Borrowing Constraints and Homeownership over the Recent Cycle

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Introduction

Mortgage credit supply expanded during the early part of the 2000s before tightening considerably following the 2008 financial crisis (Parrott and Zandi 2013; Goodman et al. 2015a; Anderson 2015). Homeownership increased (from 64 percent to 69 percent between 1994 and 2004) and then decreased back to 64 percent by 2014 (CPS/HVS 2015). This represents the largest fluctuation in the homeownership rate since the middle of the 20th century.[1] . While the total number of households increased by over 5 million between 2006 and 2014, the number of households who own their home actually decreased by almost 1 million over the same period (CPS/HVS 2015).

Following the housing crisis and the Great Recession of 2008, evidence indicates a considerable tightening of mortgage underwriting terms over the period 2008-2013 (Parrott and Zandi 2013; Goodman et al. 2015a; Anderson 2015). Goodman et al. (2015a) find that credit scores have appreciably increased compared to 2001 and estimates that 4 million more loans would have been made between 2009 and 2013 if credit standards had been similar to those that prevailed in 2001. Descriptive evidence indicates that despite an increase in the number of purchase transaction since 2011, the share of first-time homebuyers remains below historical levels (Bai et al. 2015).

While previous studies have shown a tightening of credit following the Great Recession, the extent of the impact on homeownership has not been estimated. This paper presents evidence on the role of changes in borrowing constraints on the recent decline in homeownership. We find a large, negative impact of being borrowing constrained on the probability of an individual household owning a home in 2010-13.

[1] The homeownership rate increased from post-Great Depression lows of less than 45 percent in 1940 to over 60 percent in 1960 (Fetter 2013). By comparison, between 1965 and 1994, homeownership fluctuated by less than 3 percentage points (staying between 63 and 66 percent) (CPS/HVS 2015).

The next section reviews the literature about the impact of credit availability and borrowing constraints on homeownership. Section II presents the datasets used to identify constrained individuals and the impact of being constrained on tenure choice. Section III describes the methodology. Section IV analyses the results and discusses implications for changes in the homeownership rate.

1. Literature

Changes in lending terms have been estimated to play a large role in past variations in homeownership. As reported by the decennial census, the homeownership rate increased from a low of 44 percent in 1940 to 62 percent in 1960 (U.S. Census, 2015). According to Fetter (2013), the self-amortizing long term fixed rate mortgage with lower downpayments that was introduced by FHA was the major factor in this rapid and large increase.

This is consistent with evidence of credit rationing in the mortgage market found in the empirical literature (Duca and Rosenthal 1994; Rosenthal et al. 1991), and in particular is an example of credit markets in which lenders ration access to credit as modeled by Stiglitz and Weiss (1981). In this context, borrowers who cannot meet a minimum downpayment requirement, for example, will not be able to obtain a mortgage even if they are willing to pay a higher interest rate and even if the higher interest rate mortgage would have resulted in a lower annual ownership cost than the cost of renting. The impetus for credit rationing comes from asymmetric information, adverse selection, and moral hazard. Lenders use non-rate terms to limit adverse selection associated with higher interest rates or moral hazard for borrowers with little collateral.

The impact of being borrowing constrained on homeownership is well established in the empirical literature (Linneman and Wachter 1989; Zorn 1989; Rosenthal et al. 1991; Duca and Rosenthal 1994; Haurin et al. 1996; Gyourko et al. 1999; Rosenthal 2002; Barakova et al. 2003; Barakova et al.

2014) as reviewed in [redacted].[2] Consistently, having insufficient wealth for a substantial downpayment is found to have a larger negative effect on the propensity to own than income (Linneman and Wachter 1989). Young households (Haurin et al. 1996) and minority households (Gyourko et al. 1999) are particularly subject to the effect of borrowing constraints, consistent with the lower homeownership rate observed among these groups. In addition to income and wealth, a third constraint, credit quality is also found to have a significant and negative effect on homeownership (Barakova et al. 2003). Using a novel survey approach, Fuster and Zafar (2015) test the effect of the availability of loans with different downpayment requirements on stated intention to become a homeowner. They find that the size of the required downpayment is an important determinant of the tenure decision, particularly for financially constrained households.

Recent papers (Barakova et al. 2014; Gabriel and Rosenthal 2015) have investigated the role of changes in borrowing constraints and demographics on homeownership during the bubble period, providing evidence of the role played by the loosening of borrowing constraints in the expansion of homeownership. Using the National Longitudinal Survey of Youth (NLSY) data for recent movers between 38 and 46 years old in 2003, Barakova et al. (2014) finds that the impact of being income and credit constrained on the propensity to own significantly lessened between 2003 and 2007.[3]

Gabriel and Rosenthal (2015) use census and American Community Survey microdata for 2000, 2005, and 2009 to identify drivers of homeownership by age group over that period. The use of census data provides them with a large sample size with detailed location and socio-demographic variables but

[2] The Survey of Consumer Finance (SCF) and the National Longitudinal Survey of Youth (NLSY) are the two main surveys with enough information about wealth and credit use to allow a precise estimate of borrowing constraints. While the NLSY has the benefit of being a panel, it is limited by following a generational cohort that has now aged beyond the main home-buying years.

[3] Borrowing constraints have been tested with different datasets over different periods and results have consistently found evidence of the impact of credit constraints for both recent movers and the overall population, with a focus on recent movers has more reflective of current constraints (Linneman and Wachter 1989; Zorn 1989; Rosenthal et al. 1991; Haurin et al. 1996; Gyourko et al. 1999; Rosenthal 2002; Barakova et al. 2003; Calem et al. 2010; Barakova et al. 2014).

limited wealth and credit data. Examining the overall population and recent movers, they conduct a shift-share analysis to identify the contribution of underlying characteristics relative to parameters shifts to homeownership rate changes. They find that along with changes in population socioeconomic characteristics, changes in the relationship of underlying characteristics to homeownership outcomes also contributed to increases in homeownership over the periods 2000-2005 and 2005-2009. In contrast changes in population characteristics were largely responsible for the increase in the homeownership rate in the 1990s (Gabriel and Rosenthal 2005).

This suggests that changes in market conditions and in household preferences contributed substantially to fluctuations in the homeownership rate over the period of 2000 through 2009. During this time, the impact of credit quality and income constraints on homeownership fell, but the increase in homeownership is limited by the increase in house prices (Barakova et al. 2014).[4] This paper extends the literature on the impact of borrowing constraints on tenure outcomes by identifying factors that contributed to the decline in homeownership after 2006 using SCF data. The paper estimates the changing impact of borrowing constraints, as measured by traditional standards, on the probability of individual households becoming homeowners over time, and then using these estimates, simulates the impact on changing homeownership rates. Data

This paper uses data from Survey of Consumer Finance (SCF) for 2001, 2004, 2007, 2010 and 2013.[5] We group the survey data into three periods: 2001 (baseline), 2004 and 2007 (boom) and 2010

[4] Evidence of how prices themselves are impacted by credit are found in Duca et al. (2015) and Pavlov and Wachter (2011).

[5] The SCF employs a dual-frame sample design, including a multi-stage area-probability (AP) sample and a list sample. The AP sample, which comprises roughly 60 percent of the total sample, provides broad national coverage and was selected by NORC at the University of Chicago. The list sample oversamples households that are predicted to be relatively wealthy based on a model of wealth (see Kennickell 2001 and Bricker et al. 2016). The two components of the sample are combined to represent the population of households (Kennickell and Woodburn, 1999). The eligible respondent in a given household is the economically dominant single individual or the financially most knowledgeable member of the economically dominant couple. Most of the questions in the interview of that sample were focused on the "primary economic unit" (PEU) a concept that includes the core individual or couple and any other people in the household (or away at school) who were financially interdependent with that person or couple.

and 2013 (bust). The number of households surveyed with the needed information ranges from 4,307 to 6,325 per survey year (and from 4,307 to 12,212 per period), among which between 770 and 1,068 moved within the last 2 years (788 to 2,303 per period). The overall sample is weighted to enable the drawing of inferences for the population as a whole. Between 2,036 and 3,134 of household heads form the core adult cohort, between ages 21 and 50, the main home buying years (of which 568 and 963 are recent movers). The SCF collects detailed household-level data on assets and liabilities and on demographic characteristics, income, employment and pensions, credit market experiences. The data are reported as of the time of the interview, except for income, which refers to the prior calendar year.

The SCF's detailed information, on household's wealth, income, and use of credit, make it possible to identify households who are subject to borrowing constraints based on standard underwriting criteria. In order to do so, detailed local information is needed. The internal SCF data contain local geographic information, which makes it possible to predict unconstrained desired house value and control for local housing and related conditions and to determine whether individual households are likely to be constrained in their housing tenure choice, as described further below.[6]

We conduct the analysis for the full SCF sample as well as for age restricted and recent mover samples. We use the various samples to replicate previous results and to compare the results in the literature to recent outcomes for the impact of constraints. Following the established literature (Barakova et al. 2003; 2014) we separately analyze the 21-50 age cohort, because the factors driving tenure choice in these prime home buying years are likely to systematically differ from those of older households due to differing demographic circumstances. We also estimate results for the entire population which enables us to simulate the effect of changes in the impact of the constraints on the

[6] To do so, we use FHFA's all transaction house price index data for Metropolitan Statistical Areas and Divisions (MSA) and State nonmetropolitan areas to estimate house price change. We use decennial census and ACS data to estimate MSA or State value to rent ratio.

overall homeownership rate, using SCF sample weights for the drawing of inferences for the population as a whole.

The distinction between recent movers and other households for analyzing borrowing constraints is used in the literature since, for recent movers, tenure outcome will be based on current measures of wealth (and other data), available in the SCF.[7] Thus, for comparative purposes with the 2001, and 2004-2007 samples, we conduct separate analyses of the impact of borrowing constraints for recent movers.[8]

In the most recent period, following the housing wealth decrease between 2007 and 2010, the mobility decision itself may have been impacted by credit constraints.[9] Because of the decline in home values, many households were "locked in" as the value of their home was no longer sufficient to pay off their mortgage. These households would be "move constrained" while not necessarily borrowing constrained conditional on current housing values. Therefore, the recent mover population in the 2010 and 2013 samples may be subject to a selection bias that could cause the impact of borrowing constraints to be understated for the population as a whole.[10] For this reason and to allow estimation of

[7] The likelihood of observing a longer-term homeowner pre-2007 to be wealth constrained is reduced by the wealth benefit to the homeowner of rising home prices over the period of ownership, potentially generating an endogeneity problem in measuring the impact of borrowing constraints on ownership for non-recent movers. Various factors may mitigate the potential endogeneity problem. For example, longer-term owners that initially had been wealth constrained, and that benefitted from subsequent equity accumulation, may have extracted the equity through cash-out refinance or through home equity borrowing, causing them to remain wealth-constrained at the higher home values. Other such households that initially were wealth constrained but were freed of wealth constraints due to equity accumulation, may instead become income-constrained when evaluated at the higher home values.

[8] Direct evidence on the impact of credit on mobility itself in the recent period is provided by Laeven and Popov (2015). Also see Bricker and Bucks (2016) for an analysis of mobility in the late 2000s using the SCF.

[9] While the SCF provides information about when households moved in their current dwelling, enabling us to identify recent movers who have made their tenure choice recently, the lack of panel data means that we lack data to model mobility decisions

[10] Bias could arise because households that are wealth constrained for borrowing would tend to be move constrained as well. Therefore, recent movers that appear to be wealth constrained will tend to be a selected sample such that the inference that they are constrained results from measurement error and is incorrect. Moreover, subsequent to the collapse in home values during 2007-2010, the endogeneity problem for the longer-term homeowner population is mitigated.

impact for the population at large we present results for the overall sample as well as for the recent movers.

Tables 1 and 2 present summary statistics by period for the overall population (1a) and the following subpopulations: all recent movers (1b); the overall population age 21-50 cohort (2a); and recent movers within the age 21-50 cohort (2b). The share of recent mover households (who moved within the last 2 years) is decreasing across periods, ranging between 21.7 and 19.4 percent for the entire population and between 31.5 and 28.7 percent for the age 21-50 cohort. The homeownership rates among recent movers are, as expected, lower than those for the overall samples. In all samples, the homeownership percentage in 2010-13 drops sharply from its 2004-07 peak levels.

Included in the descriptive statistics are estimates the share of the different samples that are borrowing constrained using standard underwriting criteria for loan-to-value (10 percent), debt-to-income (38 percent) and credit score (620) as discussed further below. The intention is to define constraints under traditional standards rather than effective standards to capture how changes in the mortgage market affect the impact of being constrained according to traditional criteria. Overall, the descriptive statistics in Tables 1 and 2 indicate that compared to the entire population, recent movers have socio-economic characteristics that are generally associated with lower propensity to own and a greater likelihood of being constrained. The age 21-50 cohort also exhibits characteristics that are less favorable to homeownership both in terms of endowment and borrowing constraints than the population as a whole.

We find that 2004-07 is the period with the highest share of constrained individuals. However, it is not the share of individuals subject to traditional borrowing constraints that establishes the impact of the constraints. Rather the question is whether being subject to standard constraints impacts the probability to own. We test for this impact of constraints on the individual probability of homeownership in the following.

2. Methodology

The first step of the empirical approach identifies which households, are subject to one of three borrowing constraints: wealth insufficient to cover a downpayment, income that would result in a debt - to-income ratio above standard limits and credit score below the range associated with prime borrowers. For the main specification presented below, the following thresholds were used to identify a borrower as being constrained: wealth below 10 percent of estimated preferred house value; income that would result in a mortgage payment-to-income ratio above 38 percent; and an estimated credit score below 620.[11] As a robustness analysis we test alternative thresholds, varying the minimum downpayment from 3 to 20 percent, the maximum mortgage payment-to income ratio from 28 to 42 percent; and minimum credit score from 620 to 680. The results are qualitatively unchanged.

In order to establish which households are constrained or not, including among renters, it is necessary to estimate a housing demand equation. The housing demand equation is estimated for unconstrained homeowners, whose housing value is expected to reflect household preferences. Unconstrained homeowners wealth and income relative to home value and credit satisfy the established thresholds. Being an unconstrained homeowner is not a random event, and requires controlling for sample selection.

Similar to Barakova et al. (2003; 2014), we apply a bivariate probit (Heckman type) approach that corrects for selection effects to estimate unconditional housing demand equations for owner-occupants, so that the parameters to estimate preferred house value are based on the observed

[11] This paper is looking at the combined effect of credit constraints over time and given the high level of collinearity between constraints we use an indicator of whether a household is subject to one or more of the constraints (wealth, income and credit) or not. We also estimated the results for the three constraints separately following previous studies (Barakova et al. 2003, 2014). The results for each constraint show a similar pattern with the income constraint in particular becoming insignificant in the 2004-07 period and increasing back above 2001 levels in 2010-13. The results are available from the authors on request.

demand of unconstrained households. We jointly estimate the selection equation identifying the probability of being unconstrained among owner households (first stage), and the housing demand equation estimating the preferred home value of unconstrained owner households (second stage). Both equations include control variables that determine housing demand and the probability of being constrained at the household level X_1 (log of income[12], the inverse hyperbolic sine (IHS) of non-housing wealth[13], marital status, number of children, family size, age, educational attainment, race) and housing market characteristics at the county level X_2 (log of median house value). Subscripting the household with i and denoting the error term ε_i, we have: [14]

First stage: $\text{unconstrained}_i = \alpha + \beta_1 X_{1i} + \beta_2 X_{2i} + \varepsilon_i$

Second stage: $\log(\text{house value} \mid \text{unconstrained}) = \alpha + \beta_1 X_{1i} + \beta_2 X_{2i} + \varepsilon_i$

The estimated preferred home value calculated for unconstrained households is then used to predict the preferred home value of all households (renters and owners, constrained or not) based on the characteristics from the home demand equation.

In addition, we use the credit score imputation model developed in Barakova et al. (2003) based on characteristics present in the SCF to impute individual credit scores. When comparing the credit scores imputed for each SCF family to the mean census tract credit score for each family obtained from Equifax, the distribution of imputed credit scores is similar to the one from the Credit Bureau. For instance, the average of census tracts mean imputed credit score is 687.4 compared to 688.6 for the

[12] Previous studies, including Haurin et al. (1996) have considered whether income and wealth needed to be endogenized and found limited evidence for the existence of systematic bias associated with using actual current income and wealth. We therefor use these direct measures.

[13] Following Burbidge et al. (1988), IHS is used rather than log for non-housing wealth due to a substantial number of households with negative non-housing wealth values.

[14] Both equations include the same set of explanatory variables; the literature has not identified a variable that would affect the probability of being unconstrained and is not related to the quantity of housing services consumed. Haurin et al. (1996) provide a discussion of how due to the non-linearity of the probit model in the first stage, identification is possible even if both sets of explanatory variables are identical.

average of census tracts mean credit score from Equifax. Comparisons at the median, 25th and 75th percentiles also show close alignment.

Once borrowing constrained households are identified, we estimate a probit model for each period relating tenure status (owner or renter) for household *i* to an indicator for whether the household is subject to any one of the three borrowing constraints: income, wealth or credit. We control for a number of household characteristics X_a (log income, age, marital status, race, education and children) and local market *j* characteristics X_2 (price to rent, HPI change) with error ε_i. This approach enables the estimation of the overall effect of borrowing constraints on a household's probability of owning.

$$Owner_i = \alpha + \beta_1 X_{1i} + \beta_2 X_{2j} + \beta_3 Constraint_i + \varepsilon_i$$

We apply the same analysis for all three samples: the full 21-50 age cohort; the movers in that cohort; and the overall population.

3. Analysis and Results

Tables 5a and 5b present the estimated, marginal effects on tenure status of the indicator for borrowing constraints and the control variables, respectively, for the overall population and for recent movers, for 2001, 2004-07, 2010-2013. Tables 6a and 6b present the results, respectively, for the age 21-50 cohort, and, for the recent movers in that cohort over time for the same periods. The changes in the composition of recent movers combined with changes in house prices affecting the endogeneity of wealth contribute to make the entire population the more robust sample for purposes of comparing the impact of borrowing constraints on homeownership achievements over the different subperiods, thus we focus on these results.

For all four samples, the estimated marginal effect associated with being impacted by one or more borrowing constraints varies but remains negative and statistically significant throughout.[15] For 2004-07 relative to 2001, the point estimates of the marginal effects for the entire population and the 21-50 samples indicate a decline in the impact of being constrained on probability of owning; for instance, in the overall population being constrained is associated with a 23 percent reduction in the probability of owning in 2004-07 and a 26 percent reduction in 2001. These estimates are consistent with relaxation of borrowing constraints during the housing boom and with previous studies (Barakova et al. 2014 and Gabriel and Rosenthal 2015). However, the standard deviation around the point estimates is too large to attribute statistical significance to either the cross-period or cross-sample differences for 2001 and 2004-07

By 2010-13, the estimated impact of the constraints for the full population increases to 30 percent, substantially higher than during the boom period and also higher than in 2001, and these differences are statistically significant. A similar pattern is observed in the age 21-50 cohort, although the difference between the 2010-13 and 2001 estimated marginal effects is not statistically significant due to a larger standard deviation around the estimates. As noted above, the recent mover population in this period following the sharp decline in house prices is subject to potentially significant selection bias, so that the relationship is not robust to restricting the sample to recent movers in the entire population or to recent movers in the age 21-50 cohort.[16]

[15] Because this paper examines the combined effect of credit constraints over time and given the high level of collinearity between constraints we use an indicator of whether a household is subject to one or more of the constraints (wealth, income and credit) or not. We also estimated the results for the three constraints separately following previous studies (Barakova et al. 2003, 2014). The results for each constraint show a similar pattern with the income constraint in particular becoming insignificant in the 2004-07 period and increasing back above 2001 levels in 2010-13. The results are available from the authors on request.

[16] In addition, the smaller sample size of the recent movers affects the precision of these results. The number of recent movers in the SCF is about half the number of recent movers in the NLSY data used in Barakova et al. (2014).

The signs of the control variables remain largely constant over time, with some variation in the magnitude of the coefficients. As expected, married individuals with children, a higher educational attainment and higher income have generally a higher propensity to own, while Black and Hispanic households have a lower propensity to own. A higher value to rent ratio is associated with a lower propensity to own in 2004-07 and 2010-13 but not in 2001. The effect of house price trend is negative and statistically significant for the overall population and for the overall age21-50 cohort.

The results indicate that the impact of being borrowing constrained on the probability to own has increased substantially in the 2010-13 period to levels not only higher than those measured for the 2004-07 period, but also than those measured in 2001. This estimation of the impact on homeownership outcomes is consistent with measures of the tightening of credit found in recent studies that show a decrease in the number of mortgages originated (Parrott and Zandi 2013; Goodman et al. 2015a; Anderson 2015) without directly estimating impact on homeownership outcomes.

In [redacted] we conducted a simulation exercise using the results for the entire population in order to examine the impact of changes in characteristics relative to changes in coefficients in explaining the predicted homeownership change between 2001 and 2004-07 and between 2001 and 2010-13. The simulation results show that changes in credit coefficients contribute to explain the increase in the homeownership rate between 2001 and 2004-07 as found by Gabriel and Rosenthal (2015). For 2004-07, the predicted homeownership rate would be 65.2 percent, if the coefficient associated with being constraint had remained at the 2001 level. This is 3.7 percentage points lower than the homeownership rate predicted in our data for that period (68.9 percent) using characteristics and coefficients from 2004-07. These predictions are an exercise that does not account for the risk and sustainability consequences of the eased borrowing constraints during 2004-07; that easing of constraints proved to be unsustainable. For 2010-13, the predicted homeownership rate would be 68.5 percent, if the impact of the constraints were similar to those estimated for 2001 ceteris paribus. This is 2.3 percentage points

higher than the homeownership observed (66.2 percent). If the coefficients associated with being constrained had remained at 2004-07 levels, the predicted homeownership rate in 2010-13 reaches 71.4 percent.

Conclusion

This paper provides further evidence on the role of the changing impact of borrowing constraints on homeownership trends over the period 2001-2013. The findings provide estimates of the importance of borrowing constraints as a factor in the probability of homeownership and compare current levels to earlier periods.

The findings indicate that there have been substantial variations in the impact of being borrowing constrained on household tenure over the period 2001 to 2013 as well as variations in the share of households constrained. The coefficient associated with being constrained declined in the early period (2004-07) for the overall population consistent with a loosening of credit during that period. In the overall population the negative effect on homeownership of being constrained increased beyond 2001 levels in 2010-13, indicating a tightening of credit during that period.

In the overall population, simulations indicate that if the coefficients associated with being constrained were back to 2001 level in 2010-13, the predicted homeownership rate would be 2.3 percentage points higher. This provides an indication of the impact on homeownership of the continued tightening of credit supply measured by other indicators. Further research is needed to understand how being constrained not only affects household tenure decision but also their mobility decision. In the context of a secular decline in mobility, better understanding the role of borrowing constraints in that trend has important implications, more generally, both for housing and labor markets.

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Table 1a: Descriptive Statistics for the Entire Population

Variable	2001	2004-2007	2010-2013
Moved (%)	20.3%	21.7%	19.4%
Homeownership (%)	67.3%	68.9%	66.2%
Age (years)	49.0	49.9	50.9
Log Highest Grade Attained	2.5	2.6	2.6
Black (%)	13.3%	13.1%	14.4%
Hispanic (%)	8.1%	9.4%	10.9%
Married (%)	60.3%	58.4%	57.6%
Children (%)	42.6%	44.0%	43.4%
Log Family Size (#)	0.7	0.7	0.7
Log Family Income ($)	10.5	10.7	10.7
Log Predicted House Value ($)	5.2	5.5	5.3
Imputed Credit Score	695	687	688
Wealth Constraint (%)	33.5%	40.7%	37.0%
Income Constraint (%)	31.1%	41.1%	13.3%
Credit Constraint (%)	20.1%	22.9%	22.8%
Any Constraint (%)	57.9%	67.9%	52.4%
PMMS (%)	7.1%	5.7%	4.0%
Value to Rent	18.0	21.2	19.7
1 Year HPI Change (%)	7.2%	4.9%	1.8%
N	4,316	8,727	12,212

Source: SCF, Freddie Mac and FHFA

Table 1b: Descriptive Statistics for Recent Movers

Variable	2001	2004-2007	2010-2013
Homeownership (%)	33.0%	37.1%	23.4%
Age (years)	36.2	37.8	38.0
Log Highest Grade Attained	2.5	2.6	2.6
Black (%)	15.9%	16.7%	18.4%
Hispanic (%)	14.6%	13.3%	14.8%
Married (%)	52.5%	51.2%	48.5%
Children (%)	46.1%	44.1%	45.2%
Log Family Size (#)	0.7	0.7	0.7
Log Family Income ($)	10.2	10.3	10.3
Log Predicted House Value ($)	5.1	5.3	5.2
Imputed Credit Score	651	649	647
Wealth Constraint (%)	55.6%	60.8%	60.3%
Income Constraint (%)	32.1%	42.4%	15.5%
Credit Constraint (%)	35.9%	38.9%	39.9%
Any Constraint (%)	76.0%	81.7%	75.0%
PMMS (%)	7.1%	5.6%	4.0%
Value to Rent	17.8	20.7	19.6
1 Year HPI Change (%)	7.3%	5.2%	1.8%
N	788	1,636	2,303

Source: SCF, Freddie Mac and FHFA

Table 2a: Descriptive Statistics for the Entire Population Age 21-50

Variable	2001	2004-2007	2010-2013
Moved (%)	28.7%	31.5%	30.1%
Homeownership (%)	59.3%	59.8%	54.9%
Age (years)	37.2	37.2	37.1
Log Highest Grade Attained	2.6	2.6	2.6
Black (%)	14.7%	14.6%	15.9%
Hispanic (%)	11.0%	13.2%	15.4%
Married (%)	62.0%	62.0%	60.7%
Children (#)	0.6	0.6	0.6
Log Family Size (#)	0.9	0.9	0.9
Log Family Income ($)	10.6	10.7	10.7
Log Predicted House Value ($)	5.2	5.4	5.3
Imputed Credit Score	668	657	656
Wealth Constraint (%)	41.2%	51.5%	47.7%
Income Constraint (%)	26.0%	36.9%	11.1%
Credit Constraint (%)	28.2%	33.3%	33.7%
Any Constraint (%)	61.3%	73.0%	62.5%
PMMS (%)	7.1%	5.7%	4.0%
Value to Rent	18.0	21.3	19.7
1 Year HPI Change (%)	7.2%	5.1%	1.8%
N	2,313	4,242	5,838

Source: SCF, Freddie Mac and FHFA

Table 2b: Descriptive Statistics for Recent Movers Age 21-50

Variable	2001	2004-2007	2010-2013
Homeownership (%)	31.6%	36.5%	22.5%
Age (years)	32.6	32.9	32.7
Log Highest Grade Attained	2.6	2.6	2.6
Black (%)	16.1%	17.1%	18.2%
Hispanic (%)	16.0%	14.4%	16.1%
Married (%)	53.1%	54.0%	50.9%
Children (#)	0.5	0.5	0.5
Log Family Size (#)	0.8	0.8	0.8
Log Family Income ($)	10.3	10.4	10.4
Log Predicted House Value ($)	5.1	5.3	5.1
Imputed Credit Score	644	641	638
Wealth Constraint (%)	58.4%	64.1%	64.1%
Income Constraint (%)	30.7%	40.4%	15.0%
Credit Constraint (%)	38.4%	41.9%	43.0%
Any Constraint (%)	77.9%	83.1%	77.9%
PMMS (%)	7.1%	5.6%	4.0%
Value to Rent	17.8	20.8	19.7
1 Year HPI Change (%)	7.3%	5.3%	1.8%
N	619	1,226	1,750

Source: SCF, Freddie Mac and FHFA

Table 3a: Marginal Effects, Entire Population

	2001	2004-2007	2010-2013
Any Constraint	-0.26***	-0.23***	-0.30***
	(0.02)	(0.01)	(0.01)
Log Family Income	0.08***	0.08***	0.06***
	(0.02)	(0.01)	(0.01)
Log Highest Grade Attained	-0.06*	0.02	0.04*
	(0.04)	(0.03)	(0.02)
Married	0.13***	0.12***	0.12***
	(0.02)	(0.01)	(0.01)
Children	0.04**	0	0.03***
	(0.02)	(0.01)	(0.01)
Black	-0.17***	-0.14***	-0.17***
	(0.03)	(0.02)	(0.02)
Hispanic	-0.21***	-0.18***	-0.16***
	(0.04)	(0.02)	(0.02)
Value to Rent	0	-0.00***	-0.00***
	0.00	0.00	0.00
1 Year HPI Change	-1.28***	-0.20**	-0.22**
	(0.35)	(0.09)	(0.10)
First year=1		-0.02	0.01
		(0.02)	(0.01)
Obs.	4,316	8,727	12,212

Table 3b: Marginal Effects, Recent Movers

	2001	2004-2007	2010-2013
Any Constraint	-0.25***	-0.25***	-0.21***
	(0.06)	(0.05)	(0.03)
Log Family Income	0.13***	0.10**	0.05***
	(0.03)	(0.04)	(0.02)
Log Highest Grade Attained	-0.02	0.29***	0.20***
	(0.08)	(0.09)	(0.07)
Married	0.10**	0.12***	0.09***
	(0.04)	(0.04)	(0.02)
Children	0.17***	0.08**	0.05**
	(0.04)	(0.03)	(0.02)
Black	-0.02	-0.12***	-0.15***
	(0.06)	(0.04)	(0.02)
Hispanic	-0.10*	-0.08*	-0.08***
	(0.06)	(0.04)	(0.03)
Value to Rent	0	-0.00**	-0.01***
	(0.01)	0.00	0.00
1 Year HPI Change	0.48	-0.06	-0.06
	(0.82)	(0.20)	(0.19)
First year=1		0.01	0.05*
		(0.04)	(0.03)
Obs.	788	1,636	2,303

Table 4a: Marginal Effects, Entire Population Age 21-50

	2001	2004-2007	2010-2013
Any Constraint	-0.29***	-0.24***	-0.32***
	(0.04)	(0.03)	(0.02)
Log Family Income	0.13***	0.15***	0.08***
	(0.04)	(0.03)	(0.02)
Log Highest Grade Attained	0.07	0.14***	0.21***
	(0.07)	(0.05)	(0.04)
Married	0.13***	0.12***	0.12***
	(0.04)	(0.02)	(0.02)
Children	0.20***	0.13***	0.15***
	(0.03)	(0.02)	(0.02)
Black	-0.13***	-0.15***	-0.19***
	(0.04)	(0.03)	(0.02)
Hispanic	-0.13***	-0.09***	-0.08***
	(0.05)	(0.03)	(0.02)
Value to Rent	0	-0.01***	-0.01***
	(0.00)	(0.00)	(0.00)
1 Year HPI Change	-1.75***	-0.36***	-0.42***
	(0.52)	(0.14)	(0.16)
First year=1		0	0.03
		(0.03)	(0.02)
Obs.	863	1,745	2,442

Table 4b: Marginal Effects, Movers Age 21-50

	2001	2004-2007	2010-2013
Any Constraint	-0.25***	-0.19***	-0.17***
	(0.07)	(0.07)	(0.04)
Log Family Income	0.13***	0.17***	0.08**
	(0.04)	(0.06)	(0.03)
Log Highest Grade Attained	-0.01	0.30***	0.23***
	(0.09)	(0.11)	(0.08)
Married	0.11**	0.09**	0.08***
	(0.05)	(0.05)	(0.03)
Children	0.22***	0.11***	0.06***
	(0.04)	(0.03)	(0.02)
Black	0.03	-0.08*	-0.16***
	(0.06)	(0.04)	(0.02)
Hispanic	-0.07	-0.05	-0.06**
	(0.06)	(0.05)	(0.03)
Value to Rent	0	-0.00*	-0.01***
	(0.01)	(0.00)	(0.00)
1 Year HPI Change	0.59	-0.09	-0.07
	(0.84)	(0.23)	(0.21)
First year=1		0.02	0.06**
		(0.05)	(0.03)
Obs.	618	1,226	1,749