Under review.

Income, Minority Status, and the Determinants of Homeownership Stability

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Abstract

This paper examines the extent to which populations experiencing low homeownership rates in the United States also experience low homeownership survival probabilities. We determine whether low-income, Hispanic and black households that achieve homeownership are as likely as white and high-income households to sustain it. Using the Panel Study of Income Dynamics spanning the years 1970 to 2005, we find that low-income homeowners consistently have higher homeownership exit rates, Hispanic households have higher raw exit rates prior to but not subsequent to 1997, and a black/white sustainability gap appears to arise post 1997.

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I. Introduction

Despite more than a decade of federal policy initiatives designed to boost the homeownership rates of underrepresented groups, there remain sizable differences in homeownership rates by race, ethnicity and income in the United States. Homeownership rates for black, Hispanic and low-income households are at less than 50% whereas non-Hispanic white households and high-income households have homeownership rates at 75% and exceeding 85%, respectively.[2] A substantial body of research has documented both that income is an important determinant of homeownership and that black and Hispanic households are less likely to be homeowners than other groups, controlling for demographic, income, wealth and price variables.[3] Several studies have focused on the causes of the racial gap in homeownership rates.[4]

Differences across groups in rates of homeownership may be due to households entering homeownership at different rates, exiting homeownership at different rates or both. Policy initiatives have focused largely on enabling minority and low-income households to attain homeownership and fewer resources have been devoted to the preservation of homeownership (McCarthy, Van Zandt and Rohe, 2001). As we discuss below, these efforts have been successful in expanding the number of homeowners in the United States in the last decade, particularly among minority and low-income households, and moved into homeownership households that would otherwise not have been able to achieve homeownership. Whether or not these households are able to sustain homeownership or slip back into renting presents an important policy question. Both for

[2] Differences in homeownership rates by race and ethnicity: 2005 data from the Census Bureau. See Bostic and Surette (2001) and Turner (2002) for differences by income group.

[3] See Dynarski and Sheffrin (1985), Linneman and Wachter (1989), Deurloo, Clark and Dieleman (1994), Gyourko and Linneman (1996), Bostic and Surette (2001), Turner (2003), Freeman (2005), Masnick (2006), Turner and Seo (2007), and Luea.

[4] For example, see Gyourko, Linneman and Wachter (1999), Coulson (1999), Charles and Hurst, Freeman and Hamilton

understanding why certain populations have relatively low rates of ownership and for guiding public policy, an understanding of the extent to which low ownership rates come about due to low entry or high exit rates is needed.

There is an extensive literature examining the determinants of homeownership exit through mortgage default, which we reference below. However, despite the policy importance of the topic, little work has been done to examine homeownership exits in general, whether by default or sale, and the potential for racial, ethnic or income differentials in homeownership sustainability. To our knowledge, only a few efforts have been made to date to examine differential exit probabilities. Boehm and Schlottmann (2004) use PSID data from 1984 to 1992 to model household transitions into and out of homeownership by race and income. They find evidence that, although black homeowners are less likely to enter homeownership than white homeowners, black homeowners also in fact *less* likely to exit homeownership than white homeowners, all else equal, suggesting that the lower black homeownership rate is due to differential entry rates rather than differential exit rates.[5] Their results also indicate that lower income households face a higher likelihood of homeownership exit than other households. Although providing important insights on cumulative homeownership probabilities, a limitation of the Boehm and Schlottmann study is that while they control for factors that enable homeownership entry, they do not control for the factors that are likely to cause homeownership exit, such as family instability, financial distress and investment considerations.

Using the National Longitudinal Study of Youth (NLSY) data set from 1979 to 2000, Haurin and Rosenthal (2004) examine racial and ethnic differences in housing transitions for young adults,

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(2004), Hilber and Liu (2007), and Cortes, Herbert, Wilson and Clay (2007).

[5] Table 3b (p. 120) reports that whites are more likely than blacks to exit from first-time homeownership to renting. There is however no statistical differences in exit rates by race for second-time homeowners.

and Haurin and Rosenthal (2005) examine racial differences in exit from first time homeownership by young, low-income households. Haurin and Rosenthal (2004) find that black and Hispanic households tend to have significantly higher raw exit rates than white, non-Hispanic households (exhibit 13, p. 20). Controlling for a host of household characteristics and financial variables, including measures of net wealth, Haurin and Rosenthal find that, across models, contrary to Boehm and Schlottmann, black homeowners remain more likely than white homeowners to exit homeownership (for example, see exhibit 28, p. 46). Despite Hispanic households higher raw exit rates, no such econometric result is present for Hispanic households. The authors (2005) find that a similar black/white exit gap exists among low-income homeowners. The gap is diminished when low income is defined using education and ability measures, but still persists. Although important and suggestive, the results in both studies are specific to young adults and the particular composition of the NLSY, which the authors note over samples black, Hispanic and low-income households. Nonetheless, these findings provide important motivation for further study.

This paper provides a comprehensive analysis spanning a 35 year time period of the causes of exit from the homeownership state, determining whether black, Hispanic and low-income households that achieve homeownership are as likely as white, non-Hispanic and high-income households to sustain it. Using household data from the Panel Study of Income Dynamics (PSID), we examine homeownership stability over two time periods, according to PSID data availability: (1) 1970 through 1997 based on the PSID longitudinal data, and (2) 1999 to 2005 based on the reconstituted and biennial PSID sample. Using the longitudinal data through 1997, we construct homeownership spells and examine the factors that affect homeownership exits. Households in our sample range in age from 21 years old, at the time of first entry into homeownership, to 75 years old, at the end of our longitudinal observation period in 1997. Our empirical approach using the pre-

1997 longitudinal PSID data is twofold. First, we generate stability profiles to determine if there are raw survival differences across groups. Second, we apply duration analysis to investigate the factors that are correlated with an exit from homeownership.

As noted above, in 1997, the PSID reconstituted its sample. Specifically, the PSID dropped 1/3 of the core sample, added a refresher sample, changed to biennial data collection, and reformatted sample weights. These changes prevent us from undertaking duration analysis beyond 1997. However, using the biennial data, we can provide insights on post-1997 homeownership stability by race, ethnicity and income since the PSID includes off-survey-year questions about households' homeownership status. Using this information, we examine the probability that U.S. homeowners in 1999 will exit homeownership by 2005 and the extent to which this probability varies by race, ethnicity and income. All of our analysis is weighted using the PSID family combined weights, as described in the data section below.

Our results include the following. During the pre-1997 period, Kaplan-Meier estimates indicate that low-income households have lower raw homeownership survival probabilities than higher income households. In contrast, we cannot reject the hypothesis of equal survival probabilities by race and ethnicity, a result which holds up for black households controlling for other factors using duration analysis. That is, our pre-1997 analysis consistently indicates that black households are as likely to sustain homeownership as white households. For low-income and Hispanic households, we find that they have higher raw exit hazards than high-income and non-Hispanic households, respectively, but these gaps are eliminated when we control for household composition and house finance variables, even before we control for employment variables and wealth proxies. We also find that the income exit differential is only with respect to low-income homeowners: moderate-income households are as likely as high-income household to sustain

homeownership during this time period.

Our post-1997 analysis yields very different results for the key variables, though most other controls have consistent coefficient estimates across the time periods. Specifically, examining homeowners in 1999, we find large raw exit gaps by race and income, for both low- and moderate-income, but not by ethnicity. Indeed, the race and low-income gaps in homeownership sustainability in the post-1997 period persist, even after controlling for household composition, finance, employment and wealth variables. The higher rate of exit of moderate-income households is eliminated once wealth controls are added into the analysis. At no time during the post-1997 period, however, do we find that Hispanic homeowners are more likely to exit homeownership than non-Hispanic homeowners.

Taken as whole, our findings over the two time periods, 1970 - 1997 and 1999 - 2005, suggest the following. Low-income households have significantly higher raw exit rates than higher income households over both time periods, and although this sustainability gap can be explained by households characteristics in the pre-1997 period, it cannot fully be explained by observable household characteristics during the post-1997 time period. Hispanic households have a higher raw hazard of exit during the 1970-1997 time period, but this gap is explained by observables, and is not present in the 1999-2005 analysis. We find no evidence that black households are more likely to exit homeownership during the pre-1997 period. However, a racial gap in sustainability appears to arise in the post-1999 period, a gap which cannot be explained by observable household characteristics. Other results include the findings that family structure, marital stability, employment stability, having an employed spouse, the relative cost of homeownership and home equity are important determinants of homeowner sustainability across time periods. In addition, we find that wealth, which we can only control for in the post-1997 analysis, is also an important determinant of

homeownership stability.

The remainder of the paper is organized as follows. Section II reports on the extent to which homeownership generates private and social benefits that low-income, black and Hispanic households as a group are not realizing and the public policies designed to lessen the homeownership gaps. Section III discusses the determinants of homeownership exit. Section IV presents the data and details our empirical strategy. Section V reports our empirical findings, and section VI concludes.

II. Benefits of Homeownership and Policies to Lessen the Gaps

That certain groups experience homeownership at relatively low rates is cause for concern particularly to the extent that these gaps are involuntary and to the extent that homeownership generates private and community benefits. First and foremost the racial and income gaps in homeownership mirror the wealth gaps across groups.[6] Insofar as homeownership enables households to accumulate wealth, particularly lower income households, renter households miss out on the wealth creation effects of homeownership, exacerbating the differences in wealth holdings across groups. Indeed, recent research suggests that owning a home translates into greater wealth accumulation, even for poor households (Di, 2001; Boehm and Schlottmann, 2004; Turner, 2002). Moreover, house-price appreciation rates have been found to be more volatile, but not necessarily lower, for low income homeowners as compared to other owners (Belsky, Retsinas, and Duda, 2005; Belsky and Duda, 2002; Case and Marynchenko, 2002). Other private benefits of homeownership that low-income, black and Hispanic households renters miss out on include the potential for enhanced financial stability and an improved quality of life through positive impacts on children

[6] See Charles and Hurst for a summary of the research on differences in wealth holdings by race, and Carney and Gale

(Haurin, Parcel, and Haurin, 2002; Green and White, 1997) and greater life satisfaction (Rossi and Weber, 1996). Community benefits of homeownership have been found to include greater neighborhood stability (Haurin, Dietz, and Weinberg, 2002) and greater civic involvement (see Rohe, McCarthy and Van Zandt, 2000; Rohe and Stewart, 1996; McCarthy et al.).

President Bush announced in June 2002 a goal of closing the homeownership gap for minority households by 5.5 million households by the end of the decade.[7] The current administration's efforts follow more than a decade of housing market interventions, including President Clinton's National Homeownership Strategy, a trillion dollar commitment by Fannie Mae, and the Campaign for Homeownership of the Neighborhood Reinvestment Corporation. Further, financial institutions have expanded their commitment to lending to low-income and minority households in part as a result of the implications of the Community Reinvestment Act. The Federal Housing Enterprise Financial Safety and Soundness Act impacts the government-sponsored enterprises in the secondary mortgage market (Fannie Mae and Freddie Mac) by allowing HUD to set affordable housing goals.[8]

Most of the homeownership initiatives endeavor to expand homeownership largely through front-end programs that help households attain homeownership, such as homebuyer training programs, down payment assistance, liberalized underwriting standards, new loan instruments, outreach programs, housing rehabilitation, and first mortgages. These efforts have been successful in expanding the number of homeowners in the United States, particularly among minority households (Freeman, 2005; Bostic and Surette, 2001; Can, Bogdan, and Tong, 1999).[9] Although

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(2000) and Haveman and Wolff (2001) regarding the wealth differential by income group.

[7] See White House press release, "Expanding Homeownership Opportunities for All Americans," 12/16/03 available at http://www.whitehouse.gov/infocus/homeownership/

[8] See Freeman (2005), Freeman and Hamilton (2004), and Wyly, Cooke, Hammel, Holloway and Hudson (2001) for excellent discussions of these and other initiatives designed to expand homeownership opportunities.

[9] Freeman finds that black homeownership increased in the 1990s in both relative and absolute terms due to policy

large gaps persist, the policy-driven, increasing rates of homeownership make understanding homeownership stability an important topic of study.

III. Determinants of Homeownership Exit

We expect that households will remain in the homeownership state as long as the present discounted stream of benefits exceeds the costs of remaining. The cost-benefit calculus for a household may change due to changing household, financial, or property characteristics. We group the factors that may generate an increase in the costs of homeownership relative to the benefits into the following categories: family instability, rising homeownership costs, financial distress and investment considerations, suggesting that these factors should be controlled when analyzing homeownership exit. Specifically, a household may transition out of homeownership due to events such as a divorce or loss of a spouse that make homeownership and its associated responsibilities undesirable. A household may transition out of homeownership if economic conditions sufficiently raise the cost of owning relative to renting: in markets where renting is relatively cheap, a household may be more willing to exit homeownership, all else equal. A household may be at risk of an involuntary exit from homeownership due to financial distress resulting from job loss, which may make selling the house necessary to scale down to lower cost rental housing. If the financial distress is anticipated to be temporary, the household may use savings or seek short-term mortgage relief in order to retain the home while weathering the crisis. Black, Hispanic, and low-income homeowners, however, tend to have little non-housing wealth (Charles and Hurst; Carney and Gale, 2000), and, as a result, may be less able to sustain homeownership during crises than other homeowners.

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changes. Bostic and Surette find that from 1989 to 1998 homeownership rates for the lowest and second lowest income quintiles increased by one and three percent, respectively, and attribute these increases to federal policy initiatives. Can et al. find that from 1993 to 1997, mortgage originations in predominately minority neighborhoods increased by 40%, and

Moreover, if minority or low-income households are less likely to seek or receive temporary mortgage assistance than other groups, then, all else equal, these households may be more likely to exit the homeownership state when crises arise.

The portfolio aspects of homeownership have been found to impact homeownership entry and thus may be important for homeownership exits. Theoretical papers by Ranney (1981), Henderson and Ioannides (1983), and Fu (1991, 1995) establish a frame work for analyzing housing decisions and Fu derives testable hypotheses, finding that housing services demand is a function of income, the time income path, and non-housing wealth. Housing investment demand is likewise a function of these factors as well as a factors such as a housing risk premium and the expected return to housing. Englund, Hwang and Quigley (2002) examine the lack of portfolio diversification of low-income homeowners, which makes them more vulnerable to house-price downturns. Empirical papers by Rosen, Rosen and Holtz–Eakin (1984), Turner (2003), and Hilber (2005) find that the portfolio aspects of housing play a role in housing decisions, whereby households are less likely to own their housing the greater the investment risk of homeownership. These papers suggest that income, non-housing wealth, house-price appreciation, the return to non-risky assets, and the risk of negative home equity are potentially important in explaining homeownership exits.

An extensive literature exists on mortgage default. The standard option theoretic framework models mortgage default as a put option: a mortgage holder has the option at any time of demanding that the lender buy the home in exchange for mortgage termination. Homeowners can increase their wealth by defaulting when the house value falls below the mortgage value, if they can do so without reputation costs. Numerous papers have examined mortgage default in this framework and its implications for mortgage pricing, for example, see Kau, Keenan and Muller (1992), Lekkas,

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rose by 31% in low-income neighborhoods, as compared to a 20% increase in metropolitan areas nationwide.

Quigley and Van Order (1993), Quigley and Van Order (1995), Vandell (1995), Quercia and Stegman (1992), and Quercia, McCarthy and Stegman (1995), all of which find that home equity plays a key role in the decision to default. Trigger events such as job loss resulting in income shocks are also determinants of mortgage default (for example, Elmer and Seelig, 1999). Trigger events combined with negative equity make mortgage default more likely (McCarthy et al. provides a summary of this literature). More generally, borrower characteristics play a role in mortgage default decisions, particularly education and access to information (Deng, Pavlov and Yang, 2005). Absent financial distress, the credit, reputation and psychic costs of default may make exercising the default option unlikely as homeowners may delay a transition out of homeownership until they can do so without incurring a loss.[10] As a whole, this literature suggests home equity, income stability, education, and expected house-price appreciation play a role in homeownership sustainability by affecting whether or not the household chooses to exercise the option to default.

IV. Data and Empirical Approach

The data are from the PSID, which is a longitudinal survey of families that has been carried out continuously since 1968 and provides a unique opportunity to follow households over time. The annual data from 1970 to 1997 we use includes the following: (i) the original 1968 PSID core sample of 5,000 households selected as a random cross-section sample of the U.S. population with an additional low-income sample; (ii) persons living within a household unit that enter the sample as a separate household when they form their own household, and (iii) an Hispanic sample added in 1989 and interviewed by the PSID though 1995. Reflecting these adjustments, particularly children entering the sample when they become adults, the original 1968 sample grew to roughly 9,000

[10] There is evidence that declining house prices and negative equity result in a "lock-in effect," as discussed in Caplin,

households by the mid-1990s. As we describe below, we select all homeownership spells for which we observe a start date for our 1970 – 1997 analysis.

In 1997, the PSID reconstituted its sample by dropping 1/3 of the core sample, adding a refresher sample, changing to biennial data collection, and reformatting sample weights. Although data on a number of household characteristics are not collected for off-survey years (i.e., 2000, 2002, etc.), such as whether a person has experienced job loss in a given year, the richness of data collected allows one to find related controls to pursue a post-1997 analysis of homeownership stability. Moreover, importantly, the PSID does collect data on households' homeownership status in off-survey years, providing the researcher with continuous, annual data on homeownership status. Finally, an advantage of the post-1997 PSID data is that one can control for wealth status: wealth data are collected biennially beginning in 1999. In the pre-1997 period, the PSID did not begin collecting wealth data until 1984, and the collection of wealth data, once it began, was only undertaken every 5 years. Moreover, the PSID did not collect wealth data as part of the supplemental Hispanic sample added in 1989.

The PSID sample is not representative of the U.S. population without the application of sample weights. In the pre-1997 sample, the PSID generates two types of longitudinal weights. The PSID core weights adjust the sample for unequal selection probabilities into the original 1968 sample, growth in the sample overtime, and differential attrition rates. Use of the core weights make the PSID sample representative of the U.S. population at any given point in time, excluding post-1968 immigration into the U.S. Heeringa and Conner (1999) report that of U.S. households in 1997, 7.5% immigrated to the U.S. after 1968; the core PSID will generally not be representative of these changes. The PSID combined weights further takes into account the Hispanic sample, which was

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Chan, Freeman and Tracy (1997, p. 79) and Genesove and Mayer (1997).

added in 1989 and drawn from the three largest Latino subgroups in the U.S.: Mexican, Puerto Rican and Cuban origin populations. Use of the combined weights make the PSID sample representative of the U.S. population in any given year, excluding non-Hispanic, post-1968 immigration. In contrast, the post-1997 sample weights are stratified to the U.S. population according to data from the Current Population Survey, and therefore adjust the sample to be representative of the U.S. population including immigration. In our pre-1997 analysis, we apply the PSID 1995 combined family weight, which is the most recent available in the 1970-1997 time period that weights analysis based on the combined core and Latino samples. Our analysis of the post-1997 data is weighted using the PSID 2003 combined family weight which adjusts the sample to be representative of the U.S. population in 2003.[11]

To examine homeownership sustainability by income status, we define income groups based on definitions of low-income, moderate income and high-income households used by government agencies for homeownership assistance programs: a low-income household is one whose annual income is less than or equal to 80% of their metropolitan statistical area (MSA) median income; moderate-income households include households with incomes between 80 and 120% of MSA median income, and high-income households are those with incomes above 120% of MSA median income.[12] The PSID does not report households' MSAs of residence, making it impossible for us to define income groups relative to households' MSA median income, but it does report the households' states of residence. Thus, we create income groups based on the data we have

[11] We use the 2003 combined family weight because the more recent 2005 weight is preliminary and not available for as many households as the 2003 weight.

[12] State homeownership assistance programs, such as Florida's State Housing Initiatives Partnership Program (SHIP), the largest state housing trust fund, use these income definitions. For example, see http://www.floridahousing.org/Home/HousingPartners/LocalGovernments. The U.S. Department of Housing and Urban Development's HOME program, which supports homeownership, defines low income as 80% of MSA median income. (http://www.hud.gov/offices/cpd/affordablehousing/lawsandregs/index.cfm). Nelson (1994) defines 50% as very low income and 80% as low income.

available: household income relative to the median income in the state in which the household resides.[13] Using state-level income to define income groups may be less desirable than using MSA-level median income, but nonetheless captures differences in cost of living better than using household income relative to sample average income, for example, as some studies do (for example, see Boehm and Schlottmann) or relative to the U.S. income distribution as in Haurin and Rosenthal (2004, 2005).

A. Duration Data - 1970 to 1997

As noted above, we use the PSID core and Latino samples over the time period 1970 to 1997, following the roughly 9,000 families from the time they enter the sample as a separate household unit to construct homeownership spells. A homeownership spell may consist of multiple moves; the length of time in each home is summed to arrive at the length of the household's homeownership spell. We select each homeownership spell for which we observe a beginning date and the household head is age 21 to 55 years old in the first year of homeownership. We restrict age to be less than 56 years in the first year of homeownership to focus on households that are pre-retirement. This restriction results in the sample including household heads up to age 75 when the sample ends in 1997.

After cleaning on these parameters, the sample includes 5,515 homeownership spells with complete data on race and ethnicity and 5,386 homeownership spells with complete data on income. Once we select all homeownership spells with complete data for all covariates available in 1970, the sample includes 4,204 homeownership spells. The weighted sample of 4,204 homeownership spells

[13] To do this, we use PSID state-location indicators to link to each household the median state income data reported by the Census Bureau. We use the 1970, 1980, 1990 and 2000 census data, apply a linear function to impute annual estimates of state median income and, as we do with the other price and income variables in the dataset, adjust the resulting series to 2003 dollars using the urban Consumer Price Index.

includes 715 low-income, 378 black, and 210 Hispanic homeownership spells. Although having a larger number of black and Hispanic homeowners in the weighted sample would be desirable, we will see that the numbers present are nonetheless large enough to create statistically significant coefficients in the duration models. Moreover, the weighted fractions of the sample that black and Hispanic homeowners represent, 9% and 5%, respectively, are fairly representative of the fraction of black and Hispanic homeowners in the U.S. population as a whole. In 1995, for example, 8.3% of U.S. homeowners are black and 6.7% are Hispanic.[14] (Note: unweighted, our sample includes 1,051 black homeowners and 376 Hispanic homeowners, which would put the fraction of black and Hispanic homeowners at 25% and 8.8% of U.S. homeowners, respectively.)

Observed homeownership spell length ranges from 2 to 28 years in the sample. In order to include as many homeownership spells as possible in the analysis, if a homeowner exits to renter status and later transitions back into homeownership, we include the household's subsequent ownership spell in the sample. Because doing so can lead to biased estimates of the standard errors, due to a lack of independence of some of the spells, we implement a correction in the duration estimations which provides robust standard errors.[15] Those who exit from homeownership by 1997 have a complete homeownership spell. Those whose spells are ongoing at the end of the sample period in 1997 are (right) censored. Roughly two-thirds of the homeownership spells are censored.

Kaplan Meier Estimates of Homeownership Stability

We begin our analysis of homeownership outcomes by first examining the extent to which low-income, black, and Hispanic homeowners have different raw survival probabilities than other

[14] Source: U.S. Census Bureau, Annual Population Statistics by Demographic Characteristics, 1994 to 2000, and Homeownership Statistics by Race and Ethnicity 1994 to 2006, available at www.census.gov.

[15] Specifically, we use the SAS covsandwhich/covs option on the proc phreg statement to make this type of routine

groups, that is, the extent to which they have lower survival probabilities unconditioned on the covariates that we examine below. To do this, we start by generating Kaplan Meier (KM) estimates of the hazard function. A hazard function gives the instantaneous rate of leaving homeownership at time *t*, conditional on having remained a homeowner at least until time *t* and can be expressed as:

$$\lambda(\mathrm{t}) = \lim_{dt \to 0} \frac{P(t \le T < t + dt \mid T \ge t)}{dt} \tag{1}$$

The hazard function provides insights on the risk of exit at any point in time, and the KM hazard function is computed at time *t* as the ratio of those who exit in the interval from time *t* to those who could potentially exit.

The KM survivor function provides insights on the stability profiles of households over time as it measures the probability that a homeownership spell will last for *t* or more years. The KM survivor function adjusts for right censoring and is calculated as

$$\hat{S}(T) = \prod_{t=1}^{T} (1 - \hat{\lambda}(t)), \tag{2}$$

where $\hat{\lambda}(t)$ is the estimated KM hazard function at time *t* (Keifer 1988, p. 659). The KM is a non-parametric, maximum likelihood estimator of the survivor function. The estimates provide a starting point for determining the extent to which low-income, black, Hispanic groups may have different survival probabilities than other groups.

Duration Model

We estimate a series of specifications based on the following proportional hazard model, which captures the transition out of homeownership at time *t* for family *i*, conditional on covariates *Z*:

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correction.

$$\lambda(t, Z_i(t)) = \lambda_0(t)\exp\{\beta_1 Black + \beta_2 Hispanic + \beta_3 (Low\ Income) + \beta_4 (Moderate\ Income)$$

$$+ \beta_5 RC + \beta_6 \%chg(RC) + \beta_7 LTV + \beta_8 \%chgLTV + X'\gamma + Z'\alpha\} \qquad (3)$$

The hazard is the product of a function common to all households, the baseline hazard, $\lambda_0(t)$, and a household-specific term. The effect of the regressors is to shift the baseline hazard — the estimated partial effect of a particular covariate is equal to the ratio of the hazards for any two households, *i* and *j*, for which only the variable of interest differs. The marginal effect, the percent change in the likelihood of exiting homeownership for each one-unit change in Z_k, is simply $exp(\hat{\beta}_k) - 1$, where $\hat{\beta}_k$ represents the estimated coefficient, and $exp(\hat{\beta}_k)$ is referred to as the hazard or risk ratio (Lancaster, 1990).

In equation (3), we control for whether the head of household is black or Hispanic and the household's income status as low or moderate income (with high income the excluded indicator). *RC* is the relative cost of homeownership, which we construct as the ratio of the cost of housing services in the owner mode to the cost of housing services in the renter mode. We measure the cost of housing services in the renter mode as the average annual rent in the state and year in which the family is observed, and we compute the average state rent using renters in the PSID.[16] The annual cost of housing services in the owner mode is approximated as the user cost of housing, which is a family–specific variable measuring the expected consumption value of the housing services from purchasing a home. We follow the standard approach to generate the user cost of housing, and we

[16] As noted previously, the PSID reports the household's state of residence, but not the household's city of residence. Since metropolitan measures of rent cannot be linked to PSID households, we use average state-level rents.

describe this approach in the appendix.[17] *%chgRC* is the percentage change in the *RC* over the observed spell. *LTV* is the loan-to-value ratio in the first year of the spell, included to capture the household's equity stake in the home and level of indebtedness, and *%chgLTV* is the percentage change in the LTV ratio over the observed spell.

X controls for life-cycle factors and crisis events as well as potential differences in preferences across households. *X* includes family composition variables such as family status (single, single with children and married, with married with children the excluded group), whether the households is female headed and whether the household experiences marital instability: married at the start of the homeownership spell and is separated, widowed or divorced during the spell. To the extent that children and a spouse generate a demand for house features such as a garage, yard and flexibility with respect to property use and residence length, we expect that married couples with children in particular to have a stronger attachment to homeownership than single households. Female-headed households may have a weaker attachment to homeownership than other households as they have been found to be less likely to own to begin with (i.e., see Turner 2003). We also control for whether the head of household has a college degree and the age of the household head. We expect that education will lower the likelihood of exit, both because education likely enables homeowners to better understand their opportunities as homeowners and higher educated households tend to have higher permanent income. All else equal, we do not have a clear prediction of the impact of age. It may be that, all else equal, an older head upon entry into homeownership means greater experience with financial markets and a lower likelihood of homeownership exit. On the other hand, an older age upon entry into homeownership means that the head has had more time

[17] We also run specifications using households' annual housing-cost-to-income ratios to capture housing affordability instead of the *RC*, where housing costs include mortgage, property tax payments and special assessments. Doing so has no qualitative impact on the coefficient estimates, and the housing cost ratio coefficient estimate is not statistically

to become acclimated to the lifestyle of a renter and possibly more likely to exit homeownership back to renting than a younger head.

All specifications include controls for the decade during which the homeownership spell began. In addition, we expect that wealth will play an important role in enabling a household to weather financial crises. However, the PSID does not begin collecting wealth data until 1984, half way into our sample, and when it is collected, it is only collected every 5 years, making imputation necessary. Moreover, we do not have any wealth data on most of the Hispanic households in our sample: the PSID did not collect wealth information as part of the 1989 Hispanic sample. Thus, we do not directly control for wealth holdings in the duration analysis (although we do in the post-1997 analysis). However, as noted above, we control for education and the age of the head of household, variables which are determinants of wealth (Hurst, Ming and Stafford, 1998).[18]

The vector *Z* includes employment controls. We expect that employment status may be important in explaining the length of homeownership spells, beyond the role of household income. Households currently experiencing employment interruptions may face further employment instability and may thus transition out of homeownership in anticipation of future job loss or disruption. The PSID did not begin collecting data on employment status of head and spouse (if present) until 1976, however. Selecting only those spells beginning in 1976 or later and carefully cleaning on the employment variables reduces the sample size to 3,227 homeownership spells, of which 549 are low-income homeowners, 300 are black homeowners, and 179 are Hispanic homeowners in the weighted data. We nonetheless run a duration model specification using this smaller sample size to control for the employment status variables. These variables include: (i)

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significant.

[18] It turns out that, in our data, age is correlated with wealth holding for white homeowners, but not so much so for black and Hispanic homeowners. However, higher education levels are associated with higher wealth holdings for all groups in

whether the head experiences any unemployment in the first three years of the homeownership spell, and, if so, the average duration of the unemployment spells in weeks; (ii) whether the spouse (if present) is employed; (iii) whether the spouse (if present) experiences any unemployment in the first three years of the homeownership spell, and, if so, the average duration of the unemployment spells in weeks. We construct these measures to capture employment instability in the first 3 years of homeownership because, as we discuss below, we find that it in the first three years of homeownership that households are at the greatest hazard of exit.

We estimate equation (3) using the Cox partial likelihood method, an attractive method because it is semi-parametric and as such does not impose structure on the baseline hazard function, can handle right censoring and yields coefficient estimates that are consistent and asymptotically normal. In addition, though not fully efficient, the partial likelihood has a high asymptotic relative efficiency.[19] Another desirable feature of the Cox model is that, while the presence of unobserved heterogeneity may affect the baseline hazard, it does not bias the parameter estimates in the semi-parametric Cox approach.[20] Nonetheless, we check for whether the findings are sensitive to the hazard specification as a Cox model by running the models using three different parametric specifications: lognormal, Weibull and Gamma.

B. Data and Probit Model – 1999 PSID Homeowners

Using the post-1997 biennial data, we examine homeownership sustainability by selecting all homeowners in the 1999 PSID sample and asking the following question: by 2005, how many of these households have exited homeownership and why. Despite the biennial nature of the data, the

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our data, thus controlling for education is likely the better wealth proxy.

[19] Amemiya (1985, p. 455).

[20] Lancaster (1990, pp. 304-305).

PSID does collect data on households' homeownership status in off-survey years, providing the researcher with continuous, annual data on homeownership status. As noted above, some household data are not collected for off-survey years, and thus are no longer available annually. However, we try to match the controls we do have in the post-1997 PSID data as closely as possible to the pre-1997 analysis, and we describe below the controls we construct and how they relate to the pre-1997 analysis. We also extend the pre-1997 analysis by controlling for wealth measures. Our analysis of the post-1997 data is weighted using the PSID 2003 combined family weight. After cleaning and imputing missing data, our weighted 1999 sample of homeowners includes 3,554 homeowners. Of these, 320 are black homeowners, 210 are Hispanic homeowners, and 478 are low-income homeowners.

The propensity for homeowner *i* to exit homeownership is estimated based on the 3,554 homeowners as

$$prob(exit) = \Phi(\beta_0 + \beta_1 Black + \beta_2 Hispanic + \beta_3 (Low\ Income) + \beta_4 (Moderate\ Income) + \beta_5 RC + \beta_6 LTV + X'\gamma + Z'\alpha + \beta_7 NHW), \quad (4)$$

where prob $(OWN)_i$ equals one if the household exits homeownership by 2005 and zero otherwise. $\Phi(.)$ is the standard normal cumulative distribution function. The variables in equation (4) are identically constructed as those used in the duration analysis, except the employment instability controls. The biennial PSID does not report incidences of unemployment in off survey years. As a substitute measure of employment stability, we control for the number of years by 2005 that the head and spouse (if present) have been with their current employer, thus capturing employment changes between 1999 and 2005. Other than the job security variables, all variables pertain to the household's status in 1999. *NWH* is the household's reported total net non-housing wealth. We also run specifications that include the household's regional location (west, midwest, south or northeast).

V. Empirical Results

A. Duration analysis – 1970 to 1997

Table 1 reports the KM estimates by income group based on the sample of 5,386 homeownership spells.[21] Comparing across income groups, the estimated hazard of exit for low-income households is higher than that of either moderate or high-income households in the first seven years of the homeownership spell; after that, no clear pattern emerges. Most striking, however, is the probability of an exit in the third year, given that the household has been a homeowner for at least two years. The third year of homeownership is the year of highest risk of exit for all groups (except moderate income homeowners who face a slightly higher risk of exit in the fourth year). Note as well that this exit risk in the third year is significantly higher for low-income households than higher income groups: it is estimated to be 10% for low-income households, whereas the corresponding exit risk is 5.8% for moderate-income and 5.1% for high-income households.

Referring to table 1, the homeownership survival functions of moderate-income and high-income households take on higher values than that of the low-income households in any given year. For example, the probability of remaining a homeowner for at least twelve years is 63% for low-income households, and 66 and 68% for moderate- and high-income households, respectively. We test for a statistical difference in the survival distributions by income group using a Log-Rank test and Wilcoxon test, each of which generates a Chi-Square test statistic. Based on the test statistics, we reject the null hypothesis that all income groups have the same survivor function. However,

[21] Although homeownership spell length ranges from 2 to 28 years in the sample, we report the KM estimates by income status only for spell lengths of up to 18 years because the sample size becomes small beyond that and for some spell lengths exceeding 18 years there are no KM estimates generated due to a lack of observed exits.

pair-wise tests reveal that it is the stability of low-income households that differs from that of the other two groups. We cannot reject the hypothesis that moderate- and high-income households have the same raw survival probabilities. Thus, low-income households are at greater risk of exit in the first several years of owning and have lower survival probabilities overall than either of the two higher income groups.

Table 2 reports the KM estimates by race and ethnicity based on the sample of 5,515 homeownership spells. Similar to the case of low-income households, the hazard of exit of black households is higher than non-black households in the first few years of homeownership. For example, the probability of an exit in the third year, given that the household has been a homeowner for at least two years, is estimated to be 8.2 and 6.6% for black and non-black households, respectively. We see that after the third year of homeownership no evident relationship exists between the hazard rates of black versus non-black households. The estimated homeownership survival rates of black households also show no pattern when compared to white households in any given year after the first few years, and the Log-Rank and Wilcoxon tests do not reject the null hypothesis of equivalent survivor functions. That is, beyond the first few years of owning, there is no evidence that black households are less likely to sustain homeownership than white households.

Table 2 also reports the KM estimates according to Hispanic/non-Hispanic status.[22] The hazard rate is higher for Hispanic households than non-Hispanic households in the first six years of homeownership. The survival functions appear similar for both groups only in the first few years, however the Log-Rank and Wilcoxon tests do not reject the null hypothesis of equivalent survivor functions for Hispanic and non-Hispanic households. Similar to the KM estimates by income group,

[22] We report estimates for the first nine years only for Hispanic households because the number of Hispanic households in our weighted analysis is relatively small and for some years beyond year nine there are no KM estimates generated due to a lack of observed Hispanic exits.

notice that the year of highest hazard of exit is also year three for black and Hispanic households, with hazard function values of 8.2% and 9.5%, respectively. In summary, the KM estimates suggest that black and Hispanic households are as likely as other groups to sustain homeownership, although both groups have a higher raw hazard of exit from homeownership during the early years, particularly Hispanic households whose higher exit risk occurs until year seven. Low-income households experience a higher raw risk of exit in the first several years of owning as well. However, unlike black and Hispanic households, low-income households have lower survival probabilities overall than other groups.

Table 3a presents the descriptive statistics for all homeowners and by income status and censured status. Reported are the weighted sample means for the 4,204 homeowners for which we have complete data on the covariates. The mean start date of the homeownership spells is 1982. Of the total homeownership spells, about 70% or over 2,800 spells are censored, i.e. the spells were ongoing in 1997. Almost 1,400 spells end during the analysis period. The average length of a homeownership spell is 12 years, although as an estimate of the length of time in the homeownership state, this number is biased downward due to censoring. For the sample as a whole, in the first year of homeownership, the average loan to value ratio is 75%, and the ratio of user cost to rental cost, the relative cost of homeownership, is 1.42. Demographic characteristics include the following: at the start of the spell, 47% of the sample is married with children, 6% of the sample is female-headed, 9% is black, constituting 378 black homeowners, and 5% is Hispanic, constituting 210 Hispanic homeowners. Roughly 7% of homeowners experienced a change in marital status from married to either separated, divorced or widowed during the spell. In addition, 54% of household heads have a college degree and 22% experienced an incidence of unemployment during first three years of the observed spell. On average, the relative cost of housing ratio falls by 41%

and the loan-to-value (LTV) ratio falls by 23% over the observed spell. Finally, the average age in the first year of homeownership is 34 years.

In terms of understanding the low/high income exit differential, notable differences in means across income groups include the following. The low-income group has a higher incidence of single persons, particularly single parents, relative to the higher income groups. Low-income homeowners have a lower rate of college education, higher incidence of unemployment, greater length of unemployment spells, and, if married, a lower probability of having a working spouse, than the higher income homeowners. Particularly striking is the fact that only 35% of low-income homeowners have a college degree, whereas 63% of high-income homeowners have a college degree. Low-income households also have a significantly higher relative cost of homeownership than the higher income groups.

Table 3b reports the sample means by race and ethnicity. Differences in means are particularly large between black and non-black households. Black households are more likely to have low income (36% compared to 15% for non-black households). Black households in the sample are also more likely to be single and especially to be single parents (27% of black compared to 6% for non-black households). The relative cost of homeownership is higher for Black than other categories, and black homeowners are older at the time of entry, are less likely to have a college degree and have lower average incomes than other homeowners. Both black and Hispanic homeowners have start dates of homeownership spells that are more recent than other households. Hispanic homeowners have characteristics that are on average more similar to non-Hispanic homeowners than black versus non-black households, although to some extent this reflects the higher representation of Hispanic homeowners in the recent spells. Nonetheless, Hispanic

households experience less of decline in the relative cost of homeownership and are less likely to have an employed spouse than non-Hispanic households.

We begin the econometric analysis by examining the hazard of exit for the 1970-1997 time period by race, ethnicity and income status, without controlling for additional covariates, in order to ascertain any raw differences in exit risks using a weighted duration model (we do not report these in table format). A proportional hazard model that controls for race yields a statistically insignificant coefficient on the black indicator variable, indicating that black homeowners do not have a higher raw exit of homeownership. By contrast, controlling only for Hispanic and income group indicates Hispanic and low-income homeowners have statistically significant and dramatically higher raw exit rates, at 51% and 85%, respectively, relative to the relevant excluded groups. Moderate income homeowners raw exit rates are not found to be statistically different than those of high income households.

Table 4 reports the coefficient estimates and risk ratios for the Cox proportional hazard specifications. Our key findings include that, across models, the coefficient estimate on the black indicator variable indicates that black homeowners are no more likely to exit homeownership than non-black homeowners, even when we control for many key observables, as in model (5). In addition, the coefficient estimates on moderate income suggests that there is no evidence that these homeowners are more likely to exit homeownership than the high-income households. By contrast, similar to the raw duration model results reported above, low-income and Hispanic households are more likely to exit in the base model, model (1), which controls for family characteristics, marital instability and spell start decade. Controlling for family situation explains a good part of the raw differential in exit risk between low- and high-income households, lowering exit-risk differential from the 85% mentioned above to 32%. Hispanic exit risks are only slightly lowered given the

controls in model (1) from 51% to 49%.[23]

Referring to table 4, we see that in model (2), once we control for home-finance variables, including the relative cost of homeownership at the start of the spell, the LTV ratio at the start of the spell and the percentage change in these variables over the spell, the coefficient estimates for the Hispanic and low-income variables become statistically insignificant. In both instances, although the estimated standard errors remain about the same, the coefficient estimates fall in magnitude, rendering the estimates statistically insignificant. The results thus far indicate that for low-income homeowners the largest reduction of exit risk comes about by controlling for family status and marital instability, whereas for Hispanic households it is the home finance controls that appear to matter most.[24]

The lack of a black/white exit gap is especially important in light of the substantially lower homeownership rates of black households, suggesting that the low homeownership rates are due to low entry rates rather than high exit rates. One concern however is whether the lack of a gap be due to a correlation between missing data and homeownership instability? That is, are households that do not fully report survey data also more likely to exit homeownership? If so, then the lack of a gap may be in part due to deleting observations with missing data: of the 5,515 homeownership spells, as we discuss above, we are only able to retain 4,204 homeownership spells with complete data. We check for this as follows. First, the retention numbers are fairly reassuring: the fraction of the

[23] We run model (1) in table 4 without the decades of homeownership start. While the start variables have significant coefficient estimates in model (1), when we exclude them, the Hispanic/non-Hispanic and low-income/high-income exit gaps reported for model (1) are not affected.

[24] We check for whether the findings are sensitive to the hazard specification as a Cox model by running the models using three different parametric specifications: lognormal, Weibull and Gamma. Use of the parametric models has no impact on our key findings, with one important exception: the Hispanic/non-Hispanic gap persists beyond the inclusion of family situation controls. Indeed, the parametric models are consistent in indicating that Hispanics homeowners remain roughly 25% more likely to exit than non-Hispanic households, even after the employment variables are controlled for as in model (5) of table 4. Finally, the specification checks indicate that the Gamma distribution is the best fitting parametric model, and this model suggests that the hazard of homeownership exit is decreasing over time.

sample retained after cleaning is fairly similar across groups, especially for Hispanic versus non-Hispanic homeowners: 82% of white, 62% of black, 77% of non-Hispanic, and 70% of Hispanic homeownership spells. Second, we run a KM estimation that tests for a difference in the survival profiles for the 4,204 homeownership spells not deleted versus the 1,311 we delete due to incomplete data. The results indicate we cannot reject the hypothesis of equal survival functions between the deleted and undeleted observations, giving us more reason to believe that any group effect (race/ethnicity/income) we find or fail to find in the analysis is not due to correlations between missing observations, homeownership instability and group retention in the sample.

Other results include the following. Several controls have particularly large effects across models: marital instability increases the likelihood of exit by between 93% in the base model and 70%, once employment controls are added in. A one-standard deviation increase in the relative cost of homeownership increases the risk of homeownership exit by roughly 50%, and a one-standard deviation increase in the percentage change in relative cost has a very large impact, increasing the risk of exit by over 100%.[25] The homeowner's LTV ratio in the first year of owning does not have a statistically significant impact on exit risk, however, the percentage change in the LTV is important across models. The coefficient estimate on percentage change in the LTV indicates that a one-standard deviation increase in the LTV, which equals 0.78, is associated with a 17% increase in the likelihood of exit, according to model (5).

Model (5) indicates employment status and stability matters a great deal for homeownership stability. Having an employed spouse reduces the likelihood of exit by 57%, each additional week of unemployment experienced by the head increases the hazard of exit by 2%, and households in which the wife experiences unemployment have a 67% increased risk of exit. Referring to model

[25] The standard deviation of the relative cost of homeownership is 1.09. Such an increase in the relative cost of

(4), which controls for income in tens of thousands of dollars, we see that income has a negative and significant impact on the hazard of exit, an impact that is diminishing as income rises. Evaluated at the sample mean of $66,305, controlling for income and income squared indicates that each additional $10,000 in family income decreases the risk of exit by 6%.[26]

Some final notes regarding table 4. We find that single homeowners are more likely to exit the homeownership state than households that are married with children. The risk ratio is initially large, but then falls to 20% more likely to exit once employment variables are added in. Singles with children are found to be more likely to exit, but this result disappears once employment controls are included. Having a college degree does not have an impact once amount of income is controlled for or employment variables are added in. The age at the start of homeownership matters across models: an increase in age of 5 years lowers the likelihood of exit by 16%. Regarding model diagnostics, one measure of goodness-of-fit for a proportional hazard model is the Akaike's information criterion (AIC). Comparing models (1) to (4), which are based on the same sample, the AIC (with covariates) decreases with the addition of covariates and is minimized in specification (4). This suggests that controlling for income in levels provides a better fit than controlling for income using the income group indicator variables.

B. Probit analysis – 1999 U.S. homeowners

Table 5 presents the weighted descriptive statistics for all homeowners and by income status, race and ethnicity. Reported are the weighted 1999 sample charateristics for the 3,554 homeowners for whom homeownership status is observed through 2005 and for which we have complete data on the covariates. Black and Hispanic homeowners comprise 9% and 6% of the sample, respectively,

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homeownership increases the hazard risk by exp(β*1.09)–1; which, in the case of model 5, for example, equals 0.51.

which is consistent with the pre-1997 sample. While 27% of all owners exited by 2005, 42% of black and 50% of low-income homeowners exited. The raw exit rates are 33% for moderate income homeowners, and 22% for high-income homeowners (not reported in the table), giving a low/high income gap differential of 28 percentage points. Among Hispanic homeowners, only 23% exited, a rate that is lower than the sample average. For the sample as a whole, 16% of households are low income, but 25% of black households and 38% of Hispanic households are low income. Black, Hispanic and low-income households have higher LTV ratios than other groups.

The relative cost of homeownership is higher in pre-1997 sample in all categories than in 1999, reflecting the higher marginal tax rates in place over the 1970 to 1997 time period. We see in table 5 that black and low-income households have a relatively high relative cost of homeownership in comparison to other groups. Demographic characteristics include: 9% of the sample is single with children, but 26% of black and also 26% of low income households are in that category. Single with no children comprise 21% of the entire sample, 30% of black , 42% of low-income, and only 8% of Hispanic homeowners. Average age of the sample is 41.2 years. Similar to the pre-1997 data, black and low-income homeowners have significantly lower rates of college education than the other groups, at 46% and 38%, respectively. Average income is $78,000 for all owners, $54,000 for Black, $45,600 for Hispanic, and $23,700 for low income owners. Net non-housing wealth has a mean of $183,307 for the entire sample, $2,551 for Black, $25,914 for Hispanic, and $23,945 for low income households. The average length of employment is 7.22 years for all owners, 5.95 for Hispanic and 4.89 for low-income households. Spouses had an average length of time at a job of 3.63 years for the sample as a whole, but only 1.93 years for Hispanic and 0.18 years for low-income homeowners.

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[26] The risk ratio is computed as exp(-0.09 + 0.0002*2*66.3), which equals 1.06.

Table 6 reports the Probit coefficient estimates and robust standard errors. Across models, the coefficient estimates consistently indicate that black and low-income homeowners in 1999 are more likely to exit homeownership by 2005 than other groups. To gauge the magnitude of the estimates, we compute marginal effects using the normal probability distribution evaluated at the sample means of the control variables, which yields a value of roughly 0.29 across models, except for model (6) which yields a value of 0.20. Referring to model (1), the marginal effect indicates that controlling for family, income, house finance and employment status as well as age and education reduces the raw black/non-black exit gap of 16% to 6.7%. Controlling for wealth using indicator variables reduces the gap to 5%. Models (4) and (5) both build on model (3) by including regional controls and indicate a black/non-black gap of 5.2% and 5.7%, respectively, where model (5) controls for income in levels rather than by groups. We also consider specifications that control for the household's LTV ratio at exit or censoring: for those that exit by 2005, we use the LTV ratio in the last year the household is observed as a homeowner; for non-exiting homeowners, we use the LTV ratio in 2005. Model (6) uses the alternative LTV measure and generates a black/white gap that is further reduced, to 4%. Note that model (6) is the log-likelihood maximizing model.[27]

Regarding low-income homeowners relative to high-income homeowners, model (1) indicates that controlling for family, income, house finance and employment status as well as age and education reduces the raw low/high-income exit gap of 28% to 14%. The addition of wealth indicator variables and regional controls further reduces the gap; in model (4), we see that, relative to high-income households, low-income households are 10% more likely to exit, controlling for

[27] We also run model (6) with income in levels rather than controlled with group indicator variables. Doing so has little impact on the marginal effects, yielding a black/white gap of 4.4%, for example, generates a log-likelihood value of -1176.9, which is less than -1169.9 of model (6), and suggests that income is better controlled for using the group indicator variables. In addition, running (6) with income in levels yields a statistically insignificant coefficient on the Hispanic variable, just as model (5) does.

observables. Model (6) indicates a remaining low/high income gap of 8%. The raw moderate/high-income exit gap of 11% is reduced to 5% in model (1) and eliminated once wealth is controlled for, as in model (3). Regarding Hispanic homeowners, when we control for income using income group, Hispanic homeowners are roughly 7.5% *less* likely, depending on the model, to exit homeownership than non-Hispanic homeowners. This result is consistent with the raw Hispanic/non-Hispanic exit gap of -5 percentage points as reported in table 5, but is not present when we control for income status (in any of the specification, not just the full model reported) using income in levels and income squared. Model (6) suggests that Hispanic households are 5% less likely to exit homeownership than non-Hispanic households.

Note that findings by race, ethnicity and income differ in important ways from our pre-1997 findings. The most dramatic difference is the presence of differential exit rates by race in the post-1997 sample, but not in the pre-1997 sample. With respect to low-income households, there is consistency in the findings, except that observables cannot explain all of the income exit gap in the post-1997 analysis. Controlling for house finance status eliminates the raw gap by ethnicity in the pre-1997 analysis, and, in the post-1997 analysis, there is no evidence that Hispanic households have higher homeownership exit rates.

Many of the other post-1997 results are strikingly similar to our pre-1997 findings: family status, marital instability, age and having an employed spouse results are all qualitatively and quantitatively similar across time periods. For example, marital instability has a particularly large impact on the likelihood of exit: it increases the likelihood of exit by 61% using duration analysis (model (4)) and by roughly 51% in the post-1997 analysis (across models). Similar to the finding that employment stability increases the likelihood of homeownership stability in the pre-1997 analysis, table 6 indicates that each additional 5 years the head is with his current employer lowers

the probability of exit by 5%. Table 6 indicates that a one standard deviation increase in the relative cost of homeownership increases the probability of exit by roughly 2%, which is qualitatively similar to the pre-1997 findings, but smaller in magnitude.

Regarding the homeowner's LTV ratio, the coefficient estimate is insignificant when controlling for the homeowner's LTV ratio in 1999, as in models (1) to (5). In contrast, controlling for the household's LTV at exit/censoring generates a statistically significant coefficient on the LTV ratio: according to model (6), a one standard deviation increase in the LTV ratio at exit/censoring increases the probability of exit by 7%. This result is robust to including income in levels or using the group indicator variables. The finding that it is the LTV at exit/censoring that matters is consistent with the pre-1997 analysis, which found that the change in the LTV over the spell is important in explaining homeownership exits, but the LTV ratio in the first year of homeownership is not. The importance of the LTV variables over the spell and at exit/censoring provides evidence in support of the option theory of mortgage default: households with less home equity are more likely to exit homeownership, possibly through default as the theory would predict (but we cannot ascertain in our data). Finally, whether the head of household has a college degree does not play a role in the likelihood of exit over the time period 1999 to 2005. While somewhat surprising, this result is consistent with the pre-1997 findings that whether or not the head has a college degree is not important in explaining exits once the employment controls are added in to the model. Thus, it is not education *per se* that aids homeownership sustainability rather it is the role education plays in ensuring job stability that matters.

A homeowner's level of non-housing wealth is important in preventing homeownership instability. The impact is not large in model (2); however, controlling for wealth using indicator variables implies that wealth has a non-linear and fairly large effect, and model diagnostics suggest

that doing so provides a better fit than using a continuous wealth variable. Homeowners with positive NHW holdings of up to $10,000 are 7% less likely to exit homeownership, homeowners with NWH between $10K and $24K are 8% less likely to exit homeownership and households with NHW exceeding $24K are roughly 17% less likely to exit homeownership than households with zero or negative NHW. We also run model (5) with controls for regional location: west, midwest, south and northeast, with northeast being the excluded group. The regional indicators are statistically significant and suggest that homeowners in the west, midwest and south are more likely to exit homeownership than households in the northeast. Including the regional indicators has no qualitative effects on the other coefficients. Regarding model diagnostics, comparing models (4) and (5) which control for income with group indicator variables and in levels, respectively, we see that the log-likelihood ratio is maximized with model (4), suggesting that income is better controlled for using income group indicator variables. Model (6) provides the best fit, according to the log-likelihood value.

VI. Conclusion

Using household data from the Panel Study of Income Dynamics (PSID) spanning the years 1970 to 2005, we investigate the extent to which low-income and minority households are less likely to sustain homeownership than high-income and white, non-Hispanic households. We consider households who enter homeownership pre-retirement and would tend to be unlikely to exit homeownership absent a family or financial crisis. We examine homeownership stability over two time periods, according to PSID data availability: (1) 1970 through 1997 based on the PSID longitudinal data, and (2) 1999 to 2005 based on a reconstituted, biennial PSID sample.

We find a dramatic raw gap in homeownership sustainability by income status that is present across time periods. In the pre-1997 time period, most of the low/high-income gap can be explained by differences in family situation. This sustainability gap is more persistent in the post-1997 time period: it cannot be fully explained by observables. Indeed, controlling for household composition, crisis, house-finance, employment and wealth variables, we find that low-income homeowners in 1999 remain 8% more likely to exit homeownership by 2005 than high-income households. There is no gap in sustainability for moderate income homeowners versus high-income homeowners in the pre-1997, but one arises in the post-1997 time period: there is a raw moderate/high-income exit gap of 11%, which is eliminated once we control for wealth using indicator variables. Hispanic households are found to have a higher raw exit probabilities during the pre-1997 time period. The extent to which the pre-1997 gap persists as controls are added in depends on the hazard specification. In the Cox proportional hazard models, the sustainability gap is eliminated once house finance variables are controlled for; according to the parametric models, however, it remains at 25% even after employment controls are added in. Post-1997, there is no evidence that Hispanic households are more likely to exit homeownership than non-Hispanic households.

Our findings indicate that black households are not more likely to exit homeownership prior to 1997. However, based on our analysis of U.S. homeowners in 1999, a racial gap in sustainability appears to arise after that. The raw exit numbers indicate that 42% of black homeowners in 1999 exit homeownership by 2005, whereas only 26% of non-black homeowners exit homeownership during this time period. This black/white gap cannot be explained by observable household characteristics. Even after controlling for household composition, crisis, house-finance, employment and wealth variables, a black/white gap of 4% remains.

We conclude that the low homeownership rates of Hispanic households in the United States post-1997 are due to low entry rates, not high exit rates. This should be reassuring for those advocating programs that enable Hispanic groups to enter into homeownership through down payment assistance and increased credit availability, suggesting that such policies will, over time, erode the Hispanic/non-Hispanic gaps in homeownership rates that exist. The prognosis is less favorable for low-income households in general, particularly since a good part of the low/high-income exit differential is due to family situation, and recent data suggests that regardless of observable characteristics, low-income households have higher exit rates.

The racial gap in sustainability that appears to have arisen post-1997 as well as the persistent low/high income gap are of particular concern, since these gaps coincide with the policy-induced expansion of minority and low-income homeownership that occurred in the 1990s. These results suggests that homeownership has not been a sustainable experience for the black and low-income renters brought onboard relative to other groups. The implications of these findings include the need for policies that not only move black and low-income renters into homeownership, but also enable homeowners to sustain homeownership. Policies such as homebuyer training programs that educate buyers about mortgage products and markets as well as early intervention through enhanced training

and counseling, short term financial support during crisis periods, and restructuring of loans would provide resources towards sustaining homeownership. In addition, as mortgage debt levels also play a role in the increased risk of homeownership exit, designing programs that require a higher down payment (in contrast to current programs) would help ensure that those assisted are able to retain the homes they finance and, indeed, are able to take part in the many benefits homeownership can provide.

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APPENDIX: *Relative Cost of Homeownership*

We create a measure of the relative cost of homeownership, *RC*, for each household in the sample as the ratio of the cost of housing services in the owner mode to the cost of housing services in the renter mode. We measure the cost of housing services in the renter mode as the (weighted) average annual rent in the state and year in which the family is observed, and we compute the average state rent using renters in the PSID.[28] The annual cost of housing services in the owner mode is approximated as the user cost of housing, *USERCOST*, which is a family–specific variable measuring the expected consumption value of the housing services from purchasing a home.

We calculate the household's yearly user cost as the cost of purchasing a house and then selling it after one year; it is the sum of depreciation and maintenance costs, the after-tax opportunity cost of the down payment and the after-tax mortgage interest payments and property taxes minus the expected, nominal capital gain on the housing structure (Sheffrin,1983):

$$USERCOST_i = HOUSE[\delta + m + (1-\tau_i)(\alpha r^* + (1-\alpha)r + t) - E\tilde{\theta}_i]. \qquad \text{(A1)}$$

Home value, *HOUSE*, is approximated in each year at the as the state-level (weighted) average of the self–reported house value for the homeowners in the PSID. Following previous research, the maintenance, δ, and depreciation rates, *m*, are each set to a value of 0.02 (e.g., see Poterba, 1992). The household pays a mortgage interest rate r^*, and property tax rate *t*, on their housing investment and receives mortgage tax savings of $\tau_i(\alpha r^*)*HOUSE$, where τ_i is the household's marginal income tax rate and α is the loan to value ratio on the house. The tax information in the PSID allows for a

[28] As noted previously, the PSID reports the household's state of residence, but not the household's city of residence.

precise calculation of the household's marginal tax rate, τ.[29] The opportunity cost of the housing investment is the interest foregone on the housing equity, $(1-\alpha)r$, where r is the interest rate.

The property tax rate, t, is calculated in each year as the ratio of the average, self–reported estate taxes to the average, self–reported house value. The interest and mortgage interest rates, r and r^*, respectively, are set equal to the seven–year treasury bill rate. The seven–year rate is chosen rather than a shorter term rate to better reflect the median time families remain in their homes, which is 6 years (Molony, 2006). We use the Freddie Mac CHMPI state indexes to generate state-level, nominal, annual, house-price appreciation rates, $E\theta_j$.

Since metropolitan measures of rent or other variables cannot be linked to households, we use state-level variables.

[29] The marginal tax rate is calculated by the PSID staff through 1992, and, using their methodology, we compute it for PSID households from 1993 to 1997 and in 1999.

Table 1. Kaplan-Meier Estimates by Income Category. PSID Homeownership Spells 1970 to 1997.

Spell Length (Years)	Low-Income			Moderate-Income			High-Income		
	Hazard Func.	Survival Func.	Survival Std Err	Hazard Func.	Survival Func.	Survival Std Err	Hazard Func.	Survival Func.	Survival Std Err
1	0.000	1.000	0.000	0.000	1.000	0.000	0.000	1.000	0.000
2	0.060	0.943	0.006	0.040	0.962	0.005	0.051	0.952	0.004
3	0.102	0.853	0.010	0.058	0.909	0.008	0.062	0.895	0.006
4	0.050	0.813	0.011	0.060	0.858	0.010	0.058	0.847	0.007
5	0.051	0.797	0.011	0.042	0.824	0.011	0.050	0.808	0.008
6	0.050	0.775	0.012	0.042	0.791	0.012	0.044	0.774	0.009
7	0.052	0.738	0.014	0.040	0.761	0.013	0.027	0.754	0.009
8	0.032	0.716	0.015	0.038	0.733	0.014	0.031	0.732	0.009
9	0.023	0.700	0.015	0.031	0.712	0.014	0.022	0.717	0.010
10	0.031	0.679	0.016	0.039	0.685	0.015	0.022	0.702	0.010
11	0.035	0.658	0.017	0.019	0.673	0.015	0.022	0.688	0.010
12	0.038	0.634	0.018	0.015	0.663	0.015	0.014	0.679	0.010
13	0.026	0.619	0.019	0.007	0.659	0.015	0.017	0.668	0.010
14	0.014	0.610	0.019	0.012	0.652	0.015	0.017	0.657	0.011
15	0.030	0.593	0.020	0.013	0.644	0.016	0.024	0.642	0.011
16	0.006	0.590	0.020	0.028	0.627	0.016	0.014	0.634	0.011
17	0.018	0.580	0.020	0.018	0.616	0.016	0.014	0.625	0.011
18	0.047	0.555	0.022	0.013	0.609	0.017	0.009	0.620	0.012

	Total	Exited	Censored	% Censored
All Households	5,386	1,611	3,775	70.1
Low income	1,430	403	1,027	71.8
Moderate income	1,257	396	861	68.5
High income	2,699	812	1,887	69.9

Note: sample size for KM estimates by income status is 5,386 homeownership spells. The estimates are unweighted.

Table 2. Kaplan-Meier Estimates by Race and Ethinicity. PSID Homeownership Spells 1970 to 1997.

Length of Spell (T)	Non-Black Households			Black Households			Non-Hispanic Households			Hispanic Households		
	Hazard Func.	Survival Func.	Survival Std Err	Hazard Func.	Survival Func.	Survival Std Err	Hazard Func.	Survival Func.	Survival Std Err	Hazard Func.	Survival Func.	Survival Std Err
0	0.000	1.000	0.000	0.000	1.000	0.000	0.000	1.000	0.000	0.000	1.000	0.000
2	0.049	0.954	0.003	0.055	0.948	0.005	0.050	0.952	0.003	0.058	0.952	0.009
3	0.066	0.894	0.005	0.082	0.874	0.008	0.069	0.889	0.005	0.095	0.878	0.015
4	0.060	0.844	0.006	0.047	0.835	0.009	0.055	0.843	0.005	0.072	0.827	0.018
5	0.046	0.808	0.007	0.027	0.813	0.010	0.038	0.812	0.006	0.080	0.774	0.022
6	0.040	0.777	0.007	0.058	0.785	0.011	0.042	0.784	0.006	0.078	0.725	0.025
7	0.029	0.755	0.008	0.052	0.747	0.012	0.035	0.757	0.007	0.017	0.714	0.026
8	0.035	0.731	0.008	0.027	0.728	0.013	0.033	0.734	0.007	0.037	0.690	0.028
9	0.025	0.713	0.008	0.023	0.712	0.013	0.025	0.717	0.007	0.020	0.676	0.029
10	0.026	0.696	0.008	0.035	0.689	0.014						
11	0.023	0.681	0.009	0.023	0.674	0.015						
12	0.017	0.670	0.009	0.019	0.662	0.015						
13	0.016	0.659	0.009	0.012	0.655	0.016						
14	0.015	0.650	0.009	0.017	0.644	0.016						
15	0.019	0.639	0.009	0.037	0.622	0.017						
16	0.015	0.630	0.009	0.025	0.608	0.017						
17	0.017	0.620	0.010	0.013	0.600	0.018						
18	0.017	0.610	0.010	0.010	0.595	0.018						
19	0.011	0.605	0.010	0.012	0.589	0.018						
20	0.006	0.602	0.010	0.008	0.586	0.019						

Sample Size	Total	Exited	Censored	% Censored
All homeowners	5515	1632	3883	70.4
Non-Black	3829	1162	2667	69.7
Black	1686	460	1226	72.7
Non-Hispanic	4978	1496	3482	70.0
Hispanic	537	126	411	76.5

Note: sample size for KM estimates by race and ethnicity is 5,515 homeownership spells. The estimates are unweighted.

Table 3a. Weighted Sample Means by Income and Censored status. PSID Homeownership Spells, 1970 to 1997.

	All Owners	Low Income Owners	Mod. Income Owners	High Income Owners	Owners that Exit	Owners Censored
Length of observed spell (years)	11.96	9.45	12.86	12.29	6.61	14.26
Start date of spell	1982	1985	1982	1983	1981	1984
Censored homeownership spell	0.70	0.62	0.69	0.73	0.00	1.00
Black	0.09	0.19	0.10	0.06	0.09	0.09
Hispanic	0.05	0.05	0.05	0.05	0.05	0.05
Low income	0.17	1.00	0.00	0.00	0.22	0.15
Moderate income	0.26	0.00	1.00	0.00	0.26	0.25
High income	0.57	0.00	0.00	1.00	0.52	0.60
Single with no kids	0.20	0.35	0.22	0.15	0.24	0.18
Single with kids	0.08	0.23	0.06	0.05	0.10	0.07
Married no kids	0.25	0.08	0.21	0.31	0.21	0.26
Female Head	0.06	0.20	0.04	0.03	0.08	0.05
LTV ratio in first year	0.71	0.71	0.72	0.71	0.73	0.70
RC: relative cost of homeownership	1.42	1.66	1.51	1.31	1.44	1.41
Start70 (spell begun in the 1970s)	0.40	0.28	0.44	0.42	0.47	0.37
Start80 (spell begun in the 1980s)	0.32	0.34	0.32	0.31	0.37	0.30
% Change in *LTV* ratio	-0.23	-0.18	-0.21	-0.25	-0.11	-0.28
% Change in *RC*	-0.41	-0.38	-0.40	-0.42	-0.05	-0.56
Age in first year	34	34	32	34	32	34
College	0.54	0.35	0.47	0.63	0.48	0.57
Head experiences unemployment	0.21	0.34	0.23	0.16	0.27	0.18
Num. weeks head unemployed	1.11	2.14	1.40	0.66	1.87	0.81
Spouse (if present) employed	0.91	0.78	0.88	0.93	0.87	0.91
Spouse (if present) experiences Unemployment	0.19	0.24	0.21	0.17	0.23	0.17
Num. weeks spouse unemployed	1.22	2.22	1.49	0.92	1.69	1.05
Household average income	66,305	27,159	47,448	86,233	58,944	69,472
Household median income	58,421	27,130	46,356	72,296	612,212	53,020
Sample Size	4,204	825	1,068	2,311	1,282	2,922

Notes: (i) The sample size of 4,204 homeownership spells differs from that in the KM estimation due to data lacking on one or more of the covariates. (ii) Means are weighted using the PSID 1995 combined family weight. (iii) Low-income is defined as having an annual household income that is less than 80% of the state/yr median income. Moderate-income is defined as having an annual household income between 80% and 120% of the state/year income. High-income is defined as having household income exceeding 120% of the state/year income. (iv) Dollars values are expressed in 2003 dollars.

Table 3b. Weighted Sample Means by Race and Ethnicity. PSID Homeownership Spells, 1970 to 1997.

	Black	Non-black	Hisp	Non-Hisp
Length of observed spell (years)	10.3	12.1	9.0	12.1
Start date of spell	1985	1983	1986	1983
SPELLCEN (=1 if spell is censored)	0.67	0.70	0.67	0.70
Low income	0.36	0.15	0.16	0.17
Moderate income	0.28	0.26	0.25	0.26
High income	0.36	0.60	0.59	0.57
Single with no kids	0.26	0.19	0.15	0.20
Single with kids	0.27	0.06	0.09	0.08
Married no kids	0.12	0.26	0.24	0.25
Female Head	0.24	0.04	0.05	0.06
No longer married	0.06	0.07	0.09	0.07
LTV ratio in first year	0.76	0.71	0.72	0.71
RC: relative cost of homeownership	1.7	1.4	1.5	1.4
Start70 (spell begun in the 1970s)	0.29	0.41	0.27	0.41
Start80 (spell begun in the 1980s)	0.33	0.32	0.23	0.33
% Change in *LTV* ratio	-.20	-0.23	-.24	-0.23
% Change in *RC*	-.53	-0.39	-.26	-0.41
Age in first year	36	33	33	34
College	0.41	0.56	0.57	0.54
Head experiences unemployment	0.22	0.21	0.18	0.21
Num. weeks head unemployed	1.3	1.1	0.97	1.1
Spouse (if present) employed	0.91	0.91	0.86	0.92
Spouse (if present) experiences Unemployment	0.14	0.19	0.20	0.19
Num. weeks spouse unemployed	1.1	1.2	1.7	1.2
Household average income	47,910	68,092	71,482	66,044
Household median income				
Sample Size	378	3026	210	3994

Notes: (i) The sample size of 4,204 homeownership spells differs from that in the KM estimation due to data lacking on one or more of the covariates. (ii) Means are weighted using the PSID 1995 combined family weight. (iii) Dollar values are expressed in 2003 dollars. (iv) Spells occur during different calendar periods, which will affect comparisons of means across groups. For example, the income of Hispanic homeowners is higher then that of non-Hispanic homeowners, in part reflecting the fact that Hispanic homeowners are primarily observed in the 1990s (the median start spell start date for Hispanic households is 1992), where as the non-Hispanic households tend to have earlier start dates (with a typical start date of 1984). Although the dollar values are adjusted for inflation, they are not adjusted for productivity gains.

Table 4. Cox Proportional Hazard Model Estimates of Homeownership Exit. PSID Homeownership Spells 1970-1997.

	Coefficient Estimates and Robust Standard Errors					Hazard Ratios				
	(1)	(2)	(3)	(4)	(5)	M1	M2	M3	M4	M5
Race (Black=1)	-0.08	-0.03	-0.01	-0.09	0.05	0.92	0.97	0.99	0.92	1.0
	(0.19)	(0.19)	(0.18)	(0.19)	(0.22)					
Ethnicity (Hispanic=1)	0.40*	0.28	0.26	0.27	0.14	1.49	1.33	1.29	1.32	1.1
	(0.17)	(0.17)	(0.18)	(0.18)	(0.21)					
Low income	0.28*	0.11	0.01		-0.11	1.32	1.12	1.01		0.9
	(0.09)	(0.09)	(0.10)		(0.12)					
Moderate income	0.03	-0.05	-0.11		-0.14	1.03	0.96	0.90		0.8
	(0.07)	(0.07)	(0.07)		(0.09)					
Household Income				-0.09*					0.91	
				(0.02)						
Household Income				0.0002*					1.00	
				(0.00005)						
Single with no kids	0.74*	0.70*	0.76*	0.69*	0.19***	2.10	2.02	2.15	2.00	1.2
	(0.09)	(0.08)	(0.08)	(0.09)	(0.11)					
Single with kids	0.62*	0.70*	0.80*	-0.78*	0.24	1.86	2.02	2.22	2.17	1.2
	(0.31)	(0.30)	(0.29)	(-0.29)	(0.39)					
Married no kids	-0.03	-0.06	-0.08	-0.03	-0.37*	0.97	0.95	0.92	0.97	0.6
	(0.08)	(0.08)	(0.08)	(0.08)	(0.11)					
Female head	0.15	-0.05	-0.14	-0.23	-0.36	1.16	0.95	0.87	0.80	0.7
	(0.34)	(0.32)	(0.32)	(0.32)	(0.41)					
No longer married	0.66*	0.49*	0.46*	0.48*	0.57*	1.93	1.64	1.60	1.61	1.7
	(0.10)	(0.11)	(0.11)	(0.11)	(0.14)					
Start spell in the 1970s	-0.93*	-0.90*	-0.95*	-0.93*	-0.47*	0.39	0.41	0.39	0.40	0.6
	(0.12)	(0.12)	(0.12)	(0.12)	(0.13)					
Start spell in the 1980s	-0.25*	-0.27*	-0.29*	-0.28*	-0.18***	0.78	0.76	0.75	0.76	0.8
	(0.10)	(0.10)	(0.10)	(0.10)	(0.11)					
RC		0.38*	0.36*	0.37*	0.46*		1.46	1.44	1.45	1.5
		(0.03)	(0.03)	(0.03)	(0.04)					
LTV		0.06	-0.13	-0.10	0.006		1.06	0.88	0.91	1.0
		(0.11)	(0.12)	(0.12)	(0.15)					
% change RC		0.88*	0.86*	0.87*	1.11*		2.41	2.37	2.40	3.0
		(0.06)	(0.06)	(0.06)	(0.09)					
% change LTV		0.15*	0.13**	0.13*	0.20*		1.16	1.13	1.14	1.2
		(0.05)	(0.05)	(0.05)	(0.05)					
College			-0.15**	-0.05	-0.01			0.86	0.96	0.9
			(0.06)	(0.07)	(0.08)					

Table 4 continued. Cox Proportional Hazard Model Estimates of Homeownership Exit. PSID Homeowership Spells 1970-1997.

	Coefficient Estimates and Robust Standard Errors					Hazard Ratios				
	(1)	(2)	(3)	(4)	(5)	M1	M2	M3	M4	M5
Age in first year			-0.02*	-0.02*	-0.03 *			0.98	0.97	0.97
			(0.004)	(0.004)	(0.005)					
Spouse employed					-0.85 *					0.43
					(0.12)					
Head unemployment					0.13					1.13
					(0.10)					
Num. weeks					0.02 **					1.02
					(0.008)					
Spouse unemployment					0.51 *					1.67
					(0.15)					
Num. weeks					-0.004					1.00
					(0.02)					
AIC	18794	18365	18321	18296						

Note: *, **, *** indicate significance at the .01, .05 and .10 levels, respectively. The sample size is 4,204 homeownership spells. Results are weighted the PSID1995 combined family weight. Household income is in tens of thousands of dollars. We report the AIC for comparison of models (1) to (4), but not for model (5), since it is based on a small sample (1976 to 1997) in model (5) than the other models, and thus not directly comparable.

Table 5. PSID Homeowners in 1999. Weighted Sample Means.

	All Owners	Black	Non-Black	Hispanic	Non-Hispanic	Low-Income
Fraction that Exit by 2005	0.27	0.42	0.26	0.23	0.28	0.50
Black	0.09	1	0	0.01	0.09	0.19
Hispanic	0.06	0.01	0.06	1.00	0.00	0.19
Low income	0.12	0.25	0.10	0.38	0.10	1.00
Moderate income	0.17	0.22	0.16	0.23	0.17	0.00
Household average income	78,000	54,300	80,300	45,600	79,900	23,700
Single with no children	0.21	0.30	0.21	0.08	0.22	0.42
Single with children	0.09	0.26	0.08	0.16	0.09	0.26
Married no children	0.24	0.11	0.25	0.13	0.25	0.10
No longer married	0.15	0.15	0.16	0.10	0.16	0.11
College degree	0.64	0.46	0.66	0.60	0.64	0.38
Age	41.8	42.3	41.8	38.6	42	39.5
Relative cost of homeownership	1.55	1.87	1.52	1.56	1.55	1.81
LTV	0.55	0.61	0.55	0.65	0.55	0.60
Head - length of time at job by 2005	7.22	7.41	7.20	5.95	7.29	4.89
Spouse is employed (if married)	0.77	0.86	0.77	0.53	0.79	0.44
Spouse - length of time at job by 2005 (if married)	3.63	4.32	3.57	1.93	3.74	0.85
Net non-housing wealth (NHW)	183,307	42,551	196,971	25,914	192,818	23,945
NHW – median value	33,132	11,044	38,102	4,969	38,103	4,694
NHW between 0 and 10k	0.17	0.26	0.16	0.44	0.15	0.42
NHW between 10k and 24	0.15	0.15	0.15	0.18	0.14	0.14
NHW exceeding 24 k	0.56	0.35	0.58	0.17	0.58	0.17
West	0.21	0.05	0.22	0.52	0.19	0.21
Midwest	0.25	0.14	0.26	0.13	0.25	0.20
South	0.38	0.66	0.35	0.34	0.38	0.44
Weighted sample size	3,554	320	2664	213	3400	478

Notes: (i) The sample is a cross-section of homeowners from the 1999 PSID whose homeownership status is observed through 2005. (ii) Means are weighted using the PSID 2003 combined family weight. (iii) Dollars values are expressed in 2003 dollars. (iv) Data pertain to the household's status in 1999, except where noted.

Table 6. Probit Estimates of 1999 Homeowners Likelihood of Exit by 2005.

	(1)	(2)	(3)	(4)	(5)	(6)
Race (Black=1)	0.225**	0.217**	0.173***	0.179***	0.196**	0.186***
	(0.10)	(0.10)	(0.10)	(0.10)	(0.10)	(0.10)
Ethnicity (Hispanic=1)	-0.214***	-0.221***	-0.299**	-0.282**	-0.198	-0.242***
	(0.13)	(0.13)	(0.13)	(0.13)	(0.13)	(0.14)
Low-income	0.479*	0.470*	0.358*	0.354*		0.408*
	(0.09)	(0.09)	(0.10)	(0.10)		(0.09)
Moderate-income	0.170**	0.162**	0.092	0.091		0.124
	(0.08)	(0.08)	(0.08)	(0.08)		(0.08)
Single with no kids	0.693*	0.684*	0.651*	0.652*	0.683*	0.687*
	(0.09)	(0.09	(0.09)	(0.09)	(0.09)	(0.10)
Single with kids	0.881*	0.871*	0.828*	0.828*	0.873*	0.867*
	(0.11)	(0.11)	(0.11)	(0.11)	(0.11)	(0.11)
Married with no kids	0.022	0.016	0.004	0.005	0.008	0.023
	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)
No longer married by 2005	1.769*	1.771*	1.771*	1.772*	1.786*	1.774*
	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)
Relative cost of homeownership	0.083**	0.081**	0.068***	0.078**	0.082**	0.101*
	(0.04)	(0.03)	(0.04)	(0.04)	(0.04)	(0.04)
LTV	0.082	0.071	0.004	0.013	-0.022	0.325*
	(0.11)	(0.10)	(0.10)	(0.10)	(0.10)	(0.09)
College degree	-0.005	0.004	0.037	0.039	0.016	0.044
	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)
Age	-0.015*	-0.015*	-0.010*	-0.009*	-0.009**	-0.006***
	(0.003)	(0.003)	(0.004)	(0.004)	(0.004)	(0.004)
Head – number of years with current employer	-0.033*	-0.034*	-0.034*	-0.035*	-0.035*	-0.035*
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Spouse works (if married)	-0.191**	-0.200**	-0.174**	-0.180**	-0.213**	-0.163***
	(0.09)	(0.09)	(0.09)	(0.09)	(0.09)	(0.09)
Spouse – number of years with current employer (if married)	-0.001	0.0001	-0.0005	-0.0005	-0.0009	-0.002
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.007)
Non-housing wealth (NHW) in tens of thousands of dollars		-0.0009***				
		(0.0005)				

Table 6 continued. Probit Estimates of 1999 Homeowners Likelihood of Exit by 2005.

NHW between 0 and 10K			-0.224**	-0.224**	-0.199**	-0.236**
			(0.10)	(0.10)	(0.10)	(0.10)
NHW between 10K and 24K			-0.257**	-0.252**	-0.275*	-0.308*
			(0.10)	(0.10)	(0.10)	(.11)
NHW exceeding 24K			-0.575*	-0.574*	-0.614*	-0.569*
			(0.09)	(0.09)	(0.09)	(0.09)
West				-0.058	-0.076	-0.075
				(0.10)	(0.10)	(0.10)
Midwest				-0.003	-0.021	-0.007
				(0.10)	(0.10)	(0.10)
South				-0.060	-0.075	-0.056
				(0.09)	(0.09)	(0.10)
Household income in tens of thousands of dollars					-0.003	
					(0.008)	
Household income in tens of thousands of dollars - squared					-0.00005	
					(0.0001)	
Intercept	-0.581*	-0.571*	-0.333*	-0.326	-0.214	-0.640*
	(0.19)	(0.19)	(0.20)	(0.20)	(0.20)	(0.21)
Log-Likelihood	-1253.9	-1252.3	-1231.1	-1230.7	-1236.4	-1169.6

Notes: (i) *, **, *** indicate significance at the .01, .05 and .10 levels, respectively. (ii) The sample is a cross-section of homeowners from the 1999 PSID and whose homeownership status is observed through 2005. (iii) The analysis is weighted using the PSID 2003 combined family weight. (iv) The excluded group for the NHW indicator variables is non-positive NHW in models (3), (4), and (5).