RESEARCH REPORT

PERCEPTION VS. REALITY:

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Perception vs. Reality: The Relationship between Low-Income Homeownership, Perceived Financial Stress, and Financial Hardship

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Abstract

This research examines how homeowners and renters were impacted by the financial crisis in 2009. We build from the hypothesis that homeownership provides people a sense of stability which decreases the extent to which they feel stressed as a result of financial hardship. Our study tests whether owning a home affected either the degree to which lower-income households experienced financial hardship or the extent to which they perceived they were financially stressed. Using a sample of lower-income borrowers who obtained affordable mortgages through the Community Advantage Program (CAP) and a comparison panel of renters, we collected data on the effects of the financial crisis. From a portfolio performance standpoint, CAP loans have performed relatively well. Our analysis of the survey data finds that, although both renters and owners experienced similar levels of financial hardship, the homeowners were less psychologically stressed overall and reported feeling more satisfied with their financial situation.

Keywords: homeownership, financial stress, sense of control, affordable mortgage

1. **Introduction**

Although the recent boom and bust in the housing markets has made it controversial, homeownership has been considered a keystone of opportunity in the US economic system and a central element of social policy since the 1930's. Particularly from the mid-1990's through the mid-2000's, advocates and policy makers sought to expand homeownership among segments of the population whose homeownership rates lagged, namely minority and lower-income households, by combating discriminatory lending practices and encouraging the extension of credit with more flexible underwriting rules.

But, as has become painfully clear, there is a big difference between making more good mortgages possible and making as many mortgages as possible. During the sub-prime mortgage boom of 2003 - 2007, flexibility was carried to extremes, extending mortgage credit under terms and conditions that were unsustainable and feeding a house price bubble that would inevitably burst. In its wake, these lending excesses left a foreclosure crisis, a credit crunch, a global recession, double-digit job losses, and the loss of a staggering $7 trillion in housing wealth.[1]

This is a watershed opportunity for researchers and policy makers to re-examine the value of homeownership, especially for low- to moderate-income households who often have fewer other assets to draw on and whose long-term financial outlook is more vulnerable to shocks. While there is no shortage of opinions on this issue, there is a lack of real-time data. However, the Center for Community Capital at the University of North Carolina at Chapel Hill can offer a unique data source for the analysis of this question. Over the past 10 years, the Center has researched mortgage loans made to low-and-moderate income (LMI) borrowers through a

[1]Calculated from Federal Reserve Flow of Funds Report, Table B.100 Balance Sheets of Households and NonProfit Organizations. March 11, 2010 (http://www.federalreserve.gov/releases/z1/20100311/z1r-5.pdf).

groundbreaking partnership referred to as the Community Advantage Program (CAP). From 1999 to 2009, CAP funded nearly 50,000 home mortgages nationwide. This unique portfolio can provide important evidence as to the benefits and pitfalls of homeownership for a population traditionally underserved by the mainstream market, particularly as the timing of their homeownership experience encompasses both housing boom and bust episodes.

1.1 CAP Loan Performance

From a portfolio performance standpoint, CAP loans have performed relatively well considering prevailing conditions. As of the end of 2009, most borrowers had still experienced strong overall equity gains--the median CAP owner realized appreciation of $20,459. This represented two-thirds of her annual income, and earned her more than she would have earned following the Dow Jones Industrial Average, but just below what she would have earned putting the same total amount in a CD over the same period. However, considering her low initial equity investment, she has generated a double digit annual rate of return -- more than 30% per annum. This success is largely due to the fact that these low income and minority borrowers were qualified for and obtained affordable, 30-year, fixed rate, amortizing mortgages, underwritten for ability to repay (Quercia et al. 2009).

This is not to say that all is smooth sailing, however. Since inception, 4% of the loans have been foreclosed upon, and another 14% of the borrowers have, at some point in their mortgage history, been 60-or-more days delinquent. Although the rate of serious delinquency has been less than half the delinquency rate of subprime loans, the economic crisis has put a strain on many of the CAP households. For example, nearly one third of the owners said their economic situation had gotten worse between 2008 and 2009 versus only about a quarter who reported an

improvement, and some borrowers have negative equity, particularly those who bought late in the cycle.

1.2 Research Objectives

Survey data from the CAP study allows us to look beyond these top-line indicators to better understand the complex interaction between homeownership status, economic conditions, individual behavior, and psychological well-being. For the last eight years we have conducted in-depth interviews with a panel of homeowners and a comparison panel of renters, described below in section 3. Beginning in 2009, survey questions focused on the effects of and responses to the financial crisis.

We aim to answer the following questions: Has there has been an increase in stress (financial or general stress) since the recession began? If so, what are the triggers? Overall, how satisfied are homeowners and renters with their financial situation during the economic crisis? Our analysis finds that although both renters and owners are experiencing similar levels of financial stress, the LMI owners were less psychologically stressed overall and reported significantly higher financial satisfaction, even after controlling for a range of factors. These findings suggest a beneficial effect from owning one's own home.

2. Background

What evidence do we have to determine whether or not extending homeownership to underserved households is beneficial? As a wealth-building mechanism, housing represents a greater share of the wealth of lower-income households than for higher income households (Bucks et al. 2009). Therefore, the continuing fall in the stock of US housing equity threatens to

wipe out the wealth of families whose assets are most concentrated in their homes. Moreover, appreciation has a negative effect on affordability. In 2008, among working households earning 50-80% of area median income, 32% of owners paid more than 50% of their income toward housing costs, while only 7% of renters paid this much (Waldrip 2009).

Herbert and Belsky (2006) reviewed the research on the costs and benefits of homeownership for low income and minority households and found that, overall, the financial benefits are as likely to be realized by low-income and minority households as by others But this finding comes with the caveat that less well-resourced households have a more tenuous hold on homeownership. They concluded that the wealth building potential of homeownership actually realized is sensitive to a number of factors: length of time spent in homeownership versus renting, level of rents relative to home prices, house price changes, timing, location, and financing among them. As long as house prices increase, homeownership remains a viable wealth-building prospect. However, highly-leveraged households can quickly lose both their accumulated equity and original investment when house prices are declining. Haurin and Rosenthal (2004) reported that homeowners save around 80% of their house price appreciation meaning that, when values decline, homeowners not only cease to gain wealth but can quickly lose any accumulated equity.

More recently, Santiago et al. (2010) analyzed lower-income households who purchased homes through an asset-building program in Denver. They found that even very-low income households generally experienced equity gains and wealth accumulation through homeownership. However, they also found that the lack of liquid wealth put these households at greater risk for accumulating debt and experiencing mortgage delinquency. Furthermore,

Santiago et al. noted that all the home buyers in their study received very favorable mortgage terms and extensive pre-purchase counseling. It is likely that lower-income buyers without these advantages would be more at-risk of experiencing financial hardships as a result of homeownership.

Thus, homeownership may not always build financial security for low-income households. To estimate the relative wealth-building effects of homeownership, Bostic and Lee (2009) simulated the wealth accumulation effects for low-income owner and renter households for 72 combinations of household type, mortgage instrument, neighborhood, appreciation rates, and time horizons. In most scenarios, homeowners come out ahead. However, in some scenarios renting was actually a better outcome financially speaking, particularly when low-income households purchase homes in middle-income neighborhoods and low-appreciation markets with down payments of 5% or less. However, as the authors point out, their simulations rely on stylized assumptions about household behavior and do not necessarily reflect actual outcomes. The literature also raises concern over labor-related immobility (McCarthy, Van Zandt and Rohe 2002) and a lock-in effect (Haurin and Rosenthal 2005) of homeownership for those with less equity, higher transaction costs on lower-balance loans, and fewer economic options.

The literature on the social and psychological benefits of homeownership for lower income households is less developed but nevertheless suggests a number of social and psychological benefits. Low-income owners generally report more satisfaction with homes and neighborhoods than renters, and nearly the same levels as owners overall (Herbert and Belsky 2006). Studies of low-income owners and renters in Baltimore by Rohe and Stegman (1994) and Rohe and Basolo (1997) found mixed evidence of psychological impacts of homeownership; it

had no effect on homeowners' perceived control over life 3 years after buying though it was correlated with improved self-esteem indirectly as a result of better housing conditions, and was strongly associated with increased overall satisfaction with life. However, the question of how homeownership is related to experiences of stress – both psychological and financial – during the recent financial crisis is one that has not yet been explored within the realm of housing research.

Moreover, we are only beginning to examine homeowner reactions to the financial crisis. In a recent National Housing Survey, Fannie Mae (2010) found three in eight respondents from a national sample including owners and renters felt stressed about their ability to pay debts, with a much greater share of renters (46%) than owners (25%) somewhat or very stressed. Sixty one percent of 2010 respondents felt the economy was on the wrong track, compared to just 43% in 2003. Interestingly, renters were less pessimistic than owners, with 11% of renters versus 23% of owners, respectively, projecting deterioration in their family's financial situation. Still, there was strong agreement that owning a home makes financial sense because of potential rent increases for renters and home value appreciation even among delinquent borrowers (85%) and underwater borrowers (75%). Over half (55%) of owners say they were sacrificing financially some or a great deal to own their homes, yet 94% of owners said that homeownership has been a positive experience, including an astonishing 82% of delinquent borrowers and 91% of underwater borrowers. Meanwhile, 79% of renters reported that renting has been positive, which is less than the share of delinquent or underwater owners who reported a positive experience with ownership. More than half the general population agreed that a high rate of homeownership is very important for the strength of their local community, and only 16% said that it is not important. Even 76% of renters described community homeownership as somewhat or very important.

Though some of these seemingly conflicting responses may stem from the fact that the decision to buy a home is largely driven by non-financial factors, the responses convey mixed messages across all kinds of households (Fannie Mae 2010). However, the connection between economic outcomes of homeownership and psychological experiences is not so clear. There is a clear lack of current research examining the linkages between housing status, economic conditions and psychological or financial stress, particularly among low-income households.

3. Data and Methods

The CAP program aims to shed light on the benefits and pitfalls of financing homeownership for lower-income and minority households. The program was launched in 1998, when the Ford Foundation made a $50 million grant to Self-Help, a North Carolina-based CDFI. Based on its own successful track record of making mortgages to underserved households in North Carolina and with the help of the Ford funding to serve as credit enhancement, Self-Help convinced Fannie Mae to buy mortgages originated under CRA and affordable housing programs that did not qualify for purchase into the mainstream secondary market, provided Self-Help indemnified Fannie Mae from default losses. Self-Help purchases such mortgages from banks around the country and delivers them to Fannie Mae, while the original lenders retain servicing responsibilities.

Table 1: Profile of CAP Funded Loans as of December, 2009

Number of Loans	46,532
Total Funding	$4,060,551,059
Median Annual Income	$30,792
Median Loan Amount	$79,000
Median Annual Income as % of MSA Median	60%
% female headed household	40.52%
% Minority	39.34%
% credit score 660 or less (including no score)	46.07%
% LTV over 95% at origination	69.29%
% with debt to income ratio 38% or lower	90.54%

Since its inception, CAP has funded 46,000 mortgages for more than $4 billion. The median borrower's income is $30,800 and the median mortgage, $79,000. In order to receive a mortgage, potential borrowers had to have a household income at or below 80% of the area median income (AMI). Minority borrowers and non-minority borrowers who were purchasing in low-income census tracts or tracts where 30% or more of the residents were minorities could qualify with an income of up to 115% of AMI. Table 1 provides descriptive data on the CAP profile. While the lenders custom designed their own programs to meet market needs, all of the programs combined features that reduced cash required to close and allowed for flexible ways to verify repayment ability and creditworthiness. Certainly all would be considered risky by today's standards: more than two-thirds of the loans had original loan to value in excess of 95%, and almost half of the borrowers had original credit scores of 660 or less or no score at all. These programs successfully targeted underserved markets: the median borrower earned 60% of the median income for the area in which they lived, and a disproportionate share of the borrowers were minorities (39%) and single female-headed households (40%).

3.1 The Community Advantage Panel

The Center for Community Capital (CCC) maintains origination and loan performance data on all of the CAP loans. To analyze comparatively the effects of homeownership, CCC also administers annual surveys to a panel of low-income renters, roughly matched by geographic location to the owners[2]. Homeowners in the Community Advantage Panel Study (CAPS) were randomly selected from the pool of almost 29,000 mortgages funded via CAP between 1998 and 2004. A total of 7,223 phone numbers were called to achieve a sample of 3,743 completed surveys representing a response rate of 52%. The data used in this research comes from the 2008 (2,376 homeowners) and 2009 (2,229 homeowners) survey waves.

For comparison purposes, a panel of renters was also initiated. The renters were randomly selected from a list of 18,640 phone numbers within a 3-mile radius of a study homeowner. The renters had to meet the same income eligibility criteria as the homeowners, described previously. A total of 1,651 renters were recruited for the panel. In 2008, 982 renters completed the survey, and 917 completed the survey in 2009.

3.2 Limitations

This study uses CAP data to examine lower-income homeownership in the context of the recent housing crisis. We use the panel survey data of owners and renters who responded to both the 2008 and 2009 surveys. The analysis uses variables from the 2008 survey to predict general stress, financial stress, and financial satisfaction in 2009. We begin with 2,216 owners and 797

[2] See "Community Advantage Panel Study: Good Business and Good Policy" at http://www.ccc.unc.edu/documents/CAP_Policy_Brief_July09.pdf for further details on the study design and research areas

renters who had valid data for all measures and use coarsened exact matching to extrapolate a small well-matched sample of homeowners and renters.

3.2.1 Comparing Owners to Renters

The comparison panel of renters was originally drawn with the intent of matching the owner panel as closely as possible in terms of geography and income. Still, the profile of the renter panel differs somewhat from that of the owners. For example, the renter panel participants tend to have lower incomes and are less likely to be married than the homeowners. As a result, descriptive comparisons between the two groups can be misleading, and any comparative analysis requires using statistical controls to adjust for underlying socio-economic differences. We address this using several statistical methods and models, described in detail below, but it is possible that some unobserved differences remain which could bias the results.

3.2.2 Generalizability

Riley, Ru, and Quercia (2009) compared the CAP survey participants with low-income and minority respondents in the May 2003 Current Population Survey (CPS), a survey of approximately 50,000 households designed to represent the non-institutionalized civilian population in the United States. They find that CAP survey participants are similar to comparable CPS respondents with respect to household size, income distribution, and minority representation. However, compared with CPS respondents, CAP survey participants tend to be slightly more educated, demonstrate greater attachment to the workforce, and be much more likely to live in the South.

Table 2: Descriptive Statistics from Full Sample

Variable (n=3103)	Freq.	Mean	Std. Dev.	Min	Max
General stress 2008		5.42	2.99	0	16
General stress 2009		5.53	2.92	0	16
Financial stress		3.64	2.76	0	12
Financial satisfaction		1.74	0.60	1	3
Homeowner	2216			0	1
Renter	797			0	1
Relative income		0.81	0.55	0	4.19
Age		41	11.41	19	92
Married	1534			0	1
Cohabiting	212			0	1
Widowed	101			0	1
Divorced	554			0	1
Separated	82			0	1
Single	619			0	1
White	1814			0	1
Black	746			0	1
Hispanic	422			0	1
Other race	104			0	1
Children in home	1841			0	1
Reduction in income	1065			0	1
Unexpected expense	1318			0	1
Single family dwelling	2413			0	1
Apartment	499			0	1
Condo/townhouse	286			0	1
Other residence	160			0	1
Male	1379			0	1
West	292			0	1
Midwest	836			0	1
Northeast	84			0	1
South	1891			0	1

3.3 Measures

We focus on three key impacts: psychological stress, financial hardship, and overall satisfaction with financial situation. For each outcome, we tested whether owning a home in 2008, as opposed to renting, increased or decreased the impact of the recession in 2009.

Descriptive statistics for all variables are shown in Table 2. We used four different statistical approaches to address selection bias, described below, to further strengthen the causal nature of these analyses.

3.3.1 Dependent Variables

There are three dependent variables, all of which were measured in 2009. First, we measured the respondents' overall stress levels. If homeownership provides lower-income households with a sense of security and control which helps them weather difficult economic times, then homeowners in our sample would have lower levels of stress than renters. If homeownership is a burden for these families, however, then homeowners may report feeling more stress and less control over their lives during the recession.

We measured overall stress using the 4-item Perceived Stress Scale (PSS) (Cohen, Kamarck, and Mermelstein 1983). The PSS measures "the degree to which respondents found their lives unpredictable, uncontrollable, and overloading" (Cohen and Williamson 1988). The PSS consists of the following four questions:

1. In the last month, how often have you felt that you were unable to control the important things in your life?
2. In the last month, how often have you felt confident about your ability to handle your personal problems?
3. In the last month, how often have you felt that things were going your way?
4. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?

Each of the 4 items comprising the scale has the following response options: 0 = never, 1 = almost never, 2 = sometimes, 3 = fairly often, 4 = very often. Two of the items are reverse coded, and then the four items are summed to create the stress score. Scores range from 0 (no stress) to 16 (high stress), and the scale is descriptive rather than diagnostic. The respondents overall had fairly low levels of stress; the mean for homeowners was 5 and the mean for renters was 6. Within our sample, the scale items have a reliability coefficient of 0.67.

The second dependent variable is financial stress. In addition to how much stress respondents feel in general, we are interested to know the degree to which they have experienced specific stressful events related to their finances. If homeownership is a drain on the limited resources of lower-income families, they would likely report more financial strain than their renting counterparts. Our six-item scale measures how much stress people experience as a result of financial difficulties. Respondents were asked how stressful they find each of the following four things: 1) paying their rent or mortgage, 2) maintaining their dwelling, 3) managing money, and 4) saving for retirement. Responses were coded 0 for "not at all stressful", 1 for "somewhat stressful" and 2 for "very stressful". Respondents were asked to rate two questions as "not at all true" (coded 0), "somewhat true" (coded 1), or "very true" (coded 2). The questions were: 1) How true is it that you pay too much rent or mortgage? and 2) How true is it that you have too much debt? The responses to these six items were summed to create an index of financial stress. The Cronbach's alpha for the scale is 0.75.

The final dependent variable is a more general measure of satisfaction with one's financial situation. It is possible that homeownership could prompt people to feel more satisfied with their finances, even if they are financially stressed, because they are satisfied with their

decision to become a homeowner. Alternatively, homeowners may feel less satisfied because it would be more difficult for them to relocate in response to a job loss or other unexpected financial hardship, or because their housing investment is eroding. We measured financial satisfaction using a single-item question. Respondents were simply asked, "How satisfied are you with your overall financial situation?" There were three response options: very satisfied, somewhat satisfied, and not at all satisfied. The majority of respondents, 52% of renters and 60% of homeowners, were "somewhat satisfied". The responses were coded one through three and modeled using an ordinal regression model.

3.3.2 Independent Variables

The key independent variable is homeownership which we code 1/0 for owner/renter. The homeownership measure is from the 2008 survey, and the outcomes are all from 2009. We therefore exclude households that switched tenure status between 2008 and 2009. There are two sets of control variables – one set which is used to predict homeownership and another which predicts the three dependent variables. We use the predictors of homeownership in the various methods and models to account for selection bias. These measures have all been shown in previous research to significantly predict homeownership in the CAP sample (Manturuk, Lindblad, and Quercia 2010). The predictors of homeownership are: age, gender, marital status, race/ethnicity, relative income, the presence of children in the home, and dwelling type.

Descriptive statistics for all variables are shown in Table 2. Age is measured as a continuous variable. Gender is measured as a 1/0 variable indicating whether the respondent is male. Marital status is measured using the categories married, cohabiting, widowed, divorced, separated, and single never married. The reference group in the model is married. The

categories for race are white, black, Hispanic, and other race. The reference is white. Relative income is a measure that captures regional differences in the cost of living. It is calculated as the ratio of household income to area median income at the MSA level. We include a 1/0 indicator variable for whether or not there are minor children living in the home. Dwelling type is measured as detached house, apartment, condo or townhome, or other swelling type.

The second group of control variables predicts the three outcomes – general stress, financial stress, and financial satisfaction. Descriptive statistics for these measures are also presented in Table 2. First, all the models include the 2008 measure of general stress to control for the respondents baseline stress level. Because we are interested in how housing status during the recession affected stress, rather than attempting to model factors which contribute to stress more generally, we control for the baseline 2008 level of stress. This accounts for unobserved characteristics which are correlated with stress generally, such as personality traits. Both age and relative income are retained from the models predicting homeownership since our analysis indicates they were not sufficiently balanced following some of the sample matching approaches.

New control variables in the outcome models are: net worth, geographic region, and two financial hardship measures. Net worth is the total value of all assets held minus the total amount of all debts owed. For homeowners, the value of the home is counted as an asset and the amount of the mortgage is a debt. This allows us to capture negative equity in the net worth calculation. Region is measured using the categories west, northeast, south, and Midwest. Midwest is the reference category. There are two measures of financial hardship – indicators for whether a household experienced a reduction in income or an unexpected expense in the prior four weeks.

3.4 Method

For this study, we use four different statistical methods which address selection bias: propensity score matching, propensity score weighting, coarsened exact matching, and instrumental variable regression. There are two primary flaws in traditional regression analysis. First, the selection variable is specified by these models as exogenous but is actually endogenous (Guo and Fraser 2009). In this research, for example, a traditional covariate control model would model homeownership as exogenous when it is not. In order to derive robust estimates, selection needs to be explicitly modeled (Heckman 1979; Heckman 1978). Second, traditional regression models assume that selection is independent from the outcome of interest. When this assumption is violated, as it often is, regression models yield biased and inconsistent estimation of the regression coefficients (Berk 2004; Imbens 2004; Rosenbaum and Rubin 1983). In the present study, respondents selected whether to purchase a home or rent a home, and this selection must be modeled in order to obtain unbiased results.

There are many different methods to address selection bias, and each method has different assumptions, strengths, and limitations. We therefore model the same outcomes using a variety of methods. If the results converge, it can be taken as strong support for the findings. The first analysis uses a within-caliper propensity score matched sample (Rosenbaum and Rubin 1983; Rosenbaum and Rubin 1985). Table 3 shows the logistic regression model predicting homeownership. Propensity scores are created using this model. The propensity score is the probability of a respondent being a homeowner, conditional on their age, gender, marital status, race/ethnicity, relative income, dependent children, and dwelling type. Following Rosenbaum and Rubin (1985), this study employs the logit of the predicted probability:

$$\hat{q}(x) = \log[(1-\hat{e}(x))/\hat{e}(x)]$$

where $\hat{e}(x)$ is the predicted probability from the logistic regression because the distribution of $\hat{q}(x)$ approximates to normal.

After calculating the propensity score for each participant, we match homeowners and renters. The matching algorithm, nearest neighbor within caliper matching (Rosenbaum and Rubin 1985), selects a control participant *j* as a match for treated participant *i*, if and only if the absolute distance of propensity scores between the two participants (i.e., the difference between propensity scores P_i and P_j) meets the following condition:

$$\| P_i - P_j \| < \varepsilon,$$

where ε is a pre-specified tolerance for matching, or a caliper. Rosenbaum and Rubin (1985) suggest using a caliper size of a quarter of a standard deviation of the sample estimated propensity scores (i.e., $\varepsilon \leq .25\sigma_P$, where σ_P denotes standard deviation of the estimated propensity scores of the sample). While propensity score matching is a highly effective method to match similar homeowners and renters, it does result in a significant reduction in the sample size. In this analysis, the matching algorithm yields 617 renters and 617 homeowners for a total sample of 1,234.

For the second analysis, propensity score weights are applied to the full sample. This method has the advantage of retaining the full sample while still incorporating the propensity of being in one group or the other. Propensity score weighting also uses the propensity scores from

Table 3: Logistic Regression Model Predicting Homeownership

	Coef.	Std. Err.
Age	0.013**	0.00
Male	0.080	0.11
Cohabiting	-0.917***	0.19
Widowed	-1.074***	0.26
Divorced	-0.821***	0.14
Separated	-1.118***	0.26
Never married	-0.706***	0.14
Black	-0.274*	0.11
Hispanic	0.091	0.15
Other race	-0.281	0.26
Relative income	2.083***	0.15
Children in the home	0.202	0.11
Apartment	-1.386***	0.13
Condo/townhouse	0.007	0.17
Other residence	-0.389	0.21
Constant	-0.264	0.30

Note: *p<0.05, **p<0.01, ***p<0.001

the model in Table 3. Rather than using the logit of the predicted probability of the logistic regression as a propensity score, however, this method defines the propensity score as the estimated probability of owning a home ê(x) (Rosenbaum 1987; Hirano, Imbens, and Ridder 2003). Sample weights are then created using the propensity score. We calculate weights for the average treatment effect (ATE) using the formula:

$$\omega(W,x) = \frac{W}{\hat{e}(x)} + \frac{1-W}{1-\hat{e}(x)}$$

The models are then run using the propensity score weights as sample weights. While this method does allow us to use the full sample, there are some limitations. Freedman and Berk (2008) examined the efficiency of propensity score weighting and concluded that weighting does reduce bias if the propensity scores can be estimated accurately. However, if there is a large

variation in the distribution of the weights, then propensity score weighting can bias the standard errors and causal effects.

Third, we use coarsened exact matching to address selection bias and reduce model dependence (Ho et al. 2007). We first "coarsen" the independent variables which are theoretically associated with homeownership by collapsing them in to meaningful bins. For example, we take the continuous variable representing years of education and coarsen it to bins representing a high school degree or less, a college degree, and an advanced degree. Second, the coarsened exact matching algorithm creates one stratum for each unique set of covariates predicting treatment and assigns each observation to a stratum. Strata without both a treatment and a control observation are dropped, and the remaining observations constitute the matched sample.

Coarsened exact matching offers advantages over other matching methods. Unlike most matching algorithms, coarsened exact matching allows the researcher to specify the maximum imbalance ex ante. This produces a marked reduction in the imbalance between treatment and control groups and, in turn, reduces selection bias and model dependence (Blackwell et al. 2009). Another advantage of coarsened exact matching is that, unlike propensity score-based matching, reducing the imbalance on one variable has no effect on the other variables in the selection model. On the other hand, attempting to match on a full set of covariates often results in such a reduction in the sample size that the results are not reliable. Hence it is often necessary to match on a reduced set of covariates. In this study, the coarsened exact matching algorithm matched 648 renters to 1,930 homeowners based on gender, marital status, and race/ethnicity.

For the final set of analyses, we used instrumental variable regression. Instrumental variable models produce consistent results when there are correlations between the independent variables. In order to achieve reliable results, it is crucial to identify a strong instrument – a variable that is highly correlated with the first stage predictor and uncorrelated with the second stage outcomes. In this study, the instrument must be correlated with homeownership and uncorrelated with financial stress, general stress, or financial satisfaction. While several previous studies have used house values as an instrument in research on homeownership (see Green and White 1997), it is not suitable in this study because house values are correlated with financial stress. Instead, we use the cumulative number of times a household has moved between 2004 and 2009. This measure predicts homeownership, but is not significantly correlated with any of the outcome variables. The first-stage equation predicting homeownership is again the model shown in Table 3, but with the inclusion of the instrument measuring cumulative moves.

For each of the four methods of addressing selection bias, we use the matched, weighted, or instrumented sample to predict general stress, financial stress, and financial satisfaction. The models predicting general stress and financial stress are OLS models because the measures are continuous. The models predicting financial satisfaction are ordinal logistic models with the exception of the instrumental variable model, which is linear.

4. Results

Table 4 shows the results for the models predicting general stress. The homeownership measure is statistically significant across all models and the effect size is similar. Homeownership is associated with a decline of between 0.364 and 0.416 points on the general

stress scale. In the propensity score matched sample, no other measures are significant. This is likely because the match reduced the sample size by more than 50% so there are too few observations to find significant differences between the owners and renters. For example, with only 617 homeowners and 617 renters, it is unlikely there is sufficient distribution to find effects for geographic regions even if such effects are present in the full sample.

Table 4: Linear Regression Models Predicting General Stress

	Within-caliper match		Propensity score weighting		Coarsened exact matching		Instrumental variable model	
	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE
General stress 2008	0.058	0.03	0.060**	0.02	0.058**	0.02	0.058**	0.02
Homeownership	-0.364*	0.18	-0.384**	0.13	-0.416**	0.14	-0.365**	0.13
Age	0.008	0.01	0.002	0.00	0.001	0.01	0.003	0.00
Relative income	0.137	0.24	0.096	0.11	0.058	0.11	0.120	0.11
Net worth	-0.001	0.00	0.000	0.00	0.000	0.00	0.000	0.00
West	-0.188	0.29	-0.182	0.21	-0.252	0.22	-0.230	0.20
Northeast	-0.662	0.48	-0.974**	0.34	-1.152**	0.37	-0.953**	0.34
South	-0.343	0.21	-0.321*	0.13	-0.352**	0.13	-0.357**	0.12
Reduction in income	0.277	0.18	0.241*	0.12	0.235	0.12	0.246*	0.11
Unexpected expense	0.156	0.18	0.107	0.11	0.083	0.12	0.115	0.11
Constant	5.139***	0.49	5.445***	0.31	5.625***	0.33	5.41****	0.31
N	1,234		3,078		2,578		2,987	

Note: *p<0.05, **p<0.01, ***p<0.001

Across the three other models, we find that a 1-point increase in reported stress in 2008 is associated with an increase of 0.06 points in 2009 on the stress scale. We also find significant effects for geographic region; being in the northeast (betas -0.953, -0.974, -1.152) or the south (betas -0.321, -0.352, -0.357) is associated with a lower stress score, likely due to regional economic conditions. More than half the respondents lived in17 southern states, but only two of those -- North Carolina and Oklahoma -- represent more than 4% of either sample, whereas Ohio dominates the Midwestern subset and California and Arizona are the lead states in the Western

subset. California and Arizona both saw substantial increases in property value from 2000 to 2006, and have since seen 30% price declines, while the two big states in the south have both logged property value gains since 2006[3]. The share of mortgages 90-days past due and in foreclosure in the second quarter of 2010 in California and Arizona is about double the level, and Ohio about 150%, of that in North Carolina and Oklahoma, indicating more distress in those markets.[4] Oklahoma logged the lowest April 2010 unemployment rate (6%) and California, the highest.[5]

Finally, the propensity score weighted model and the instrumental variable model indicate that a reduction in income in the prior year was associated with a 0.241 to 0.246 increase in stress score. In the models where this variable is not significant, the coefficient size is similar and the p-value approaches, but does not reach, 0.05. Further research is therefore needed to better understand the association between income shocks and general stress.

[3] According to FHFA/OFHEO Conventional and Conforming Home Price Index, (Index 1980Q1 = 100, NSA) obtained from Moody's DataBuffet, these states experienced the following house price changes between 2000 and 2010, and between 2006 and 2010, respectively: NC 39%,5%; OK 44%,10%; CA 66%, -31%; AZ 44%,-30%; OH,17%, -6%.
[4] According to the Mortgage Bankers Delinquency Survey for the 2nd quarter of 2010, the seriously delinquency rates for all loans (NSA) by state is: NC 6.41; OK 5.89; CA 12.14; AZ 12.81; OH 9.49.
[5] Unemployment Rate, (%, NSA) Apr-10: NC 10.00; OK 6.30; CA 12.30; AZ 9.10, and OH 10.70, obtained from Moody's DataBuffet.

Table 5: Linear Regression Models Predicting Financial Stress

	Within-caliper match		Propensity score weighted		Coarsened exact matching		Instrumental variable model	
	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE
General stress 2008	0.036	0.03	0.039*	0.02	0.041*	0.02	0.036*	0.02
Homeownership	-0.244	0.17	-0.191	0.12	-0.229	0.13	-0.181	0.12
Age	0.004	0.01	0.005	0.00	0.005	0.01	0.004	0.00
Relative income	0.206	0.24	0.120	0.11	0.104	0.11	0.130	0.11
Net worth	-0.002	0.00	0.000	0.00	0.000	0.00	0.000	0.00
West	0.010	0.31	-0.086	0.20	-0.084	0.21	-0.120	0.19
Northeast	0.570	0.55	-0.198	0.32	-0.281	0.35	-0.199	0.32
South	-0.233	0.20	-0.339**	0.12	-0.354**	0.13	-0.357**	0.12
Reduction in income	0.225	0.17	0.190	0.11	0.172	0.11	0.185	0.11
Unexpected expense	0.523***	0.17	0.348***	0.10	0.348**	0.11	0.355***	0.10
Constant	3.113***	0.44	3.287***	0.30	3.357***	0.32	3.326***	0.29
N	1,234		3,078		2,578		2,987	

Note: *p<0.05, **p<0.01, ***p<0.001

Table 5 presents the models predicting financial stress. The models again show consistent results for the homeownership variable; it is not significant in any of the four models. While homeownership did not give people a financial advantage during the crisis, it also did not appear to put them at a disadvantage compared to renters. The other consistent finding is for the unexpected expense indicator. Having an unexpected major expense in the prior year is associated with an increase in the financial stress scale of between 0.523 and 0.348.

As with the general stress outcome, there are variables which are not significant in the propensity score matched sample but are significant in other models. The 2008 general stress measure is associated with a slight increase (betas 0.039, 0.041, 0.036) in financial stress. Also, living in the south is associated with a decrease (betas -0.339, -0.354, -0.357) in financial stress, likely due to a lower cost of living.

Table 6: Ordinal Logistic Regression Models Predicting Financial Satisfaction

	Within-caliper match		Propensity score weighted		Coarsened exact matching		Instrumental variable model	
	Odds Ratio	SE	Odds Ratio	SE	Odds Ratio	SE	Coeff.	SE
General stress 2008	0.957*	0.02	0.96**	0.01	0.958**	0.01	-0.012**	0.00
Homeownership	1.365**	0.16	1.271**	0.12	1.312**	0.13	0.066*	0.03
Age	1.002	0.01	1.002	0.00	1.002	0.00	0.001	0.00
Relative income	0.846	0.14	0.943	0.07	0.931	0.08	-0.021	0.02
Net worth	1.000	0.00	1.000	0.00	1.000	0.00	0.000	0.00
West	1.105	0.25	1.178	0.16	1.126	0.17	0.053	0.04
Northeast	0.724	0.26	0.898	0.19	0.876	0.20	-0.038	0.07
South	1.102	0.17	1.119	0.09	1.168	0.10	0.035	0.03
Reduction in income	0.801	0.10	0.834*	0.06	0.843*	0.07	-0.050*	0.02
Unexpected expense	0.873	0.11	0.915	0.07	0.912	0.07	-0.026	0.02
	1,234		3,078		2,578		2,987	

Note: *p<0.05, **p<0.01, ***p<0.001

Table 6 shows the results from the final analysis predicting financial satisfaction. This is an ordinal logistic model, so the table presents odds ratios rather than coefficients, except for the instrumental variable model. As a result, a negative effect in the first three models will yield an odds ratio between 0 and 1, while it will yield a negative number for the instrumental variable model. What may appear to be conflicting results from the models are, in fact, consistent.

First, we find a consistent significant effect from the homeownership variable. Homeownership is associated with an increase in the odds of a higher financial satisfaction score between 27.1% and 36.5%. The instrumental variable model also indicates a positive relationship between homeownership and financial satisfaction. As with the prior two outcomes, we find that 2008 general stress is significant; a 1-point increase in 2008 stress is associated with about a 5% reduction in the odds of a higher financial satisfaction score. The instrumental variable model also yields a negative coefficient for 2008 general stress. The variable indicating

a reduction in income in the prior year is associated with a decrease (odds ratios 0.834, 0.843; beta -0.05) in financial satisfaction in all the models except the propensity score matched sample.

5. Discussion

The above analysis provides some intriguing insights. Though homeowners in our sample were neither more nor less likely than renters to experience financial stressors during the economic crunch, homeowners exhibited a greater perception of being in control and significantly higher financial satisfaction than renters, suggesting that the condition of homeownership somehow provide a greater sense of financial security. From the literature, macro indicators, and the CAP research as a whole, we have evidence that suggests homeownership can be a fairly reliable contributor to wealth building for low income households. It is also clear that the extent to which it leads to greater wealth is dependent on a variety of factors outside of the owners' control such as house price appreciation and employment. The varied experiences of our CAP owners show that entering homeownership is just a first step, and the path has lots of divergences. Homeownership appears to ameliorate general stressors and increase financial satisfaction, things that are related to an overall sense of life control. However, its effect on financial stress specifically is mixed, which partly explains why people continue to debate the issue of whether homeownership makes sense for LMI households.

Our analysis focused on the relationships between financial stress, general stress, and homeownership. The findings point to a cleavage between financial stress and both general stress and financial satisfaction, at least among the homeowners in this study. We found that the homeowners and renters both experienced financial stress to a remarkably similar degree.

Homeownership did not lesson the impacts of the financial crisis, but it also did not put people at a financial disadvantage compared to renters. Yet, in spite of the fact that everyone experienced similar financial stressors, the homeowners experienced less overall stress than the renters. This suggests to us that homeownership may give people a sense of being in control of their lives, which in turn reduces the stress they feel as a result of financial hardships. We found a similar result when looking at how satisfied respondents were with their overall financial situation. In spite of the fact that both groups had similar financial situations, the homeowners were again more likely to report that they felt satisfied with their situation. This supports the idea that owning a home gives people a sense of satisfaction or accomplishment which translates in to feeling more satisfied.

Our analysis of stress and financial satisfaction among low income renters and owners finds no differences for *financial* stress across tenure groups. We can in part explain the lack of an obvious effect of homeownership on financial stress by observing that external conditions moderate whether the household finds homeownership more of a financial liberator or a financial constraint.

One important limitation, as Dietz and Haurin (2003) identify as an econometric challenge in assessing the impacts of tenure on social and financial outcomes of interest, is that homeowners differ in both observable and unobservable ways from renters. Thus, assessing the effect of tenure requires consideration of underlying differences. The four different analytic methods we used enabled us to address observable differences between the owner and renter samples, but these groups could still be systematically different in unobserved ways.

Finally, we note again the dissonance between actual financial experiences and reports of financial satisfaction and sense of control. The fact that low income owners experienced similar set backs over the course of 2008 to 2009 to low-income renters, yet reported significantly lower levels of financial and general stress, indicate that the benefits to homeownership go beyond those that are financial, tangible and easy to measure.

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