively.

Hartarska and Gonzalez-Vega (2006) assessed a pre-purchase credit counseling program targeted at low-to-moderate income organized by a major bank in Ohio to fulfill Community Reinvestment Act requirements. A single organization (Consumer Credit Counseling Services) was used as the counseling provider, and only those who could demonstrate a zero or positive cash flow for a given loan size and interest rate were permitted to graduate, highlighting the sorting function of homeownership counseling programs for banks. For graduates who qualified for a loan, the maximum loan size was \$75,000, with a down payment of the lesser of 5% or \$1,000 (though gifts or grants could be applied toward this amount). Using a Cox proportional hazards survival model, counseled borrowers were found to have a 39% lower default hazard, and, consistent with other studies in the mortgage default literature, the default hazard was found to peak at 18

months before decreasing (Bunce, Gruenstein, Herbert, & Scheessele, 2001; Quercia & Stegman, 2007). Additionally, counseled borrowers exercised their option to default on the home more ruthlessly, suggesting an association between credit counseling and greater awareness of when foreclosure is the most beneficial financial choice for the homeowner.

However, because credit counseling more narrowly focuses on the financing aspect of homeownership, this study can not be directly used to estimate the effect of homebuyer education, as it omits components like home selection and maintenance. The sample size of 233 loans is also somewhat small for a maximum-likelihood based model with 20 variables and 2 interaction terms, so the study was likely underpowered. The researchers were also unable to estimate a competing risks model to account for the possible outcome of mortgage prepayment, as the researchers had information only on current and defaulted loans from the program.

#### *Financial Education and Financial Behavior*

There is a small but growing literature examining the key causal link between financial education and changes in financial behavior that is assumed to occur as a result of receiving homebuyer education. Some elements of this literature focus more heavily on areas like changes in behaviors related to retirement planning (i.e., Lusardi, 2002; Lusardi, 2004; Lusardi, 2008), but I focus here on studies directly examining links between financial education, financial literacy, or credit counseling and changes in financial knowledge and behavior. Measuring the change in borrowers' credit scores, retrospective surveys, and pre-test post-test surveys from financial education classes have

been the primary methodologies used to try to assess the link between programs designed to increase financial knowledge and resultant behavior changes.

Two studies attempted to measure changes in borrowers' financial behavior from financial education by measuring changes in credit scores. Birkenmaier and Tyuse (2005) used a pre-post test research design without a separate comparison group, comparing participants' credit scores only one year after the pre-counseling measure of credit score. Not surprisingly, they failed to establish a link between homeownership counseling and credit score improvement, as there are many factors that enter into a credit score that were not controlled for in the study, contributing to the severe omitted variable bias in the model. Also, the one-year timeframe may be insufficient for showing significant credit score improvement, particularly if the past credit history is spotty.

In the second study, Elliehausen, Lundquist, and Staten (2007) examined the impact of credit counseling on borrower behavior by comparing credit reports between 7,979 counseled borrowers and a comparison group of 65,901 non-counseled borrowers three years after receipt of credit counseling. After controlling for selection bias through the use of instrumental variables, credit counseling was found to produce negligible differences between counseled and non-counseled groups' credit scores three years later, though both groups had notable gross improvements in their credit scores. However, credit counseling did produce a significant reduction in debt and credit account usage for counseled borrowers relative to the comparison, especially in the lower quintiles of initial credit scores.

In both studies, the initial credit score was assumed to be a proxy for the level of personal financial management skills. This assumption may be misleading though as an

increased credit score is not necessarily a sign of changed financial behaviors. For example, having a greater amount owed can result in increasing credit scores. There may also be a regression to the mean effect, as individuals seeking counseling after a negative credit event may naturally see a rise in their credit score, in part from being unable to obtain additional credit until their score recovers. On the other hand, some borrowers may seek out counseling in anticipation of an impending negative credit event, resulting in a sharp drop in their credit score after counseling. Additionally, Elliehausen, Lundquist, and Staten (2007) also acknowledge that their research design cannot distinguish between changes in credit scores due to changes in behavior from restructuring of borrower debt portfolios. Thus, attempting to measure financial behavior through credit scores represents poor operationalization and also fails to illuminate any underlying causal mechanisms that convert financial education interventions into behavioral change.

Surveys represent the other main methodology researchers have used with varying success in attempting to explore the link between increasing financial knowledge and resulting behavioral changes. One study specifically attempted to examine the link between housing counseling and financial behaviors using a self-report mail survey asking about counseled homeowners' current experience and recall of experience prior to homeownership (Carswell, 2009). However, the survey primarily focused on whether homeowners had more difficulty in making payments compared to their experience as renters. This is a potentially questionable approach to assessing homebuyer education's effect on financial behavior, as the opportunity cost of failing to make a housing payment is generally higher for homeowners regardless of whether the homebuyer is educated or not. The survey questions in general also seemed to be focused more on the homebuyer's

mortgage outcomes than on illuminating the narrower relationship between financial education and behavior. The only direct question about financial behavior that could demonstrably be linked to homebuyer education came in the form of changes in prioritization of mortgage payments relative to other bills, with 86% indicating their mortgage took top priority. Some survey questions were also worded in a way that made the results uninterpretable, such as asking whether mortgage non-payment patterns improved post-counseling, as such a question would be answered negatively by those who consistently paid their mortgage before and after counseling.

Though the aforementioned studies failed to establish direct links between financial education and behavior change, Shelton and Hill (1995) conducted a survey of first-time homebuyers' using an index of financial knowledge and budgeting behaviors. The surveys were administered before and immediately after borrowers completed the three week budgeting portion of an eight week homebuyer education course using a repeated measures design. A significant change in the index of budgeting behavior was found, with subgroup analyses revealing greater positive effects on financial behavior for females, African Americans, younger homebuyers, less educated homebuyers, and lower-income homebuyers. However, some of the most important indicators on the scale—developing a written spending plan, adjusting spending patterns, and comparing spending plans with spending patterns—showed little change. Additionally, caution should be shown in generalizing the results of the study, as it was designed to assess a small pilot program in two mid-size Georgia cities using a non-standard curriculum. The short time frame between the pre and post test also limits generalization about longer-term behavioral changes.

As a whole, the literature on the linkage between financial education and changes in financial behavior is still quite weak, with research design issues preventing solid conclusions from being made in either direction. Further research in the vein of Shelton and Hill (1995) is needed to assess the strength and validity of the causal link between financial education and changes in financial behavior, especially in determining whether changes last in the long run or decay over time.

### *Factors Influencing Mortgage Default*

There are currently two main theoretical camps in the mortgage default literature, options theory and trigger theory, with correspondingly different ideas on the key factors that influence mortgage outcomes, and thus different opinions about which variables are important to control for in mortgage default models. Options theory views the foreclosure decision from a pure financial perspective, positing default as a put option where the buyer has the choice to stop making loan payments if the house is worth less than the outstanding loan value, while trigger theory proposes that insolvency is the main underlying reason behind mortgage default (Elmer & Seelig, 1999).

#### *Options Theory.*

While options theory would indicate that the option to default is “in the money” as soon as the home enters negative equity, researchers in this theoretical camp have recognized that various transactions costs associated with the loss of the home and length of tenure affect the “ruthlessness” of the exercise of this option, that is the level of negative equity required to induce the borrower to default (Ambrose & Capone, 1998). These factors include both financial costs (i.e., the negative impact on borrower credit and moving costs) and emotional or psychological costs to the borrower (i.e., emotional

attachment to a home, value of ownership, and guilt in renegeing on the commitment to pay the lender).

The loan-to-value (LTV) ratio at origination, defined as the value of the loan relative to the sale price of the home, has emerged as a significant predictor of foreclosure in several mortgage default studies, but sometimes in opposite directions. In a study of a large national subprime loan database, Quercia, Stegman, and Davis (2007) found a higher LTV at loan origination to be a significant predictor of foreclosure. However, Elmer and Seelig (1998) found that there was little difference in foreclosure patterns between conventional loans and FHA loans, which allow for high LTV ratios, casting doubt on the contribution of high LTV ratios to foreclosure. Additionally, Elmer and Seelig's (1998) empirical work initially found LTV to be statistically significant in predicting default but found that it lost its significance once broader measures of the consumer's personal financial leverage were added. Delgadillo and Gallagher (2006) also did not find the LTV ratio to be a significant predictor of mortgage default for a sample of FHA loans, but this may have been due to low variation in the loan-to-value ratios of the loans in the sample. At the same time, Hendershott and Schultz (1993) found that loans with less than 90% LTV were more likely to foreclose, indicating an effect in the opposite direction. Similarly, Hartarska and Gonzalez-Vega (2006) also found higher LTV at origination to be negatively associated with foreclosure, which they speculate could potentially be occurring through banks adding loans that help affect the level of down payment for borrowers.

In modeling mortgage outcomes, several borrower and mortgage factors besides the loan-to-value ratio have been shown to have a significant association with mortgage

default rates, but either have not shown a clear direction in their effects on default rates or have not come out as significant in every study. In assessing borrower factors, the age of the borrower was not found to be significant in Hartarska and Gonzalez-Vega's (2006) study of homebuyer education, while Anderson and Vanderhoff (1999) found age to be a significant predictor of default, with younger borrowers being more likely to default. Elmer and Seelig (1999) argue that the age of the homeowner is likely to be significant because home equity forms a much larger proportion of wealth for younger households relative to older households with more diversified wealth holdings, all other things being equal, and thus declines in home equity are more closely linked to insolvency. However, Ambrose and Capone (1998) explain the inconsistency of age's effect as a function of younger borrowers simultaneously having lower savings levels but also having a greater chance of finding employment more quickly after the loss of a job. Evidence has also been mixed on whether the number of dependents has an effect on housing cost burden, with the variable turning out to be significant as often as it has not in studies to date that have included it as a factor (Chi & Laquatra, 1998; Hakim & Haddad, 1999; Noecker-Guadagno, 1992; Vandell & Thibodeau, 1985). Findings on the effects of race on default have been less equivocal, as Hartarska and Gonzalez-Vega (2006) found that African American borrowers had three times the default hazard of non-African American borrowers. Hirad and Zorn (2001) and Pedersen and Delgadillo (2007) found that minority census tracts were significantly likely to have higher default rates.

*Trigger Theory.*

In contrast to options theory, trigger theory proposes that insolvency is the main underlying reason behind mortgage default (Elmer & Seelig, 1999). While a strategic

defaulter is unlikely to cure, having determined that foreclosing is the financially optimal position (unless interest rates or home prices change during the delinquency period), trigger-based defaulters would only foreclose if they were unable to regain sufficient income to resume mortgage payments (Ambrose & Capone, 1998). From a trigger perspective, delinquency on loan payments essentially allows borrowers to use non-payment of the mortgage to finance other expenditures. Job loss, unexpected major medical expenses, divorce, or other negative events that reduce income or events like a failed investment or stock market crash that reduce personal wealth can force borrowers into delinquency and eventually to foreclosing on the home if the borrower is unable to recover from the financial shock in time to resume payments. Trigger theory may be particularly relevant for understanding default decisions among low income homeowners, young households, and other groups that tend to have lower levels of savings and for whom the home is the primary source of wealth. Coincident with trigger theory, unemployment, lower incomes, and slower income growth have all been found to be significant predictors of foreclosure as well, coincident with trigger theory (Case & Shiller, 1996; Hendershott & Schultz, 1993; Phillips, Rosenblatt, & Vanderhoff, 1996).

Elmer and Seelig (1999) use a consumer choice model to theorize that interest rate shocks should not independently act as trigger events for default as they have equal effects on the prepayment and strategic default option. Given that interest rates have the same effect on the value of prepaying the home and on defaulting on the home, if an increase in interest rates produced a negative shock, prepayment (through sale of the home or refinancing the loan) always would be the preferable option to default in order to fulfill the mortgage obligation because its transactions costs are lower. However, Elmer

and Seelig's model does not factor into account potential constraints on the exercise of the prepayment option, such as constricted credit markets, which might negate the increase in the value of the prepayment option. Additionally, their argument implicitly assumes that the loan has a fixed rate. In loan samples with adjustable rate mortgages, increases in market interest rates could directly act as a trigger event. Delgadillo and Gallagher (2006) found the interest rate of the loan to be a significant factor in determining the probability of foreclosure, but since they did not include credit scores in their model, the significance of the interest rate is confounded with initial creditworthiness of the borrower.

*Synthesis.*

Mortgage default researchers are increasingly acknowledging that options and trigger theories explain differing motivations for default rather than seeking to use one or the other as a reductionistic explanation (Ambrose & Capone, 1998). Deciding which theory has preeminence in explanatory power may be a function of the time period and geography of the loan sample, including state foreclosure law. In some cases borrowers who have never been delinquent on their homes and can afford to continue making payments have chosen to default on their homes in the recent economic crisis because of the negative equity produced by steep declines in home values. Thus, options theory may have greater explanatory power in predicting foreclosure activity in areas like Nevada, Arizona, and Florida where home prices have declined by 50% or more and strategic defaults are more common (Zingales, 2010).

On the other hand, economic crises are also associated with increased unemployment and can also increase the likelihood of other potential trigger events such

as divorce. These trigger events create income shocks that can result in the loss of a home through foreclosure. Trigger events seem to be particularly likely to lead to foreclosure when combined with two constraints on exercising a pre-payment option that have been seen in the most recent economic crisis: illiquid credit markets that prevent owners from tapping into their home equity and illiquid housing markets that prevent the sale of the home. Resetting adjustable rate loans to an interest rate above the original rate also can serve as a trigger event, as it effectively creates a negative income shock that can lead to foreclosure.

Homebuyer education can be situated in both the options and trigger theoretical models in terms of how it affects loan outcomes. In the context of options theory, as Hartarska and Gonzalez-Vega (2006) demonstrated, borrowers who received credit counseling exercised their default option more ruthlessly when it was the best financial option for them. This would imply an association between increased financial literacy or savviness developed in credit counseling and a better understanding of one's current financial position and concurrent logical financial decisions based on that knowledge. Thus, homebuyer education could actually increase foreclosures in situations where it is the optimal choice for the borrower. Thus, whether homebuyer education produces better mortgage outcomes under options theory therefore depends on whether one is viewing the situation from the borrower or lender's perspective.

At the same time, homebuyer education theoretically should ameliorate the effects of trigger events in two ways. First, financial education can have a measurable average effect on savings and budgeting behavior, and increased savings or greater awareness of current expenses and how to reduce them could potentially help borrowers avoid

becoming delinquent in the face of an income shock. Second, financial education has been shown to influence the help-seeking behavior of borrowers in financial trouble, though a report by Fields, Libman, Saegert, Clark, and Justa (2007) for NeighborWorks indicated only a minimal effect in this area.

### *The Present Study*

This study evaluates the effect of homebuyer education on mortgage outcomes, specifically focusing on its effects on foreclosure, after controlling for borrower and mortgage factors that also influence foreclosure rates. The data for this study is from a loan database with origination information and monthly payment history from 2002-2009 from the Tennessee Housing Development Agency (THDA), Tennessee's state housing finance agency. The choice of 2002 as the start date for the study coincides with the beginning of THDA's homebuyer's education program and the beginning of a loan program with down payment assistance from THDA.

The current study addresses several gaps in the homebuyer education literature to date and is able to overcome several (though not all) of the research challenges documented in the literature. With regard to data challenges, the data set from THDA for this study addresses many of the problems that made the PricewaterhouseCoopers study infeasible. First, THDA tracks whether their homebuyers received homebuyer education and the provider from which they received the education. Second, a substantial amount of demographic data is available in the dataset as well, which in turn allows for stronger control variables. Additionally, while direct information linking homeowners to the type and duration of education received was not available, THDA sets homebuyer education standards for its statewide trainers, provides standardized curriculum materials to

educators, and uses the classroom format almost exclusively. These parameters reduce problems around the effects that unobserved differences in the curriculum, duration, and format of homebuyer have had on outcomes in previous studies. Finally, THDA only holds whole loans, so the loan performance data is directly linked to origination data as the loan goes directly from the originator to THDA and stays there rather than being securitized and sold off to third parties.

This study fills in additional research gaps by being the first study of pre-purchase education that has a sample that includes information on active, prepaid, and foreclosed mortgages, allowing the estimation of the effects of homebuyer education on the competing risks of pre-payment and foreclosure. Second, this study affords stronger comparison groups than previous studies of homebuyer education. One analysis contrasts borrowers in a 30-year fixed rate loan program who did not take homebuyer education to those who took it voluntarily. The other analysis takes advantage of a natural experiment to contrast borrowers in a 2002 loan cohort who took homebuyer education as a precondition for down payment assistance and those who ended up receiving the down payment assistance without taking homebuyer education during the first few months of the program before the homebuyer education network was fully in place. Additionally, both analyses are able control for borrowers' initial creditworthiness, a factor missing from the Hartarksa and Gonzalez-Vega study (2006). Finally, this study focuses on the terminal outcomes of loans rather than 90-day delinquencies, avoiding statistical problems associated with loans self-curing.

However, it should be noted that the pool of THDA loans tend to be safer than securitized subprime loan pools used in other foreclosure studies, as there are no exotic

mortgage structures or adjustable rate loans, and they are better documented and monitored. Additionally, THDA is a government agency and has a profit cap, so while it does function like a business, its primary mission is promoting successful homeownership rather than profit-making, unlike private lending organizations. Thus, the generalizability of this study to lower quality loan pools that contain exotic mortgage structures and to private mortgage institutions may be somewhat limited. Also, while the comparison groups for this study are relatively strong, they are not experimental groups, so the problem of selection bias remains, particularly for the Great Rate cohort being examined, as these borrowers are voluntarily choosing to take the education. Finally, this study does not have the data for assessing the causal paths by which homebuyer education influences mortgage outcomes, so it is still constrained to a black box modeling approach.

## CHAPTER III

### DESCRIPTION OF THDA HOMEBUYER EDUCATION PROGRAM

In 2001 the Tennessee Housing Development Agency (THDA) revived a down payment assistance loan program, termed “Great Start.” Coinciding with the new loan program was a requirement for the borrower to take homebuyer education. However, in early 2002 there were few certified homebuyer education trainers, wide variations in program delivery, and no network for forming training partnerships. In the fall of 2002, THDA partnered with a major regional bank and the Neighborhood Reinvestment Corporation (NRC, now NeighborWorks America) to deliver three four-day training sessions across the state to train the trainers on using the NRC’s “Realizing the American Dream” curriculum. An additional training session in May 2003 increased the number of certified homebuyer education trainers to 145. THDA was also awarded a Housing Counseling grant from HUD in 2002 to help launch the program. THDA continues to organize peer support sessions to assist non-profits in their efforts to implement homebuyer education programs.

In July 2003, THDA’s board approved a homebuyer education payment program that provides up to a \$150 reimbursement to certified non-profit agencies for any client who closes on a THDA loan after having taken a homebuyer education course (whether they choose a down payment assistance loan or not). THDA provides the “Realizing the American Dream” training materials to the training agencies at no cost to the agency.

This curriculum covers 4 basic content areas: 1) Budgeting and Credit, 2) Shopping for a Home, 3) Getting a Mortgage Loan, and 4) Keeping Your Home and Managing Your Finances (including instruction on home maintenance). The clients are required to receive 8 hours of training, which is predominantly classroom-based, though one-on-one instruction is offered on a limited basis in some rural areas.

Hirad and Zorn (2001) found that the delivery method of homebuyer education (HBE) has a significant effect on delinquency outcomes, and Collins (2007) found that spending a higher number of hours in the program has a significant effect on delinquency as well. While direct information linking the borrower to the type and duration of homebuyer education received was not available, both of these limitations were at least partially addressed with information gathered through informal interviews with THDA staff. First, THDA requires its certified trainer agencies to provide direct education and/or counseling services to its clients, meaning that borrowers either have classroom education or face-to-face counseling. The large majority of THDA's clients take homebuyer education in a classroom setting, with a small handful of homebuyers taking one-on-one counseling, which primarily occurs in rural areas or special circumstances. With respect to duration, THDA asks its certified providers to abide by the American Homeownership Education and Counseling Institute's guidelines which mandate a minimum of 8 hours of education. Collins' (2007) study found that there was little marginal benefit gained by having more than 8 hours of program exposure, so THDA's program is designed to optimize the benefit received. Hirad and Zorn's (2001) study also found the type of provider to be significant with non-profit classroom counseling being associated with the greatest reduction in ever becoming 90 days delinquent other than individual counseling

by a mortgage insurer. THDA exclusively uses non-profit providers, some of which are able to offer the service for free using grant funding (generally from HUD) and others that charge a fee for services. THDA has asked that all fee-based agencies not charge more than \$25 per client, though a few providers on the approved list have charged up to \$50-\$75 for the service.

## CHAPTER IV

### METHODS

#### *Hypotheses and Regression Methodology*

The mortgages in the THDA dataset can have one of three terminal outcomes. The first is that the loan is still active as of October 15, 2010. The second is that the mortgage has been terminated due to foreclosure on the home. The final option is that the homeowner prepays the mortgage, selling the home and paying off the mortgage balance. Given the three possible mutually exclusive categorical loan outcomes, a multinomial logit model was chosen, comparing the likelihood of foreclosure and prepayment to the likelihood of the excluded group of the loan being active. In addition to the mortgage and borrower characteristics previously mentioned, I control for the age of the loan in months to account for the time of exposure to the different outcome risks. For a subgroup analysis of the Great Rate loan program, I also control for the loan cohort to account for any unobserved differences between the two cohorts being used (2005 and 2006).

A two-stage propensity score analysis, predicting to who would receive homebuyer education and who would not to try to control for selection bias, was not used based on comparative research of quasi-experimental design methods. Bloom (2005) compared the biases from propensity score analyses and ordinary regression with covariates relative to experimental results, and found that the two alternative analyses did about equally well. Given that propensity score analysis would be unlikely to be an

improvement on ordinary regression analysis, I chose to utilize a multinomial logistic regression model.

The first hypothesis was that borrowers who voluntarily took homebuyer education in the Great Rate program for loans originated during 2005 and 2006 would be less likely to foreclose than those who did not take homebuyer education after controlling for borrower and mortgage characteristics, loan cohort, and loan age. It is difficult to predict a direction for the effect of homebuyer education on prepayment because there are two competing forces at work. On one hand, Hartarska, Gonzalez-Vega, and Dobos (2002) hypothesized that home purchase credit counseling could make borrowers more strategic, and thus more likely to prepay when it would be an optimal decision. Thus counseled borrowers may be more likely to prepay than non-counseled borrowers. However, prepayment can also be a sign of mortgage trouble if the borrower sells the home after falling behind on payments in order to avoid foreclosure. In the latter case, we would expect to see lower prepayment rates for those with homebuyer education if homebuyer education is improving financial behaviors.

The second hypothesis was that those in the Great Start program in 2002 who took homebuyer education would be less likely to foreclose than those who did not take homebuyer education (due to lack of availability when the program began), after controlling for borrower and mortgage characteristics, and loan age. The Great Start analysis does not incorporate property type as a variable due to insufficient variation and collapses the race categories used in the Great Rate analysis into White and Black by combining the small number of Hispanic and Other borrowers (20 total) into the White category.

The following equation for a multinomial logit model expresses the probability of a loan,  $i$ , ending in foreclosure ( $j=1$ ) or prepayment ( $j=2$ ) relative to the loan remaining active ( $j=0$ ):

$$P(y_i = j) = \frac{e^{\beta_j Z_i}}{1 + \sum_{k=1}^2 e^{\beta_k Z_i}} \text{ for } j = 1, 2$$

$$P(y_i = j) = \frac{1}{1 + \sum_{k=1}^2 e^{\beta_k Z_i}} \text{ for } j = 0$$

$\beta$  represents a coefficient vector and  $Z$  represents a vector of the values of the independent variables, including borrower, mortgage, and loan exposure factors (as well as a loan cohort dummy variable for the Great Rate analysis).

### *Data*

The initial data for the study was obtained from THDA's loan database comprising loans that were closed on or after January 1, 2002 until October 15<sup>th</sup>, 2009. The start date was determined by the beginning of THDA's homebuyer education program in 2002, and the database had monthly payment information up to October 15, 2009. The original data set had 22,269 loans. Based on information from interviews with THDA staff, 210 loans (less than 1% of the total loans) were identified as having irreconcilable data entry errors on variables being used in the study and were excluded from the data set, leaving 22,059 total loans that were originated between 2002 and 2009. A cutoff date for loan origination of December 31<sup>st</sup>, 2006 was chosen to allow a sufficient history of payments, given that research to date has shown that default hazards tend to peak around 18-24 months after origination (Quercia & Spader, 2008). Applying this cutoff also eliminated a few small loan programs that THDA established in the last three years that had insufficient payment history data to be included in the study. After

applying the December 31<sup>st</sup>, 2006 cutoff and eliminating small extraneous loan programs, the data set was reduced to 12,372 loans from THDA's two main loan programs, Great Rate and Great Start, which served as the basis for subsequent analysis and forming of further sub-samples for the regression analyses.

The Great Rate program is THDA's oldest and largest program and offers the lowest interest rate with no down payment assistance. Homebuyer education is not required for this loan, but an average of 10% of people in this program still chose to voluntarily take it between 2005 and 2006. The average interest rate for Great Rate loans was 5.346% ranging from a high of 5.862% in 2002 to a low of 5.029% in 2003. The Great Start loan, begun in 2002, makes available up to 4% of the loan amount available for assistance with down payment and closing costs in exchange for a higher interest rate and required homebuyer education. The average interest rate for Great Start loans was 6.324%, approximately 1% higher than Great Rate loans, ranging from a high of 6.813% in 2002 to a low of 6.030% in 2005. While THDA only offered direct down payment assistance for the Great Start program, other programs such as the American Dream Downpayment Initiative can be applied to qualified Great Rate borrowers. Because of access to down payment assistance, many of the loans in the THDA database are listed as having zero down payments, as the down payment variable in THDA's database is recorded only as the amount of the homebuyer's own money put toward the purchase price of the home. However, the amount of down payment assistance is still accounted for in the loan-to-value ratio by decreasing the mortgage amount relative to the purchase price. Table 1 summarizes the characteristics of each loan program.

Table 1

*Loan Programs and Insurance Types*

Loan Program	Downpayment Assistance	Homebuyer Education	# Loans 2002-2006	# Loans 2002-2009
Great Start	None	Optional	4,378	6,608
Great Rate	4% of price	Required	7,996	13,506

Loan Insurance Type	2002-2006		2002-2009	
	Count	% Total	Count	% Total
FHA	9,672	78.2%	13,295	66.1%
VA	401	3.2%	610	3.0%
RECD	1,521	12.3%	2,344	11.7%
Conventional Insured LTV 97.01-100%	78	0.6%	2,491	12.4%
Conventional Insured LTV 78%-97%	144	1.2%	574	2.9%
Conventional Uninsured LTV 78% or less	259	2.1%	482	2.4%
Other	297	2.4%	318	1.6%
Total	12,372	100.0%	20,114	100.0%

RECD=USDA Rural Economic and Community Development Loan Program

VA=Veterans Administration

FHA=Federal Housing Administration

In terms of loan insurance, as shown in Table 1, THDA loans are a mixture of conventional (insured and uninsured) loans and loans insured by the Federal Housing Administration (FHA), Veterans Administration (VA), and the US Department of Agriculture's Rural Development division's Rural Economic and Community Development (RECD) program. THDA loans have no pre-payment penalties though the loans are subject to a federal recapture tax. A recapture tax means that if a borrower sells or otherwise disposes of their home before a nine-year window, the borrower may have to pay the lesser of the original THDA loan amount times 6.25% or half of the actual gain from the sales or disposal of the home. Whether a homebuyer actually has to pay the

recapture tax or not is based on a complex formula that factors in the original loan amount, time spent in the home while financed by a THDA loan, current income and family size at time of sale, and the gain from the sale of the home. Buyers can refinance the loan without penalty but still are subject to the nine-year provision. Finally, the origination fee is a maximum of 1% and the discount point is a maximum of ¼% on the first mortgage.

In considering the demographics THDA targets with these loans, all loan programs have the same maximum household income and sales prices which vary by county. For 2009, the maximum acquisition cost (sales price of the home) ranged from \$200,160 to \$226,100. The household income limits differ by whether the household is comprised of 1-2 persons or 3 or more persons and is based on area median income. The income limit range for 1-2 persons was \$54,500-\$64,900 and for households of 3 or more persons the range was from \$62,675-\$74,635. THDA has a requirement that a buyer must be a first-time homebuyer, defined as not having owned a home in the previous three years, unless the homebuyer lives in a HUD targeted county, HUD targeted census tract, or a presidentially declared disaster area, in which case the first-time homebuyer requirement is waived. The THDA database does not have information on whether borrowers in these areas are first-time homebuyers or not.

#### *Variables Used*

Quercia and Wachter (1996) recommend controlling for six determinants of default decisions, four of which are available in the THDA dataset: 1) Loan-to-Value Ratio, 2) Household income, 3) Mortgage payment, and 4) Property tax and insurance

payments. While information on household composition is available at the time of origination, information on changes in household composition is not available.

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The data set contains no information on the final recommended variable, employment changes. Table 2 defines the variables that are used in this study. I interviewed an experienced staff member in the Single Family Housing Division at THDA to ascertain how the organization defined and calculated the financial ratios in their underwriting and database as well as other key variables.

### *Sample*

As mentioned earlier, one of the key challenges in studying homebuyer education to date has been finding adequate comparison groups. For THDA loans closed between 2002 and 2006, an overall average of 32.7% of borrowers took homebuyer education. However, homebuyer education was required for the Great Start program and was combined with financial assistances, as well as different interest rates, so homebuyer education was largely confounded with these factors. However, within the data available in this study there are two relatively strong non-experimental comparison groups for testing the effects of homebuyer education, though each has their own weaknesses.

First, an average of 10% of borrowers in the Great Rate program between 2005 and 2006 took homebuyer education voluntarily. These are the first two years where enough borrowers participated in homebuyer education to allow for a meaningful contrast between those who did and did not participate in the program, and growing awareness of the program likely explains a portion of the quick rise in the conditional percentage of those taking HBE voluntarily as a proportion of all who took homebuyer education between 2003 and 2005. While this comparison is more likely to be influenced by selection bias, given the voluntary nature of the program, it avoids the problems with confounding in trying to compare across loan types and periods.

Second, as mentioned earlier, at the beginning of the Great Start program in 2002, there was a 7 month period as the program was beginning where the homebuyer education programs were not fully in place. As a result, 65% of the 2002 Great Start loan cohort received these loans with down payment assistance without taking homebuyer education. This lag in the implementation of the HBE program, is also reflected in the loan cohort descriptive data in Table 3 as well, through the one-year jump in participation from 10% to 39%. A more detailed analysis revealed that no borrowers in the Great Start program who had loans originated prior to July 2002 took homebuyer education, likely due to some disorganization at program start-up.

Also, this cohort had a particularly high foreclosure rate (15.2%), so there is still high variance on the dependent variable. Thus, assuming that receipt of homebuyer education was not due to systematic differences among borrowers during the start-up phase of the program, this particular cohort is a strong choice for examining the effects of homebuyer education, as the confounding effects of the loan subsidy and other program factors are effectively controlled and issues with selection bias are prevented as individuals were required to participate as the resources became available. Thus, the group of borrowers who did not receive homebuyer education in the start-up phase of the loan program provides a relatively strong comparison group to those who received required homebuyer education later in the year, particularly due to there being no systematic reason these people were excluded from homebuyer education other than program availability. However, the main drawback is that the sample size for this loan cohort is somewhat small (730 loans) compared to later loan cohorts.



To examine the degree of similarity of borrower and mortgage characteristics in each comparison group (between those who took homebuyer education and those who did not), a series of t-tests and chi-square tests were performed for each subset, with the results displayed in Table 4. For the Great Rate comparison group, statistically significant differences were found on all variables except foreclosure and pre-payment rates, age, insurance amount, gender, and bankruptcy. In terms of substantive differences, the most notable findings were that, of borrowers with credit scores, those with homebuyer education on average had a credit score that was 19 points lower compared to the no

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any financial assistance received (with half of those without HBE making a down payment versus 31% of those with HBE), and on average those who took HBE paid \$34 less per month on their home. The chi-square test for race was significant at the .0001 level. African Americans were more likely to take homebuyer education, with 22.2% receiving HBE versus 6.6% of whites receiving HBE. The high p-value for the chi-square test for property type indicated that there was not a significant difference in the types of property purchased by those who took HBE and those who did not.

The Great Start groups were largely similar, with the only significant variables other than foreclosure being down payment, insurance, and property tax. Prior to any controls, the required HBE group had a foreclosure rate 7.0% below those without HBE, a sizeable difference. Those without HBE were somewhat more likely to have made an additional down payment, with 6.5% of those who took HBE making an additional down payment versus 1.6% of those who took HBE. Those who did not take HBE paid a minimal amount less in insurance and property tax (\$2.16 and \$4.83 respectively). The chi-square test for race was non-significant. Property type was dropped as a variable from this analysis since the counts in non-single family property types were too small to be able to produce reliable estimates.

## CHAPTER V

### RESULTS

#### *Descriptive Analysis*

The primary purpose of this study is examining the effects of homebuyer education on foreclosure, so the focus of this section will be on issues relating to foreclosure. However, the model used examines both foreclosure and prepayment risk, so information on prepayment is included as appropriate but is not discussed in detail. Table 5 describes loan outcomes by both the loan origination cohort and by loan program type. In terms of the proportions of loans originated by program type, a slight U-shape appears in contrasting Great Start and Great Rate loans, with Great Start's popularity surging in 2003 (keeping in mind that the program was introduced in early 2002) and gradually tapering off in the following years. The high foreclosure rates for the 2002 Great Start loan cohort are also notable, as they are twice the foreclosure rate of Great Rate loans for the same year. These loans were generally made to a higher credit risk population, as the Great Start loans had an average credit score that was consistently 24-26 points lower than Great Rate loans. However, the ratio of foreclosure rates between the two program narrows as time goes on despite the gap in credit scores remaining generally the same, indicating that differences in credit scores may not be the sole source of the differential in foreclosure rates. The higher foreclosure rates for the 2002 Great Start cohort may also be

influenced by program start-up effects, particularly in the delayed implementation of the homebuyer education requirement, which will be explored further in the multivariate analysis.

One other notable trend is that troubled prepayments, defined as a prepayment occurring while the borrower is one or more months delinquent on their mortgage, are a relatively frequent occurrence, as troubled prepayments comprised an average of 57% of prepayments from 2002-2006. The fact that this ratio has been declining for more recent



loan cohorts may reflect the increasing difficulty of selling homes due to the housing market bubble collapsing and reduced lending levels by banks decreasing borrowers' ability to refinance their loans, even in the currently favorable interest rate

The average time to foreclosure for the overall sample of loans was 39 months, which is longer than most other studies to date. This is likely a function of two elements. First, this sample likely has a higher average loan quality than other studies of low-income lending, particularly of studies focusing on subprime mortgages, as over half of the loans in this sample are prime mortgages. It is assumed that mortgages made to high risk individuals would be more likely to get into trouble earlier than high quality loans. However, this phenomenon is also partially a function of shifts in the housing market and economy. One can see a twin-peaked effect for earlier loan cohorts in Table 7a, whereby their peak foreclosure year initially occurred 24-36 months after origination but then had a resurgence in 2009, as the effects of the recession and extended unemployment began to take their toll, which would also extend the average time to foreclosure, had their peak foreclosure years occur in 2009 (with 2004 being a second peak), and foreclosures across all cohorts rose in 2009 from 2008. Prior to the 2005 loan cohort, foreclosures peaked at 3 years after origination, which again was somewhat longer than other studies which found the default hazard peaking between 18 and 24 months (i.e., Hartarska & Gonzalez-Vega, 2006; Quercia & Spader, 2008; Quercia, Stegman, & Davis, 2007).

Another notable pattern in time to foreclosure is how much the homebuyer education and non-homebuyer education groups differed on time to foreclosure in the Great Start group. Part of the difference is accounted for by the fact that borrowers who took homebuyer education in this cohort did not begin taking it until after the program

had already been in existence for 7 months, but even after accounting for this, the homebuyer education group still had a 5 month longer average time to foreclosure. Combined with a much higher proportion of the homebuyer education loans still being active 7 years later (40% v. 27%), these findings suggest a positive effect of homebuyer education on mortgage outcomes for this cohort.

In light of this, it is interesting that a comparison of the highest level of delinquency shows very little between the homebuyer education and no homebuyer education groups given their divergence on terminal loan outcomes. In contrast, the Great Rate comparison groups differ little on outcomes and time to foreclosure but have fairly different delinquency patterns, with those taking homebuyer education being more likely to have been 90 days or more delinquent at least once. These discrepancies between intermediate financial trouble and terminal loan outcomes also cast doubt on the utility of using 90 day delinquency as an estimator of loan outcomes.

#### *Results of the Multinomial Logit Models*

Table 8 contains the means and standard deviations for the variables used in the multinomial regression models, first considering all of the loans in the sample from 2002-2006 and then for the Great Rate 2005-2006 cohort and for the Great Start 2002 cohort. Tables 9 and 10 present the results of the two multinomial logistic regression models. The primary focus of this analysis is on foreclosure, but the coefficients of homebuyer education and control variables are included for prepayment as well, recognizing it as an alternative outcome.

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The coefficients represent the logits of foreclosure and prepayment respectively compared to the loan being active, with the Exp(B) column representing the coefficients as odds ratios, which compare the odds of foreclosure and prepayment to the odds of the loan being active as of October 15<sup>th</sup>, 2009. The first multinomial logit model compared those who took homebuyer education voluntarily and those who did not within THDA's Great Rate program (which offers a fixed rate loan and no down payment assistance from THDA). The results, shown in Table 9, indicate that homebuyer education had a strong effect on reducing the probability of foreclosure, as the odds of foreclosure were only 50.5% as high for those who took homebuyer education as for those who did not. The positive coefficient for the quadratic loan age term indicated that the probability of foreclosure was still rising for these loans at the cutoff date. Given the growth in unemployment rates in 2008 and 2009, the growth in long-term unemployment, and the still relatively young age of these loans, this finding is not particularly surprising.

However, it does differ from previous studies that found the default hazard tending to decrease after 2 years, which would have been reflected with a negative coefficient on the squared loan term. The coefficients for the control variables associated with mortgage and property factors were largely in the expected directions from previous research, with a lower credit score, and a higher initial LTV being associated with increased likelihood of foreclosure. Making a down payment (after counting any outside down payment assistance) was also associated with a moderate reduction in the probability of foreclosure. Increased property taxes had a moderate effect on reducing the likelihood of foreclosure, but this relationship is likely indicative of homebuyers with greater savings and incomes who can afford more expensive homes with higher property

taxes being less likely to foreclose. The direction of the coefficients for property type are consistent with Quercia, Stegman, and Davis' (2007) findings that multifamily, manufactured, and modular housing are associated with an increased likelihood of foreclosure while condos and town homes are associated with lower likelihood of foreclosure. However, the effect sizes in this study for manufactured, modular, and multifamily housing differ substantially, in part due to the sample for this study having much lower proportions of these types housing. Additionally, the highly compact Planned Unit Development (PUD) and Zero-line lot properties, a high density single family form of housing not seen in previous studies, are associated with a lower likelihood of foreclosure.

In terms of borrower characteristics, the coefficients were also mostly in the expected direction based on past foreclosure studies. While age was not statistically significant, the negative coefficient is consistent with previous findings that older risk of foreclosure compared to white borrowers. Hispanic and Other minorities (with Other primarily representing Asian borrowers) were associated with a reduced likelihood of foreclosure, though the effect sizes should be viewed with caution due to the small number of borrowers in these category. Larger households were more likely to foreclose, consistent with findings of a foreclosure study by Delgadillo and Gallagher (2006). Gender was not found to be a significant predictor of foreclosure.



The results of second hypothesis of whether required homebuyer education in the beginnings of the Great Start program in 2002 resulted in reduced likelihood of foreclosure are shown in Table 10. As expected from the t-test results, homebuyer education had a strong significant effect on reducing the probability of foreclosure, with the odds of foreclosure for those who took homebuyer education being 97% lower than those who did not, controlling for the other factors in the model. The significant variables and the direction of the effects of the mortgage and origination variables on foreclosure were mostly similar to the Great Rate model. One main

difference was that in this model, being in the lowest credit score category was significant and was strongly associated with a higher probability of foreclosure, as a borrower with a credit score of less than 600 had 3.25 times the odds of a borrower with a credit score of 660 or higher of having their loan end in foreclosure, controlling for all other factors. This model also reflected progressively higher risk for lower categories of credit score.

As in the Great Rate model, a higher LTV at origination for the Great Start cohort was associated with a higher likelihood of foreclosure, but the effect is much larger here. It should be noted, however, that the Great Start cohort has much less variation in LTV relative to the 2005-2006 Great Rate cohort (with standard deviations of .75 and 7.36 respectively). Caution should be used in comparing these two effect sizes and with extrapolating with the Great Start LTV coefficient. Both higher monthly payments and higher property taxes were still associated with lower foreclosure rates, though both insurance and property tax were non-significant. In contrast to the Great Rate model, higher monthly payments were a significant predictor of reduced foreclosure risk in the Great Start model. However, the underlying reason behind this effect is plausibly similar to the reason for the property tax effect seen in the Great Rate loans—this relationship is likely indicative of homebuyers with greater savings and incomes who can afford more expensive homes having higher monthly payments and being less likely to foreclose.

The gender and race variables differed substantially from the Great Rate model. While gender was not significant in the Great Rate model, it was highly significant in the Great Start model and being male was strongly associated with an increase in the risk of foreclosure. In terms of race, the coefficient and effect size flipped for black borrowers,

with black borrowers being much less likely to foreclose than white borrowers. This may in part be due to differences in demographics between the two programs. Table 8 indicates that the Great Start sample had a higher proportion of black borrowers, but roughly the same proportion of male borrowers.

## CHAPTER VI

### DISCUSSION

#### *Conclusions*

Consistent with the findings of the two previous studies on homebuyer education and foreclosure, homebuyer education was shown to substantially reduce the likelihood of foreclosure both in the case of a required homebuyer education program and in the case of voluntary participation in homebuyer education. This study is also the first study of homebuyer education to incorporate loan data that includes the effects of the housing bubble collapse. Previous studies of the effects of homebuyer education on foreclosure have not included data from periods of significant economic distress in which the effectiveness of homebuyer education is put more strongly to the test. Thus the finding that homebuyer education has had a mitigating effect on foreclosure during a period of severe economic stress and a housing market decline, after controlling for underwriting and borrower differences, particularly stands out.

The finding that making a down payment above the level of assistance received is associated with 34% lower odds of foreclosure relative to those who did not in the Great Rate cohort does raise some questions about why this would be the case. On one hand, making a higher level of down payment is likely an indicator of having a higher initial level of savings, but the level of down payments above assistance received was generally low, with an average of \$3,553 for those without homebuyer education and \$2,136 for

those with homebuyer education in the Great Rate program. From the perspective of options theory, equity is equity, but there is also the potential that there is a psychological difference in the sense of having a greater “stake” in ownership from having put more of one’s own money into one’s home versus receiving equity in the form of a grant. Additionally, with the higher interest rate on the down payment assistance loans, the buyers with lower initial savings also accumulate equity more slowly in their amortization, further increasing the probability of foreclosure.

### *Limitations*

While this study was able to utilize relatively strong comparison groups for a non-experimental study, particularly with the 2002 Great Start group, in the absence of random selection into homebuyer education, the extent to which unobservable factors, such as borrower motivation or previous financial knowledge, biased the estimates of the effect of homebuyer education is unclear. Second, this study implicitly assumed that the borrowers who took homebuyer education received the full eight hours of instruction and could not control for variables such as instructor quality and fidelity to the curriculum. However, receiving less than the full number of hours or sub par quality of instruction would bias the effects of HBE downward and thus would not account for the positive effects observed. This study was also unable to measure whether homebuyer education was received prior to finding a home or not, so it is unclear whether homebuyer education is actually influencing the home and mortgage selection process. Third, the smaller sample size for the 2002 Great Start cohort limited the number of factors that could be included in the model without comprising statistical power, and created mild problems with heteroskedasticity as having more categories with low counts boosted the influence

of those categories. Fourth, there was no indication as to whether borrowers received some form of post-purchase counseling or whether pre-purchased education influenced help-seeking behavior if they experienced trouble in meeting their mortgage payments. Finally, THDA loans tend to be safer and more closely monitored than the loans in the subprime mortgage databases utilized in other foreclosure studies, which may limit the degree to which the results of this study can be generalized to lower quality loan pools.

#### *Implications and Directions for Future Research*

The results from this study raise several interesting questions and expose areas where further theoretical development and empirical work are needed. First, the strong effect of gender for the Great Start program and its non-significance in the Great Rate analysis, as well as equivocal findings of its importance in the literature beg for a development of a better understanding of the conditions under which gender of the borrower plays a significant role in the outcome and potentially how it interfaces with other categories. Similarly, this study found that property type significantly affected the likelihood of foreclosure, but there is not a clear understanding in the default literature as to why borrowers who purchase multifamily, mobile, and manufactured housing are more likely to foreclose and why condominium and town home owners tend to be much less likely to foreclose relative to owners of single family housing.

Quercia and Wachter (1996) note that most homebuyer education providers use screening mechanisms to choose participants from people who respond to their outreach efforts, making it difficult (or perhaps even irrelevant) to try to generalize to a hypothetical population of potential homebuyers at large. The screening and referral elements that precede the receipt of homebuyer education are also not well understood,

but may significantly influence the level of effectiveness of homebuyer education. On a related issue, whether a provider of homebuyer education charges for the service or not may also be important to consider in terms of how paying for a class might affect motivation to learn and whether similar quality is found between fee-charging and non-fee charging organizations.

Quercia and Wachter (1996) outline a potential methodology for conducting a randomized experimental study, which seems to be long overdue, given that it has been almost 15 years since their methodological article was published and given the high relevance of homebuyer education to housing policy. Yet one key obstacle to a national-level evaluation of homebuyer education is the lack of standardization of course content, delivery methods, and duration of the classes among other things. If a major push on the national level, potentially through the power HUD wields in distributing funds for homebuyer education grants, were made toward the standardization and regulation of curriculum, duration, and delivery methods, the groundwork would then be in place for a rigorous national-level evaluation of homebuyer education.

However, researchers also should carefully consider whether a homebuyer education program meets certain assumptions regarding its operations before embarking on an experimental trial. An experimental study may still fail to truly estimate the effects of homebuyer education if it ignores elements of how homebuyer education is currently functioning in practice. One key assumption, implicit in Quercia and Wachter's (1996) proposed research design, is that potential homebuyers are seeking education prior to having found a home. As mentioned in the literature review, no research has been done to date on whether homebuyer education is influencing the home selection and mortgage

selection process. In fact, research findings that many counselees had already signed purchase and sales agreements prior to taking homebuyer education indicate this part of homebuyer education may be irrelevant in many cases and highlights the potential challenges of attempting such a study. McCarthy and Quercia (2000) found that 24% of households in 1998 had already completed a purchase and sale agreement prior to taking HBE. However, a more complex picture emerges as they also found an interaction between the percentage having already completed a purchase agreement and the size of the counseling agency (potentially confounded with delivery method as many larger providers exclusively used telephone-based counseling). The few large HBE providers reported having over 70% of counselees signing purchase agreements prior to beginning the program (with many of these providers primarily offering telephone-based counseling). However, for the majority of HBE providers, less than 10% of those counseled had signed purchase agreements.

A personal conversation with a homebuyer education industry insider suggests that the many homebuyers are still seeking out pre-purchase homebuyer education late in the search process, particularly when the education is a requirement for a subsidy program. However, this insider also indicated a notable rise in people seeking out HBE prior to beginning the home search process in the wake of the housing market downturn. Intuitively, it seems that proper selection of a home would have a significant influence in the end result of the mortgage. If a purchase agreement has already been made prior to receiving homebuyer education, it raises significant questions about the degree of influence homebuyer education is having on the homeowner. Yet, even if this component is missing, notable effects on mortgage outcomes could still be seen if the financial

education component influences financial behaviors, such as budgeting and saving. However, this then raises the question of the degree to which each these elements—home selection, mortgage selection, and borrower financial behaviors—affects mortgage outcomes.

Additionally, research on several other linkages in the causal model is currently absent. First, there is a dearth of research on program fidelity. That is, are providers of homebuyer education, especially in classroom settings, adhering to the curriculum elements? Are those being educated actually acquiring knowledge? Also, no research has been done to date on the link between the knowledge of home maintenance provided in many homebuyer education programs and actual home maintenance behaviors. A potentially interesting vein of research would be the degree to which home maintenance levels, a key factor in maintaining home value and thus a potential indirect link to the likelihood of strategic foreclosure, can be predicted by personal, financial, mortgage, and geographic factors, as well as whether homebuyer education is influencing maintenance of home value over time. If costs of home maintenance are not being built into cash flow assumptions used in the budgeting elements of homebuyer education, it is possible that borrowers may be unable to afford maintaining a home and would be better off renting.

Considering the extent to which pre-purchase education is being promoted as a solution to foreclosure problems, further rigorous research on homebuyer education is necessary. The ideal scenario would be to have a large provider of homebuyer education partner with banks or a state housing finance agency to design a randomized, forward-looking study in order to solve the twin problems of siloed data and selection bias. Additionally, a rigorous study would also ideally include a follow-up survey 12-18

months after the education is received akin to Shelton and Hill's (1995) budgeting and financial behavior index to assess whether the financial education component of homebuyer education is generating long-term behavioral change. Such a survey could also be used as a reminder to borrowers of post-purchase services offered by counseling agencies, which could be especially timely and relevant given the consistent finding that default hazards tend to peak at 12-24 months after loan origination. An outreach effort of this nature could also help address the common borrower misconception discovered in Saegert, Justa, and Winkel's (2005) focus group study that borrowers do not realize that they can go back to counseling agencies after their pre-purchase education if they fall into financial trouble.

The present study provides evidence to support the notion that homebuyer education is an effective risk-reduction tool, but while homebuyer education may reduce risk, it does not eliminate it. In looking at the longitudinal data, the Great Start program consistently had higher foreclosure rates than the Great Rate program for every loan cohort. There are a number of factors why this could be the case that were controlled for in the regression model, but the absolute gap in foreclosure rates should at least give one pause to consider the degree to which homebuyer education reduces risk in an absolute sense. Is it acceptable to have a loan program with a foreclosure rate consistently two percentage points higher than the baseline program? What are the individual and social costs of relaxed underwriting standards and to what degree can homebuyer education be expected to mitigate these risks? This study helps inform this question by giving a better sense of the magnitude of the effects homebuyer education can reasonably be expected to have. With these considerations in mind, homebuyer education has several qualities that

will likely continue to broaden its use as an intervention—relatively low costs, intuitive program logic, and bipartisan political acceptability. However, while homebuyer education must be seen as an important piece of the solution in addressing the larger systemic issues that imploded the US housing market and it should not be used as a way of avoiding having to address these broader problems. To be sure, having a more financially literate and knowledgeable citizenry is a noble goal and though it may not be *the* solution in and of itself to the problems that led to the foreclosure crisis, when executed well, homebuyer education can play an important role in fostering good stewardship of resources, responsible and informed use of credit, and sustainable homeownership.

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