The Sustainability of Homeownership:
Factors Affecting the Duration of Homeownership and Rental Spells

PD&R

The Sustainability of Homeownership:
Factors Affecting the Duration of Homeownership and Rental Spells

Acknowledgements

Table of Contents

List of Exhibits

Executive Summary

Introduction

The nation's homeownership rate is affected by both the length of time that households remain as homeowners rather than reverting to being a renter and the length of time households rent or live with their parents following the termination of a period of homeowning. Thus, differences in ownership rates between whites, African Americans, and Hispanics could be due, in part, to differences in their durations of owning, renting, and living with parents. Studies of this issue have been piecemeal, with none being comprehensive. The analysis presented here reveals that it is not true that "once an owner, always an owner". Also, the rate of exiting from homeownership differs substantially by race and ethnicity of the owner. There has been little recognition that post-ownership minorities are particularly unlikely to return to homeownership.

This study uses a national data set (the National Longitudinal Survey of Youth-NLSY) that follows a cohort of individuals for 21 years. Their residence histories are tracked, measuring the time spent in each type of tenure. This data set provides extensive information about the socio-demographic characteristics of individuals, allowing one to study the determinants of the length of an ownership spell, or a rental spell. The data are weighted to make the sample nationally representative.

The analysis begins by distinguishing between the length of stay in a particular dwelling and the duration of stay in one or more owned homes. All existing published studies focus on the length of stay in a dwelling (either owner or rented), or on the time to mortgage default. These studies focus on the time spent in a particular dwelling unit, not the length of time in a particular "state of the world" such as owning or renting. While these studies are of interest for some questions, they do not provide the needed information to determine whether different lengths of continuous spells of owning or renting contribute to racial gaps in homeownership rates.

A simple example confirms that the lengths of time spent as a renter and owner affect the overall ownership rate. Assume that African Americans and whites have the same residence history over a 40 year period, consisting of four spells: first the individual rents, then owns, then rents, then owns. If African Americans spend 9 years in each rental spell and 11 years in each ownership spell, then their average homeownership rate will be 0.45. If whites spend 6 years in each rental spell and 14 in each ownership spell, then their average homeownership rate will be 0.70. In this case, the sole cause of the 25 percentage point gap in ownership rates is the difference in the durations of spells of owning and renting.

The study of duration of renting and owning should lead to important policy implications. Policies that promote only temporary spells of homeownership have little impact on the national homeownership rate. What is important is promoting new ownership spells that are sustainable. Policies that lengthen existing ownership spells also will raise the national ownership rate, even if the rate of attaining first-time or subsequent spells of ownership is not affected.

The empirical analysis in this study consists of two parts. The first presents descriptions of ownership and rental spells, focusing on differences by race, ethnicity, and income. The second part is a formal econometric analysis of spell length, identifying which factors contribute to lengthening spells of owning and which ones contribute to reducing spells of renting or living with parents that follow spells of ownership.

Results from Descriptive Analysis

A number of interesting results are found in the descriptive analysis. In the year 2000 sample, African-Americans' ownership rate lags that of whites by 34 percentage points (NLSY respondents were on average 38 years old). The white-Hispanic gap is 22.5 percentage points. An important caveat regarding the Hispanic data is that the NLSY Hispanic sample represents Hispanic youths present in the U.S. in 1979 and thus Hispanics immigrating to the U.S. after 1979 are not represented in these data. Next, the percentage of each racial/ethnic group that becomes first-time homeowners sometime during the period 1979 to 2000 is reported. Differences exist, but they are smaller than the difference in ownership rates. The White-African-American gap is 26 percentage points and the white-Hispanic gap is 13 percentage points. Separating the sample by various socio-economic characteristics yields a number of insights; for example, the white-minority gap is smaller for individuals with high achievement test scores and high income, and it is much smaller when levels of education are high.

An interesting comparison is of the year 2000 cumulative rates of ever attaining first-time ownership with the year 2000 homeownership rates. The cumulative first-time-ownership rate is higher because some individuals are temporarily renters and some individuals who were previously owners were not able to sustain the spell. The differences between the cumulative and current ownership rates, by race and ethnicity, are: 88 versus 69 percent for whites, 63 versus 34 percent for African Americans, and 77 versus 45 percent of Hispanics. Thus, the difference for minorities of about 30 percentage points is much greater than that for whites (19 percentage points). These data are consistent with observing that minorities have both shorter spells of ownership and longer spells of renting or living with parents following a spell of ownership.

The study also describes the percentage of time that young adults spend as an owner between ages 21 and 34. Whites are homeowners 250 percent more often during this age span than are African-Americans and 155 percent more than Hispanics. These differences shrink substantially when the level of education is high—at least some college education. Other variables such as marriage, central city residence, and region have substantial effects on the time spent as an owner for all races. This substantial racial gap in time spent as an owner is due to two factors; fewer minorities attain first-time ownership and minorities' lengths of stay in owned dwellings are shorter while their stays in rented dwelling are longer.

These results suggest that the cliché, "once an owner, always an owner" is false. Terminations of first-time homeownership averaged 12 percent per year over the 21-year period, being very high when the respondents were young and falling to 4 percent per year when the respondents were age 38. There are substantial racial differences in termination rates of first, second, and third spells of

ownership. An interesting result is that at all ages under 42, the annual termination rate of homeownership spells by African-Americans is about 240 percent of the rate for whites and the rate for Hispanics is about 170 percent of whites. These greater annual rates of terminating spells of homeownership indicate that the duration of stay in homeownership is shorter for African-Americans and Hispanics than whites.

Results from Econometric Analysis

A formal analysis of the duration of first, second, and third-time spells of homeownership completes the paper. The first analysis includes only a set of explanatory variables (discussed below) that are observable at the time of home purchase. The results indicate that the duration of ownership spells are predictable based on these observable factors. The implication is that some households are more likely than others to quickly terminate a spell of homeownership and these households can be identified at the time of purchase. This finding is important because it suggests that policy interventions can be targeted.

On average, all spells of ownership are longer for whites than Hispanics or African-Americans. The average length of completed stay by first-time homeowners is estimated to be: 16.1, 9.5, and 12.5 years for whites, African-Americans, and Hispanics. The same pattern is observed for subsequent spells.

The most important contributor to creating the almost seven year African-American-white gap in the duration of time spent in the first spell of homeownership is the African-American indictor (dummy) variable (that is, unobserved factors correlated with race). An implication of this finding is that the length of stay in owned housing is shorter for African-Americans than whites even when they have the same observed socio-economic characteristics. Other statistically significant factors (in order of importance) include the following characteristics of African-Americans: a lower marriage rate, lower achievement test scores, more live in the South census region, larger family sizes, fewer reside in the suburbs, fewer weeks worked, more weeks unemployed, and fewer years of formal education. The most important contributors to decreasing the African-American-white gap are: African-Americans' greater age at the time of first home purchase and fewer African-Americans live in the West, which is a high-cost area.

The Hispanic-white gap in average length of stay in the first home is just over three years. The most important characteristics of Hispanics that contribute to creating the gap are: more live in the West (where durations are lower), lower achievement test scores, larger family sizes, fewer years of formal education, a lower marriage rate, fewer weeks employed, and a lower rate of living in the suburbs. Factors tending to offset the gap are Hispanics' greater age at the time of purchase and fewer live in the Northeast.

In a supplemental analysis using a smaller data set, financial characteristics are added to the explanatory variables in the duration estimation. There is no additional effect of income, although this is not surprising because most of the predictors of income are already in the analysis. The amount of liquid wealth at the time of home purchase also has little effect on the duration of owning.

Households with low home equity tend to remain in their spell of ownership longer, perhaps exhibiting a type of lock-in due to the lack of a down payment on another house.

Next, the time spent renting or living with parents following a terminated spell of homeownership is analyzed. Here, the predicted average spells are shortest for whites (10.7 years), then Hispanics (14.3 years), then African Americans (14.4 years). The estimated length of time a household spends renting after the termination of homeownership is estimated to be over ten years; thus, if you terminate first-time homeownership, it is often difficult to return to ownership, especially for minorities.

The analysis continues by adding post-purchase time-varying variables to the list of explanatory factors in the duration of ownership estimations. These post-purchase changes are important, and they often reinforce the effect of the level of the variable at the time of purchase. For example, being married at the time of purchase has a substantial positive impact on the duration of spells of ownership. Also, if a single or divorced individual is an owner and marries, the ownership spell is extended by a similar amount. The post-purchase changes with the largest negative impacts on duration of homeownership are divorce, reduction of weeks worked, a reduction in liquid wealth, and a worsening economy characterized by a rising unemployment rate.

Policy Implications

Both recently innovated and long-standing Federal and State policies have encouraged renters to become homeowners. Implicitly, there has been a focus on promoting first-time ownership, but most programs encourage a transition to ownership among all renters, no matter if they have previously been an owner (e.g. low down payment programs). These programs help shorten the length of time households spend in post-ownership spells of renting or living with parents. As described in the findings, these spells tend to be substantial in length; thus, these types of governmental policies should be effective in raising homeownership rates. Even so, there has been little recognition that post-ownership minorities are particularly unlikely to return to homeownership. Additional targeting of programs could be appropriate.

The policy gap is more focused on the lack of programs that sustain homeownership. There are household characteristics measurable at the time of home purchase that signal a risky ownership spell in the sense that early termination is likely. What policies are appropriate? More study of this issue is needed, but our analysis points to education and knowledge (measured by an achievement test score) as factors that tend to increase the length of spells of ownership. These factors appear to be particularly influential on increasing the length of ownership spells for African-Americans. A simple policy is to target those households at risk of quick termination of homeownership and provide education that raises their level of knowledge about the risks that lead to terminations of homeownership. Obviously, post-purchase counseling programs fit this description. They should be continuing, not just required at the time of home purchase. They should also focus on coping mechanisms that households can employ to address post-purchase events that tend to end ownership spells.

The Sustainability of Homeownership: Factors Affecting the Duration
of Homeownership and Rental Spells
viii

Finally, good national measures of the duration of ownership spells should be developed. Data are available quarterly that describe the homeownership rate in substantial detail (by age, by race, by location). There also has been an effort to get counts of first-time homebuyers, in part, as a measure of the success of policy interventions. What is now needed is a continuing national data set that describes the length of stay of individuals in owned and rented units. Carefully worded retrospective questions can be used to gather this important information about the duration of spells of ownership and renting. Efficiency would be achieved by obtaining this information as part of the March Supplement of the Current Population Survey, where information about changes in residence is already obtained.

Section 1   Introduction

The U. S. homeownership rate and gaps in the homeownership rate comparing racial and ethnic groups are affected by the length of time that a households remains a homeowner. That is, the departure rates from homeownership to renting, living with parents, or living in some other arrangement affect the ownership rate. Policies that promote homeownership but result in only a temporary transition from renting to owning have little impact on the national homeownership rate.

Studies about the duration of homeowning are few and analyses by race, ethnicity, and income are basically nonexistent. This study identifies factors that impact the duration of spells of homeownership and it focuses on differences in duration by race, ethnicity, and income. We also study the duration of spells of renting or living in some other arrangement following a spell of homeownership. The lengths of these spells also impact the national ownership rate.

There has been substantial interest in understanding the factors that cause differences in homeownership rates comparing minority households and low-income households with others. A recent summary of the literature by Haurin, Rosenthal, Herbert, and Duda (2004) noted that there has been practically no research about the sustainability of homeownership. Further, while there has been significant attention paid to promoting first-time homeownership by HUD and other organizations, the duration of stay by these first-time homeowners is not known. If their transition from renting to owning is temporary, then recent increases in the national homeownership rate may not persist.

Haurin, et al. (2003) identify a number of factors that could cause minority and low-income homeowners to have a higher probability of terminating homeownership. Minority households tend to have relatively low wealth, thus they have little financial cushion in case of unexpected events. These events include unexpected home repair expenses and unexpected downturns in household income. Because minorities and low-income households tend to live in older homes in inner cities, they are subject to a relatively high probability of needing a major home repair. Marriage adds stability to a household's income stream. African-Americans' marriage rate is lower than that of whites, thus their income is likely to be less stable, resulting in greater rates of terminating homeownership. Income also is relatively volatile for households subject to a high likelihood of unemployment. These households include African-Americans, Hispanics, and households with relatively little education. This difference in income stability could cause a racial gap in the length of homeownership spells. A higher combined divorce and widowhood rate for African-Americans also could contribute.

A simple example shows the impact of short stays in homeownership upon the aggregate homeownership rate. In this hypothetical example there are two groups (A and B) of equal size (100 households per cohort and three cohorts (young, middle aged, and old)). In the first period, 40 percent of both groups become homeowners, the rest are renters. In the second period, an additional 70 percent of each group's renters becomes homeowners, but 10 percent of group A's owners return to renting, while 30 percent of group B's owners return to renting. In the final period, 60 percent of each group's renters become owners, and the return rates to renting remain the same as period 2. The outcome of this process is shown in Exhibit 1.

Exhibit 1
Ownership Rates for Two Hypothetical Groups where Group B has a Greater Termination Rate of Ownership that Group A

		Homeownership Rate			
		Young	Middle Aged	Old	Group Average
Group A	Owners	40	78	83	67
	Renters	60	22	17	33
Group B	Owners	40	70	67	59
	Renters	60	30	33	41

Source: Authors' calculation.

In this example, the only difference between groups is the higher return rate of group B from ownership to renting in periods 2 and 3. However, the result is a substantial eight-percentage point difference in ownership rates (67 percent vs. 59 percent). Thus, termination rates of spells of homeownership can have significant impacts on the national homeownership rate.

The focus of this study is threefold. First, we present data that describes the attainment and termination of homeownership by race, ethnicity, and income. Second, we test hypotheses about which factors determine the length of spells of homeownership. Third, we test hypotheses about which factors determine the length of spells of renting or living with others that follow first-time homeownership.

The next section reviews the relatively small literature about households' duration of stay in homeownership. Section Three then describes the data set used in our analysis, it being a 21 year-long longitudinal survey, and presents descriptive analysis of the duration of tenure spells. Various correlates of the cumulative rate of first-time ownership in the population are discussed. We also present statistics describing the rates of termination of homeownership by race and ethnicity, followed by a description of households' transitions between homeownership and renting. We find that the termination rates of ownership are substantial. The section concludes with a description of the correlates of individuals' percentage of time spent as a homeowner between ages 21 and 35. We find substantial differences by race and other characteristics of an individual such as education and location. Section Four presents our analysis of the duration (thus termination) of spells of homeownership and, for those to which it applies, spells of renting or living with others following a spell of ownership. This duration analysis highlights differences found between minority and white households. The final section presents our conclusions and comments on the policy implications of the study.

Section 2   Literature Review

There is very little published research that focuses on the sustainability of homeownership, and less is known about the ownership experiences of low-income and minority owners. However, there are related literatures that provide some insights about the duration of stay in a specific dwelling unit. One strand of literature studies the length of stay in an owned dwelling and another addresses the length of stay of renters. These studies focus on the time spent in a particular dwelling, not the length of time in a particular "state of the world" such as owning or renting.[1] Another strand studies the length of time it takes to default on a mortgage. The vast literature on migration also is related to the duration of stay, but it focuses on geographic relocation. Migration studies differ from housing studies in that the definition of a move often requires relocation out of a county or state; they do not focus on the sustainability of a particular form of housing tenure.

Haurin and Lee (1989) motivated their study of the length of stay in a particular dwelling by noting that the user cost of ownership depends on the duration of stay in a home. Using Panel Study of Income Dynamics (PSID) data, they estimated a length of stay equation; however, they did not include race as an explanatory variable.

Henderson and Ioannides (1989) also estimated the duration of stay in a dwelling with PSID data, using a failure time (duration) econometric model. Their estimation method accounted for incomplete spells (censoring), these occurring when a survey ends prior to a household's departure from a dwelling unit. Also, they estimated separate duration equations for owners and renters. For owners, Henderson and Ioannides found that increased education reduces the length of stay, but the effect diminishes for older households. The duration of stay fell with increased age of head until owners reached age 61. The length of stay as an owner for White household heads was longer than that of all other minority groups, but this racial difference was not present for renters. Marginally significant to the explanation of owners' duration of stay was marital status, but surprisingly being married reduced the length of stay. Also marginally significant with a negative effect was household wealth, but the size of impact diminished with age.

Gronberg and Reed (1992) continued this strand of research, but they used American Housing Survey (AHS) data. For homeowners, they found that length of stay in a dwelling is shorter for households with greater income, which is consistent with Henderson and Ioannides' finding for wealth. Length of stay for owners is shorter as education and age increase, if the individual is married, and for larger families. For renters, the effect of marriage, education, and family size are the same as for owners, but those of age and income are the opposite. Their results for African-American and white households differ when comparing owners with renters. White owners stayed longer in a dwelling while white renters had shorter stays than African-Americans. This result comparing whites and

---

[1]   There are well-developed literatures about the duration of marketing time of owner-occupied houses and the duration of vacancies in rental units. While the econometric methods from these literatures are relevant to our discussion, the marketing time for a dwelling listed for sale is a substantially different topic than the duration of homeownership and thus we do not review these studies.

African-Americans is interesting and it foreshadows our findings for the duration of time spent as a homeowner and renter.

Deng, Gabriel, and Nothaft (2003) used data from the BLS-CPI survey to study the duration of stay in a rental unit. They augmented the BLS-CPI data using AHS descriptors of metropolitan areas' characteristics. Their estimation method was a proportional hazards model, this allowing the baseline hazard rate of transitions out of the rental unit to flexibly reflect the intertemporal variations present in the data. However, they did not use as explanatory variables individual level data; rather, they used only metropolitan level explanatory variables combined with a few descriptors of the properties in the survey. They found that the duration of stay in a rental unit is greater in high-rise multi-family buildings, in central cities, in locations characterized by having rent controls, high population growth, relatively more recent movers, and high unemployment rates. Renters' duration of stay was lower in the Midwest, in areas with high rates of poverty, a high share of public housing, a high percentage of elderly, African-American and Hispanic residents, high levels of rent, and for mobile home occupants.[2] The lack of individual level controls makes Deng, Gabriel, and Nothaft's study difficult to compare with previous studies. Further, it is not clear whether their findings indicate that locational variables are important to the explanation of duration of stay or they are proxies for the missing individual level variables.

The above papers address a different topic than the one we study in our research. For example, the length of stay of owners in a particular dwelling is influenced by the tendency to move-up while remaining a homeowner. Thus, households with rising income or wealth are likely to stay for a relatively short time period in a particular unit, but they also are likely to remain a homeowner. The above studies' result that marriage leads to a shorter stay would not be expected if the duration of stay as a homeowner was studied rather than the stay in a dwelling. A stable marriage could increase the tendency to trade-up, explaining the above findings, but it would also ensure the stability of the family needed to sustain homeownership. Another difference is that the above studies lump together all spells of ownership[3] into one group of owners and all spells of renting into a single group of renters rather than studying each spell separately.

A different perspective on homeowners' length of stay comes from the literature that links mobility and various lock-in effects with homeownership.[4] Stein (1995) argued that homeowners may delay the sale of their home if falling house prices result in low or negative home equity (house price lock-in). If the household moved, it might not be able to make the required down payment on another dwelling. Henley (1998) examines the mobility of British homeowners and finds that negative home equity significantly reduces the probability of a move and thus it extends the duration of stay. Further, he finds a nonlinear effect where large positive home equity also is positively correlated with a lower probability of a move, although he does not present a theory of why high levels of home

---

[2]   Data describing the type of dwelling are not available in our data set.

[3]   That is, whether the spell is the first-time as a homeowner or is some subsequent ownership spell.

[4]   There is another set of papers that argue tenure choice and mobility are simultaneously determined. These studies (Boehm 1981, Ioannides 1987, Zorn 1988) recognize that the duration of stay in a dwelling is affected by the transaction cost of moving and that these costs differ comparing an owned unit to a rental unit. However, they tend to focus on mobility (a dichotomous choice) rather than the duration of stay.

equity decrease mobility. Chan (2001) finds that mobility was reduced by 24 percent over a three-year period and 33 percent over a four-year period due to house price declines in the early 1990's. Genesove and Mayer (2001) argue that homeowners that are located in areas with falling house prices may choose to remain in their dwelling if the sale would lead to a nominal loss. Engelhardt (2003) finds supportive evidence that falling house prices reduce mobility due to households' aversion to nominal losses.

Another type of lock-in for homeowners occurs if mortgage interest rates rise and a homeowner has a fixed rate, nonassumable, and nontransferable mortgage. Hendershott and Hu (1982) explain that if interest rates rise, households will delay moving because purchasing another home generally would require obtaining a new mortgage at a higher interest rate. Quigley (1987) uses PSID data to show that the rate of mobility is negatively related to the difference between the original and current market mortgage values, confirming the lock-in hypothesis.

The mobility-ownership models are developed in the context of a single spell of homeownership and the tests are based on the length of stay in a particular dwelling. However, generalization of these hypotheses is possible based on the argument that, in the case of negative equity, mortgage lock-in, or nominal losses, a household may not only prefer to remain in its home rather than move to another home, but it may prefer to remain in its home rather than convert to renting. Thus, the duration of the spell of ownership could be extended in these cases. If a household's home equity is low or the mortgage interest rate has risen, and if the household is required to move because of job relocation, then the outcome is not clear. The household might buy a smaller unit in the new location and thus continue its spell of ownership or it might be forced to rent, at least temporarily. We test these hypotheses in our model.

Also relevant to this study are analyses of the default risk on home mortgages. Obviously defaults are relatively rare; however, studies of defaults are particularly relevant to the analysis of ownership sustainability for the set of households that terminate homeownership under financial duress. A recent working paper by Deng and Gabriel (2002) summarizes this literature. They find that default probabilities are higher in areas with high unemployment rates, when a household has a large number of dependents, for single males, for higher loan-to-value ratios, and the higher is the probability of negative home equity. Default probabilities are, the greater a household's wealth, income, and credit score. They found no independent effect of race, ethnicity, or being a first-time homeowner.

Studies explicitly recognizing that housing choices are a dynamic process and applying this insight to the analysis of the length of stay in a dwelling are few. One is Rosenthal (1988) who uses a semi-Markov model that explicitly accounts for the relationship between residence times and the homeownership rate. He focused on the impact of changes in tax policy. An important finding was that any change in tax policy that affects the length of stay in owned dwellings also affects the national homeownership rate. Rosenthal did not analyze differences in ownership rates by race and ethnicity.

Boehm and Schlottmann's (2004) paper also explicitly addresses the duration of stay in owned and rented units in a dynamic framework. Again, they define a "spell" as a stay in a particular dwelling rather than the length of time spent as an owner. However, they study multiple stays in owned houses using data from the Panel Study of Income Dynamics: 1984-1992 rather than just single spells. They

find that households are very mobile in the housing "hierarchy", moving not only from renting to owning, owning to owning, but also from owning to renting. Particularly important determinants of a household's probability of terminating a spell of ownership are losses of income and wealth. Regarding race, they find that minority households are less likely to attain first, second, and third spells of ownership than whites. They also find that minority households are about twice as likely to leave first-time ownership and return to renting. These post-ownership spells of renting by minorities are not, in general, followed by second spells of ownership; rather, they remain as renters.

The conclusion of the review of the literature is that there is an absence of comprehensive studies of the length of time that households remain a homeowner, the reasons for terminating spells of ownership, and the length of time that these reverting households remain a renter or live with parents. Existing studies of the duration of time in a particular dwelling are useful in that they help point to variables that may be important to the explanation of the transitions between renting and owning.

Section 3   Data Set and Descriptive Statistics

3.1   Data Set

Our study uses data from the National Longitudinal Survey of Youth (Center for Human Resource Research 1999). The survey began in 1979 when its respondents were ages 14 to 22. The initial survey included about 12,000 youths and the attrition rate has remained relatively low for the 21-year period with over 7,000 responses received in 2000.[5] The survey was annual through 1994, then biannual. However, in 1991 information about homeownership was not collected; thus, 1991 data are not included in our analysis. In 2000, respondents were ages 35 to 42, having passed through the primary first-time home purchasing years. The NLSY oversamples African-American, Hispanic, and low-income individuals. Weights are supplied by the survey so that generalizations to the U.S. population in these age categories can be made.[6] These weights are readjusted in each survey; thus, attrition from the sample is accounted for by the reweighting of observations. Noteworthy is the observation that the Hispanic sample represents Hispanic youths present in the U.S. in 1979. The NLSY cohort remained unchanged thereafter, thus Hispanics immigrating to the U.S. after 1979 are not represented in these data.

3.2   Homeownership Rates

The homeownership rates of white, African-American, Hispanic, and Asian households in the NLSY sample are reported in Exhibit 2. The sample weights indicate that the sample's respondents represent about 31 million individuals. Because of the young age of the respondents in 1979, the ownership rate is very low. It rises over time as the cohort ages, achieving 64.6 percent in 2000 when the average respondent's age is 38.5. The rates for whites, African-Americans, Hispanics, and Asians also are reported in the exhibit. The gaps in ownership rates are reported in Exhibit 3, rising in year 2000 to a 34.4 percentage point difference comparing whites and African-Americans, 22.5 percentage

---

[5]   The 1979 NLSY contained a sample of military members, which was dropped in 1982. These respondents are not included in our analysis.

[6]   The optimal data set would be one where continuous observations are available for every variable. Thus, at every point in time, the values of all variables would be known. No longitudinal data set contains this quality and quantity of information. The NLSY contains three types of variables: those reporting values at all points in time (e.g., continuous work histories), those aggregated over a particular time period (e.g., income earned in the last calendar year), and those that are a snapshot at the time of the survey (e.g., tenure status). Because tenure status is reported only as of the survey date, some intrasurvey transitions from owning to renting and back (or vice versa) will be missed. The longer the time between surveys, the more likely is an intrasurvey event to occur. The change in the NLSY from an annual survey to a biannual one raises the question of whether all available data should be used or only biannual data (which would drop the results for seven surveys). We chose to utilize all available data.

Exhibit 2
Homeownership Rates of Whites, African-Americans, Hispanics, and Asians

Average Age	Year	% Owner Total	% Owner White	% Owner African-American	% Owner Hispanic	% Owner Asian
18.5	1980	3.9	4.5	1.9	2.0	3.5
19.5	1981	5.7	6.5	2.2	4.4	5.1
20.5	1982	8.1	9.2	3.4	5.0	5.3
21.5	1983	9.5	10.6	4.2	6.2	6.2
22.5	1984	11.7	13.2	4.3	7.4	7.7
23.5	1985	15.3	17.1	6.3	8.9	8.8
24.5	1986	19.5	21.9	5.8	12.2	14.6
25.5	1987	23.5	25.9	8.6	18.1	17.8
26.5	1988	29.6	32.5	11.2	20.3	21.3
27.5	1989	35.2	38.5	14.3	23.4	26.3
28.5	1990	38.5	42.3	15.3	26.3	22.0
30.5	1992	43.3	47.3	17.7	30.2	28.5
31.5	1993	48.8	53.6	20.8	33.8	28.5
32.5	1994	51.8	56.9	23.4	35.4	33.8
34.5	1996	56.1	60.7	25.7	38.5	36.3
36.5	1998	60.5	64.7	30.5	44.5	39.2
38.5	2000	64.6	68.4	34.0	45.9	43.4

Source: Authors' tabulations of NLSY weighted data.

Exhibit 3
Racial and Ethnic Gaps in Homeownership Rates

Average Age	Year	White-African American	White-Hispanic	White-Asian
18.5	1980	2.6	2.5	1.0
19.5	1981	4.3	2.2	1.4
20.5	1982	5.8	4.2	3.8
21.5	1983	6.4	4.4	4.4
22.5	1984	8.9	5.8	5.6
23.5	1985	10.8	8.2	8.3
24.5	1986	16.1	9.8	7.3
25.5	1987	17.3	7.8	8.1
26.5	1988	21.3	12.2	11.2
27.5	1989	24.2	15.1	12.2
28.5	1990	27.0	16.0	20.3
30.5	1992	29.6	17.1	18.9
31.5	1993	32.8	19.7	25.1
32.5	1994	33.5	21.5	23.0
34.5	1996	35.0	22.2	24.3
36.5	1998	34.2	20.3	25.5
38.5	2000	34.4	22.5	25.0

Source: Authors' tabulations of NLSY weighted data.

points comparing whites and Hispanics, and 25.0 percentage points comparing whites and Asians.[7] It is important to note that these gaps are cohort specific; that is, in 2000 they are only applicable to individuals ages 35 to 42.[8]

3.3   Time Paths of Achieving First-Time Homeownership

This section focuses on the process of individuals becoming homeowners for the first time. The NLSY longitudinal data set allows us to follow the cohort of individuals for 21 years and track respondents' movements into owning from either renting or living in some other arrangement. We focus on differences in these movements into ownership by race and ethnicity and describe how attaining first-time homeownership is correlated with a set of time-invariant variables.

Exhibit 4 displays the annual rate that individuals achieve their first spell of homeownership. The horizontal axis represents the survey year and the vertical axis is a two-year moving average of the percentage of the cohort that became a first-time owner in that survey year (the data are weighted).[9] The three lines represent the movements of white, African-American, and Hispanic households into first-time homeownership. The peak movement for this cohort of white and Hispanic households into ownership occurred between 1987 and 1988 when the cohort members were ages 22 to 29. Interestingly, the rate of moving into first-time ownership for African-Americans exceeds that for whites from 1995 through 2000, with the pattern for Hispanic-white differences being similar. These differences could be explained by multiple factors including a delayed movement by African-Americans into ownership due to the lack of wealth or income while in their twenties, or by changes in public policy after 1995 that encouraged African-Americans to become first-time homeowners.

---

[7]   Asians are not oversampled in the NLSY. Thus, our descriptive statistics for Asians are less precise than for other groups.

[8]   This value of 64.6% for adults ages 35-42 compares well with the Census Housing Vacancy Survey (PDR 2003, Table 27) value of 67.9% for slightly older adults (ages 35-44). The 2000 Census reports the ownership rate for the 35-44 age category is 66.2%. The differences between estimated rates is likely explained by the older ages of the Census category, sampling variation in the NLSY, and the fact that the NLSY households are categorized by the age of the respondent rather than the age of the household head. Comparative data for race/ethnicity has good agreement for the Hispanic ownership rate (NLSY equals 45.9% while it is 48.8% in Census 2000), but the African American ownership rates differ more (NLSY equals 34.0% versus 44.6% in Census 2000).

[9]   Surveys were not administered in 1991, 1995, 1997, and 1999. For these years, the percentage displayed equals one-half of the recorded percentage of persons becoming first-time owners in the following year. For example, in 2000, 12% of white respondents became owners compared with 1998. This gain is split equally between 1999 and 2000.

Exhibit 4
Annual Movement into First-Time Homeownership by Race
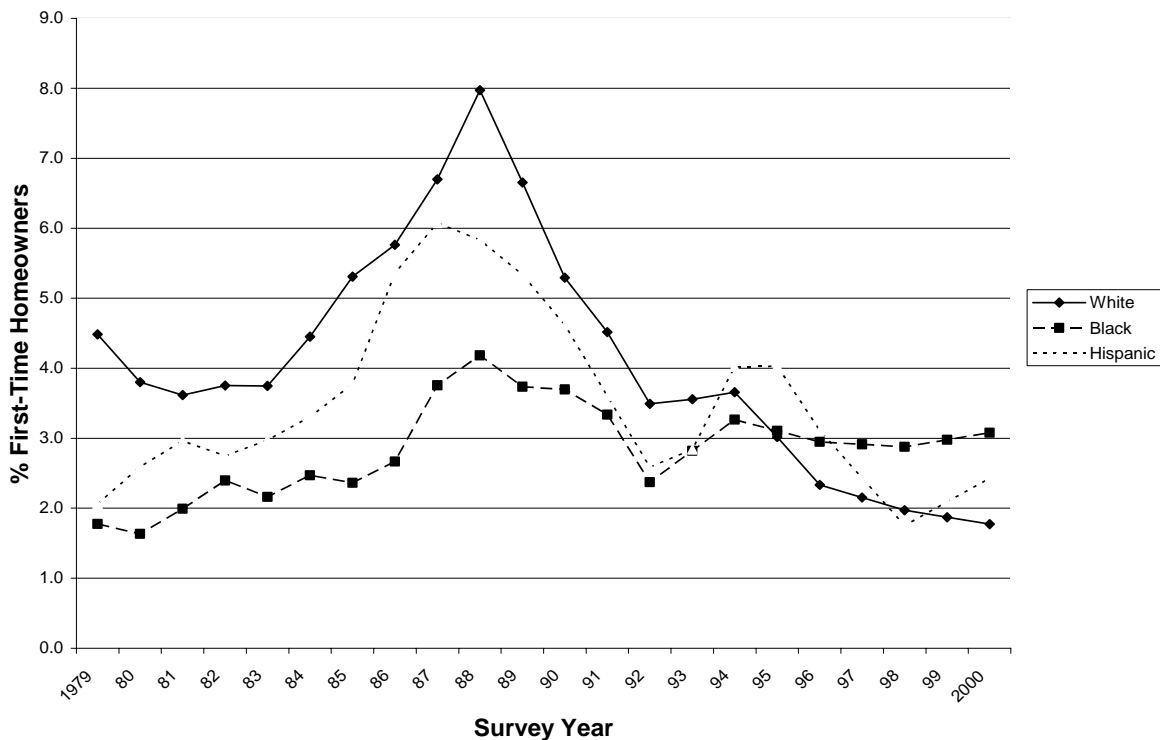
Source: Authors' tabulations of NLSY weighted data.

We next present exhibits that show the cumulative movement into first-time homeownership by race and ethnicity. These values do not equal the homeownership rate in a particular year because they do not account for terminations of spells of first-time ownership (which are substantial in number), nor for the termination of second-time or subsequent spells of ownership. These exhibits reveal a rarely seen perspective on access to ownership during a household's life.

As shown in Exhibit 5, there are substantial racial differences in the percentages of cohort members who become first-time homeowners. In 2000, the African American-white gap is about 25 percentage points and the Hispanic-white gap is 12[10]. Interestingly, these gaps are achieved around 1988 and they remain stable for the next 12 years. White individuals' attainment of first time homeownership is clearly accelerated compared with minorities, this occurring when most respondents are age 30 or younger.

---

10   The Hispanic-white gap is likely influenced by the sample's structure, where new immigrants are not included following 1979.

Exhibit 5
Cumulative Movement into First-Time Homeownership by Race
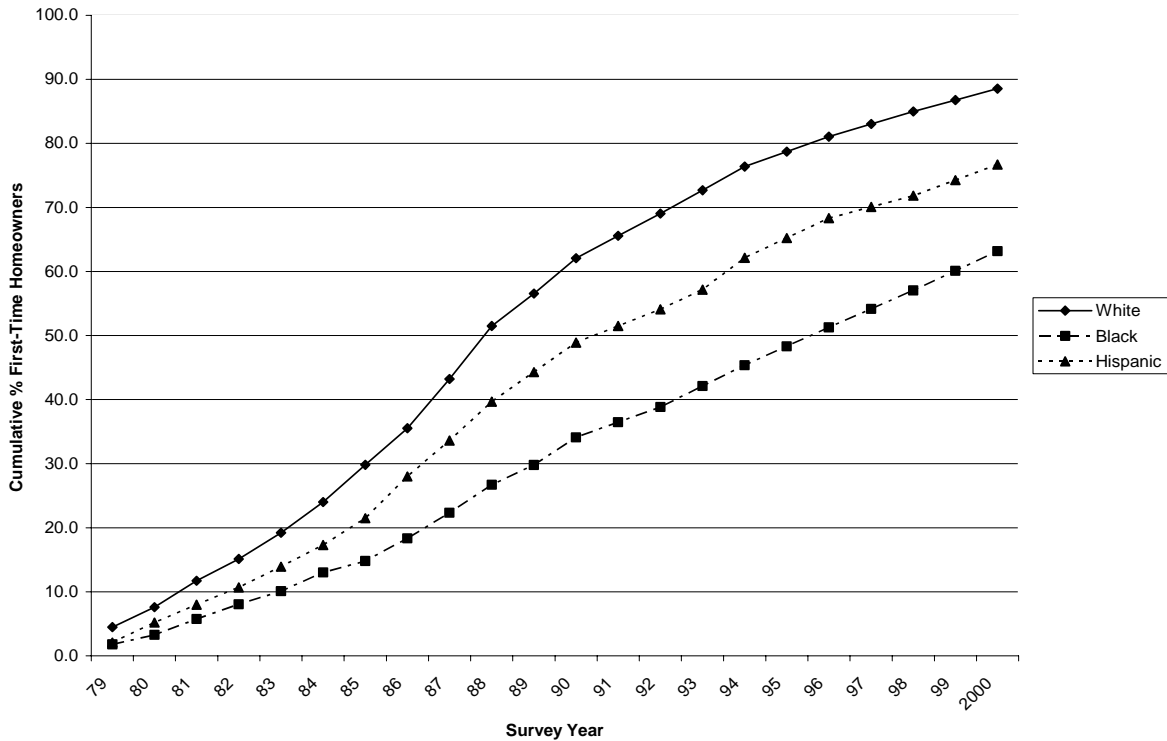
Source: Authors' tabulations of NLSY weighted data.

An interesting comparison is of the year 2000 cumulative rates of attaining first-time ownership with the year 2000 homeownership rates. Obviously the cumulative rate will be higher because some individuals are temporarily renters in 2000 (e.g. following a move or marital breakup) and some individuals were previously owners but were not able to sustain the spell. The differences between the cumulative and current ownership rates, by race and ethnicity, are: 88 versus 69 percent for whites, 63 versus 34 percent for African Americans, and 77 versus 45 percent of Hispanics. Thus, the difference for minorities of about 30 percentage points is much greater than that for whites (19 percentage points). These data are consistent with observing that minorities have both shorter spells of ownership and longer spells of renting or living with parents following a spell of ownership.

Exhibit 6 displays the cumulative movement into first-time homeownership by race for those households that scored in the top two-thirds of a NLSY administered achievement test (AFQT). Normed scores (adjusted for age differences) are reported in the survey. The test includes as components: arithmetic reasoning, word knowledge, paragraph comprehension, and numerical operations.[11]

---

[11]   The test is based on the Armed Forces Qualification Test. It has been used widely in academic research.

Exhibit 6
Movement into First-Time Homeownership by Race—Mid and High Achievement Test Scores
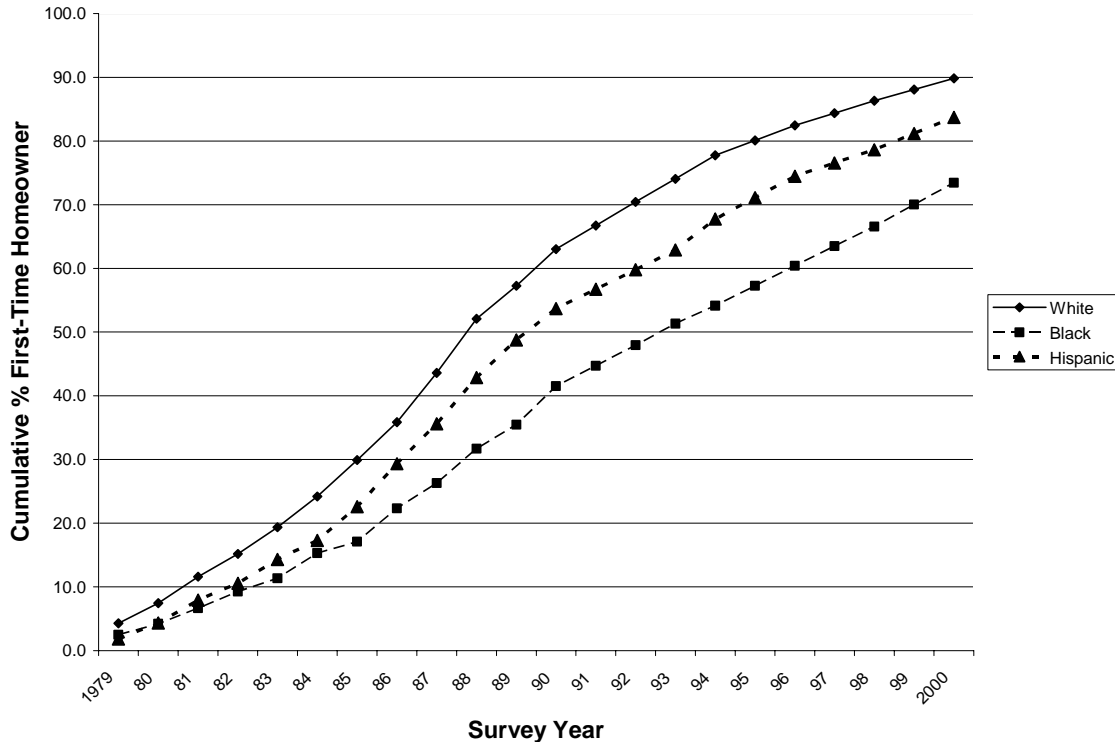
Source: Authors' tabulations of NLSY weighted data.

As shown in the exhibit, even when controlling for differences in test scores, there are substantial differences in entrance rates into homeownership. In this cohort, white households enter earlier and establish a substantial gap between themselves and Hispanics (rising to 11 percentage points in 1993, then falling to 6 by 2000) and African-Americans (rising to 24 percentage points in 1994, then falling to 16 by 2000). The decline in the gap that occurs as the cohort ages is notable.

Exhibit 7 describes the cumulative percentage of low achievement test score individuals that became first-time homeowners. Households with low AFQT scores are more likely to be low income earners throughout their lives, thus this exhibit shows the gap in first-time ownership rates among those least likely to become owners. As the cohort ages, the African-American-white gaps rises to 26 percentage points and changes little thereafter, while the Hispanic-white gap rises to 11 percentage points and remains constant. These results differ from those for higher AFQT households in that the peak gap is slightly higher for low AFQT individuals and there is little or no reduction in the gap in the late 1990s.

Exhibit 7
Movement into First-Time Homeownership by Race—Low Achievement Test Scores
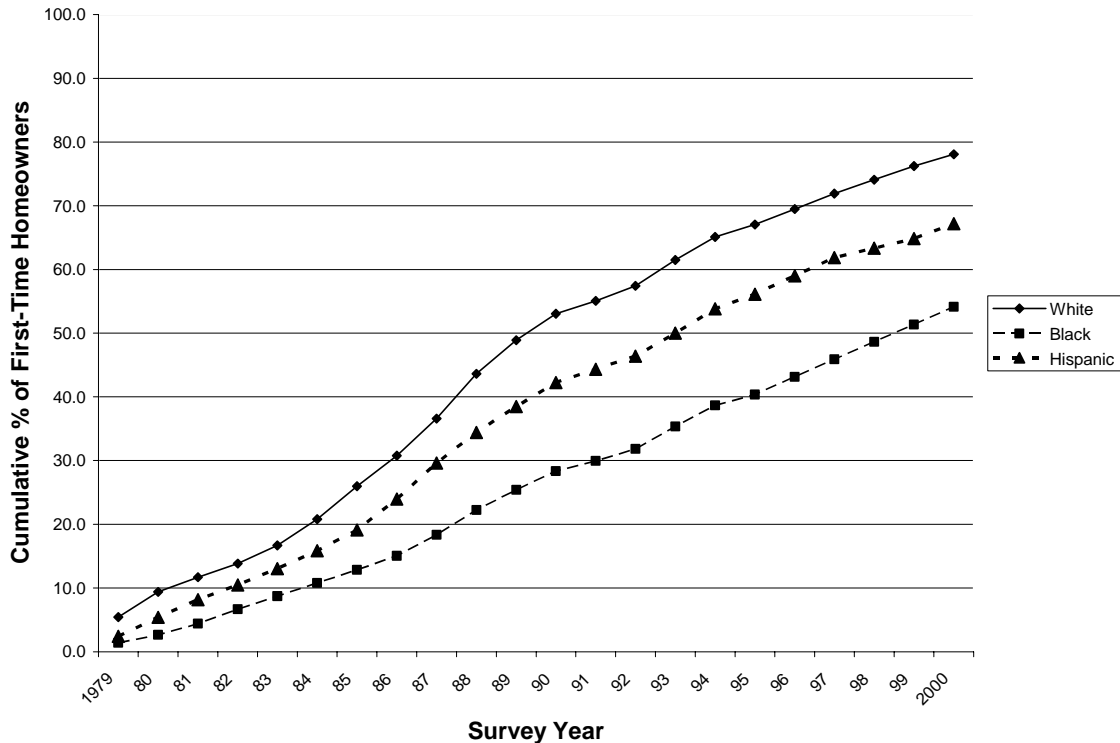
Source: Authors' tabulations of NLSY weighted data.

A similar perspective comes from viewing the growth of first-time homeownership by the respondent's highest grade completed (HGC). We separate HGC into two categories, those completing grade 12 or less and those with some college or more, shown respectively in Exhibits 8 and 9.[12] We find that the maximum gap for respondents who completed at least some college education comparing whites and African-Americans is relatively small. Also, it is much smaller than the white-African-American gap for respondents who scored well on the AFQT (7 percentage points versus 24). Further, the ownership gaps for college educated adults fall to 3 and 8 percentage points for African-Americans and Hispanics by the year 2000. Worthy of note is the observation that African-Americans first-time ownership rates are greater than for Hispanics (this being the reverse of the finding for AFQT test scores), suggesting that college education is particularly helpful for African-Americans' attainment of homeownership.

---

[12] The measure is the highest grade completed during the 21-year survey period, a time invariant value. Thus, in the early survey years, a respondent may be attributed an HGC greater than the highest grade achieved at that particular time.

Exhibit 8
Movement into First-Time Homeownership by Race—Some College or More Education
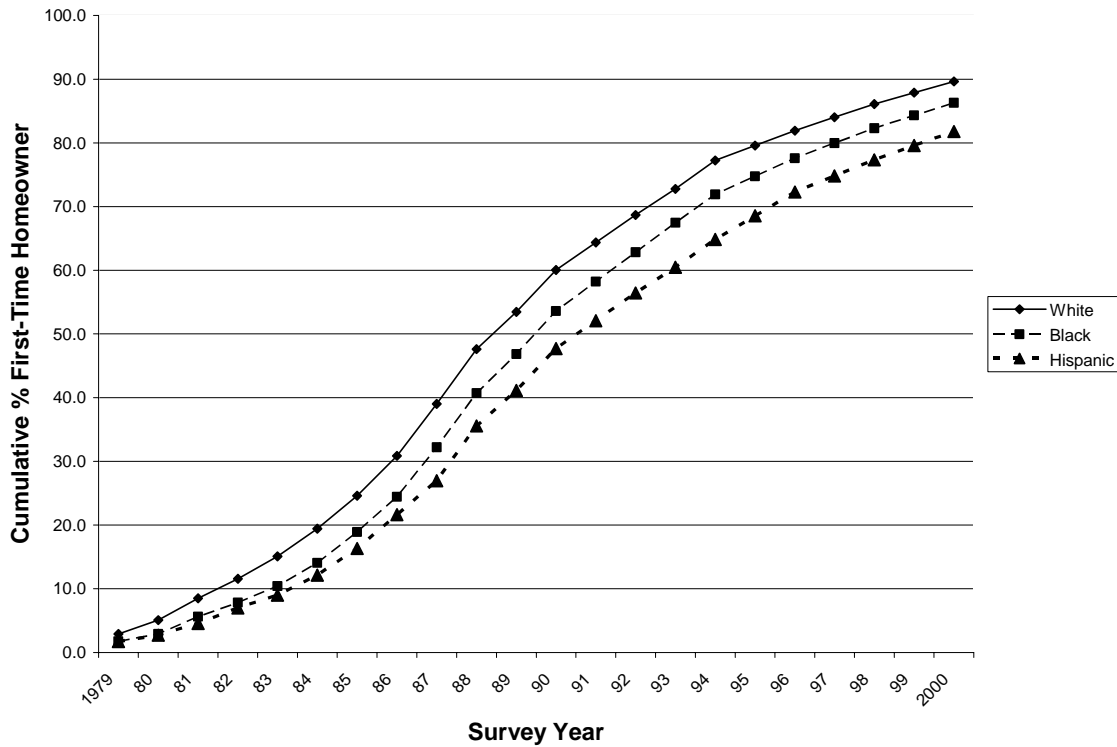
Source: Authors' tabulations of NLSY weighted data.

The results are much different for individuals with a 12th grade education or less. The gaps in homeownership rates grow over time to 34 and 19 percentage points comparing whites with African-Americans and Hispanics, respectively. There is only modest diminution of the gaps in the late 1990s. Thus, low levels of education negatively affect movements into ownership for all groups, but the impact on African-Americans is very large, creating a huge African-American-white gap.

Comparing first-time ownership attainment rates of those with 12 years of education or less with those with more than 12 years reveals that for whites, those with education have higher first-time ownership rates, but only after 1991. This result likely occurs because college education slows the movement into ownership, but starting in 1985 those with more education began to catch up. In contrast, the rate for highly educated African-Americans is never smaller than for African-Americans with a twelfth grade education or less. Again, this finding points to education making an important contribution to African-American attainment of first-time ownership. The pattern for Hispanics is similar for whites with the crossing point occurring in 1989.

Exhibit 9
Movement into First-Time Homeownership by Race—12 Years or Fewer of Education
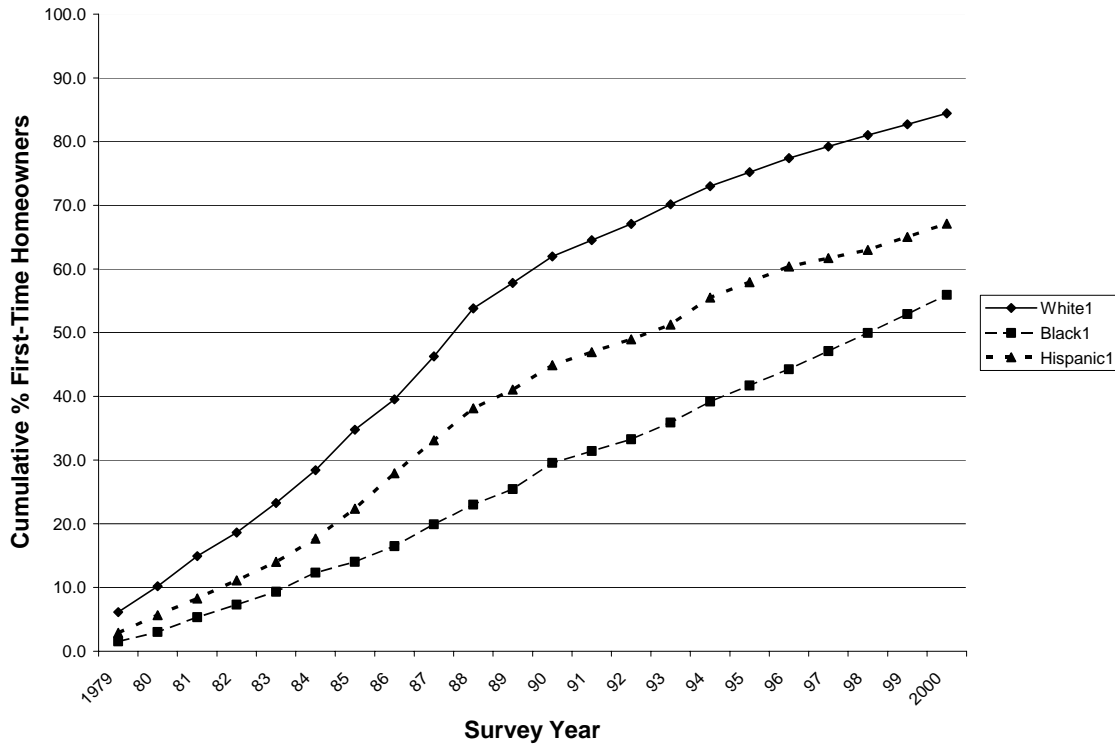
Source: Authors' tabulations of NLSY weighted data.

A similar analysis was conducted dividing the U.S. into four census regions: Northeast (NE), North Central (NC), South (S), and West (W). The respondents included in this analysis are limited to those who remained in the same region throughout the survey period. As expected, the cumulative rates of homeownership are greater in the regions with lower priced housing. In both the South and North Central regions, the year 2000 total share of respondents who attained first-time homeownership is 86 percent, while it is 79 percent in the Northeast and 77 percent in the West.

Exhibit 10 displays the differences in rates of attaining first-time homeownership by region. In particular, the white-African American ownership gaps are shown for four regions. The time series of African-American-white gaps by region is interesting in that the gap in the South is the largest through 1987, peaks in 1992, and then experiences a substantial decline. However, the African-American-white gap in cumulative first-time ownership rates generally continues to rise in the other regions.

Exhibit 10
Regional Gaps in First-Time Homeownership by Race
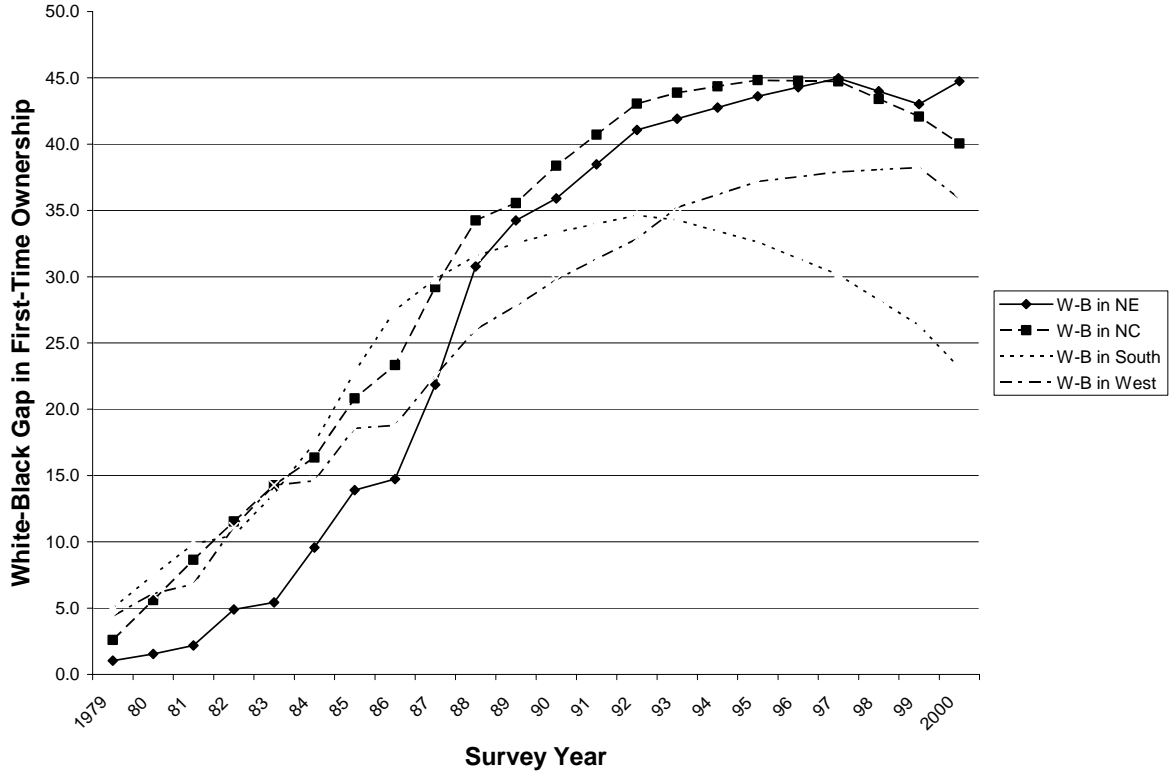
Source: Authors' tabulations of NLSY weighted data.

Our final description of first-time homeownership looks at low-income individuals. Because income changes over time, households move into and out of the low-income category, thus the statistics must be interpreted with care. Households are classified as low income if their income is below $20,000 (in 1979 values). Exhibit 11 shows substantial racial differences in the cumulative rate of attaining ownership for low-income households. By 2000, the rate for low-income whites (0.50) is about 16 percentage points greater than for African-Americans and six percentage points greater than for Hispanics. The African-American-white gap rises through 1994 and then falls. The white-Hispanic gap rises through 1992 and then declines.

Exhibit 11
Movement into First-Time Homeownership by Race: Low-Income Households
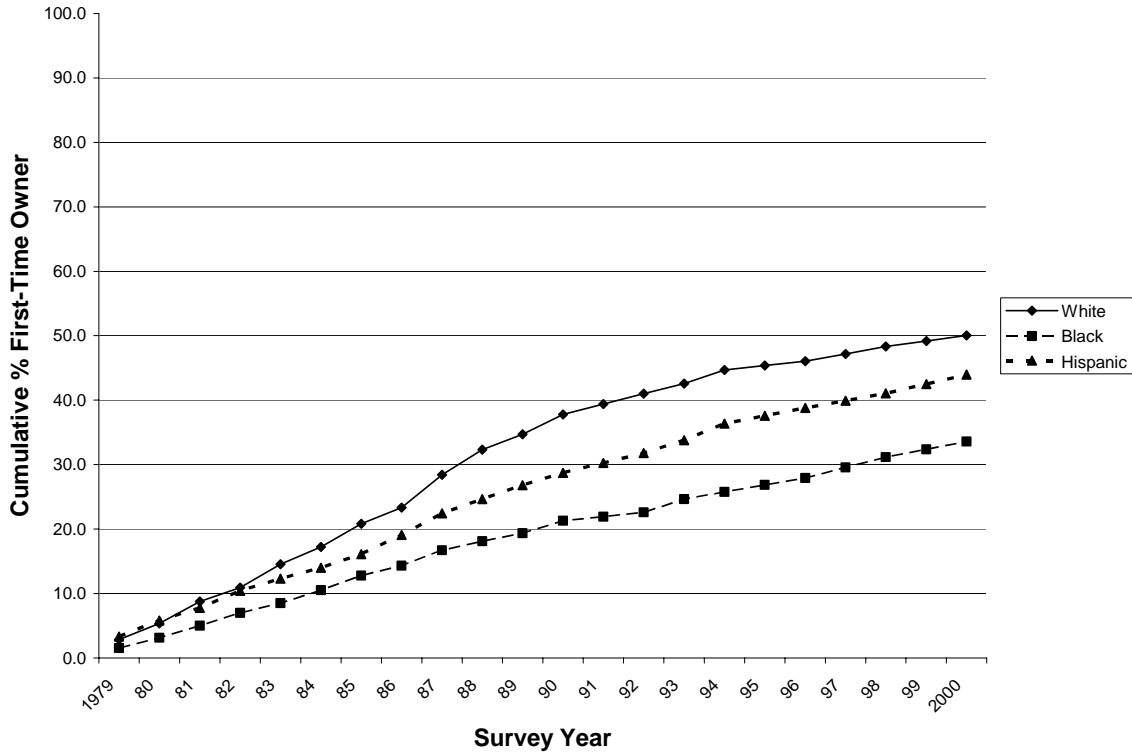
Source: Authors' tabulations of NLSY weighted data.

3.4   Termination of Homeownership Spells

Homeownership rates are determined not only by the percentage of people that begin a spell of owning, but also by the rate of exiting ownership. Thus the duration of owning is an important, though neglected, determinant of the nation's homeownership rate. The annual rate of terminating spells of ownership is an indicator of spell length. In this section we first present data by race and ethnicity that describe annual rates of terminating homeownership. We find that termination rates are substantially higher for African-Americans than other groups and somewhat higher for Hispanics. Next, we describe a 21-year history of transitions among tenure statuses. Although the percentage of African-Americans and Hispanics becoming first-time homeowners is lower than that of whites, their histories of subsequent transitions are quite similar. The overall gap in ownership rates is not fully explained by these transition histories, implying that the duration of spells of owning and subsequent spells of renting are important contributors to the gap in ownership comparing African-Americans, whites, and Hispanics.

During the 21-year coverage period of the NLSY, respondents underwent many transitions in their living arrangements. We categorize living arrangements into three groups: Homeowners, Renters, and Other. Those respondents in the Other category include ones living at home with parents, living

in an institution, or living in temporary quarters.[13] Because NLSY respondents were relatively young in the first survey, most lived with their parents and later transitioned into renting or ownership.

The data in Exhibit 12 to the right of the survey year column reports the annual percentage of homeowners (in a particular spell of ownership) who transition to either renting or some other living arrangement such as living with parents.[14] Transitions from first-time ownership are designated as Own-1, those from second time ownership are Own-2, and those from third time ownership are Own-3. The third and fourth data columns report transitions from first-time ownership to Other and to renting. The sum of these two types of transitions is reported in the next column for Own-1, followed by the total transitions for Own-2 and Own-3. The final column lists the percentage of homeowners (any spell) who transition during that year to either renting or Other.

Exhibit 12
Percentage of Homeowners Terminating First, Second, and Third Spells of Homeownership

Avg. Age	Survey Year	From→ To→	Own-1* Other	Own-1 Rent	Total Own-1 Other & Rent	Total Own-2* Other & Rent	Total Own-3* Other & Rent	Total All Own Other & Rent
18.5	1980		8.2	20.9	29.1	0.0	0.0	29.1
19.5	1981		7.4	19.8	27.2	0.0	0.0	27.2
20.5	1982		4.3	19.7	24.0	1.6	0.0	25.6
21.5	1983		4.4	15.0	19.3	1.4	0.0	20.7
22.5	1984		3.3	12.9	16.2	1.5	0.0	17.7
23.5	1985		2.5	9.5	12.0	2.8	0.0	14.8
24.5	1986		2.0	8.6	10.6	2.3	0.1	13.0
25.5	1987		1.9	7.7	9.5	2.0	0.4	11.9
26.5	1988		1.8	7.9	9.6	2.7	0.5	12.9
27.5	1989		1.3	5.4	6.7	2.4	0.5	9.6
28.5	1990		0.7	5.1	5.8	1.9	0.4	8.1
30.5	1992		1.2	6.4	7.5	2.2	0.4	10.2
31.5	1993		0.9	3.5	4.4	1.6	0.5	6.5
32.5	1994		0.9	2.8	3.7	1.6	0.3	5.6
34.5	1996		1.1	4.1	5.1	2.2	0.8	8.1
36.5	1998		1.2	3.3	4.5	1.9	1.1	7.5
38.5	2000		0.8	3.4	4.2	2.5	1.0	7.8

Source: Authors' tabulations of NLSY weighted data.

*Own-1 is a household's first spell of owning, Own-2 is a household's second spell of owning, and Own-3 is a household's third spell of owning.

---

[13] More specifically, the category Other includes living with parents, living in military barracks or military housing, aboard ship, in a dorm, fraternity, or sorority, in a jail, hospital, orphanage, religious institution, or other temporary quarters.

[14] Because these data are reported annually, they provide some information about the duration of stay in a particular tenure status. High annual rates of termination of ownership suggest a lower duration of stay.

Between the 1979 and 1980 surveys, 29.1 percent of individuals age 15 to 22 who were homeowners transitioned from first-time owning to either renting or some other living arrangement. This large percentage is not surprising because of the relative youth of the respondents. The annual percentage transitioning from ownership falls nearly monotonically for the next 21 years, after accounting for the two-year gaps later in the sample period. The data in columns 2 and 3 show that on average there are four times as many transitions from first-time owning to renting compared with other living arrangements. The percentage of individuals transitioning from second or third spells of ownership to renting or Other is considerably smaller than transitions from first-time ownership. One possible explanation is the experienced gained in a prior spell of ownership may help extend the duration of a subsequent spell.

We also separated the sample into white, African-American, and Hispanic respondents and repeated the analysis shown above.[15] Exhibit 13 shows that all groups' termination rates tend to fall with increased respondent age, but there is year-to-year volatility due to the smaller samples for minorities. The final two columns report the substantial differences in termination rates comparing whites, African-Americans, and Hispanics. On average, African-Americans' termination rate is 240 percent of that of whites and that for Hispanics is 168 percent of whites.[16] Further, there is no time trend in this ratio, as it remains approximately constant throughout the period. These differences in rates could have a substantial impact on the rates of homeownership by race and thus they contribute to the explanation of the minority-white ownership gap.

3.5 Changes in Residence: Owning, Renting, and Other

We constructed a history of tenure and living arrangements for each respondent. For example, a history that is often taken as typical in the U. S. is that an individual first lives with his or her parents, then transitions into renting, followed by homeownership where he or she remains. A respondent who divorces after transitioning into homeownership, and who later remarries might have a history of: Parents, Rent, Own, Rent, and Own.[17] The NLSY contains 18 surveys through 2000, this forming an upper limit on the number of transitions that can be observed. One note of caution is that although residence histories help inform the discussion of homeownership rates, they are far from definitive because they omit the duration of stay in each tenure status, this being a critical input to the determination of homeownership rates.

---

[15] There are too few Asian terminations of ownership in the sample to report reliable annual rates.

[16] The overall termination rate for Asians is 142% of that for whites. Aggregation across all survey years makes this number reasonably reliable compared with the value for individual years.

[17] An individual cannot transition directly from first-time renting to second-time renting because this is counted as a continuous spell of renting. Similar statements hold for owning and living with parents/others.

Exhibit 13

Percentage of White, African-American, and Hispanic Individuals Terminating Spells of Homeownership

From To	White Owner Other & Rent	African-American Owner Other & Rent	Hispanic Owner Other & Rent	African-American-White Diff Other & Rent	Hispanic-White Diff Other & Rent
1980	26.2	57.8	37.8	31.6	11.6
1981	25.3	59.8	45.4	34.6	20.2
1982	24.0	53.4	35.9	29.4	11.8
1983	18.0	54.2	35.4	36.2	17.3
1984	16.7	35.9	27.5	19.2	10.8
1985	13.1	45.9	23.3	32.8	10.2
1986	12.7	23.2	15.6	10.5	2.9
1987	11.0	24.6	20.6	13.6	9.6
1988	12.3	26.2	22.1	13.9	9.8
1989	9.0	19.3	15.5	10.3	6.4
1990	7.2	19.5	11.6	12.3	4.5
1992	9.2	25.2	14.0	16.0	4.8
1993	6.4	11.1	9.8	4.7	3.4
1994	5.1	10.7	10.7	5.7	5.7
1996	7.3	19.6	13.3	12.3	6.0
1998	6.7	17.9	14.6	11.2	7.9
2000	7.3	15.7	12.4	8.4	5.1

Source: Authors' tabulations of NLSY weighted data.

The results of our analysis are presented in Exhibit 14. The entries in the exhibit are the percentages of the cohort who undertook a particular transition. This percentage is defined as the number of transitions (weighted) divided by the number of respondents in the cohort in 1979 (weighted) who left their parental household sometime in the 21-year period and who were not owners in 1979. In 1979, 357 individuals were homeowners. They are omitted from the transition analysis because we cannot observe their full history of transitions prior to 1979, nor can we observe their sequence of destination after exiting the parental home. The result is that the percentage of individuals reported to attain first-time homeownership in Exhibits 14 to 17 is lower than in Exhibit 5 where all respondents, including the 1979 homeowners are included in the analysis.

Exhibit 14
The Percentage of Individuals Experiencing a Particular Living Arrangement during a 21 Year Period

Moved From:	Moved to:											Total Changes to Other Living Arrangements	Never Entered this Living Arrangement	Remained Through the Final Period	Grand Total
	R1	O1	P2	R2	O2	P3	R3	O3	P4	R4	O4				
P1	88.4	11.6	-	0.0	0.0	-	0.0	0.0	-	0.0	0.0	100.0	0.0	0.0	100.0
R1	-	37.4	42.7	-	3.7	0.7	-	0.0	0.0	-	0.0	84.6	5.1	10.3	100.0
O1	4.8	-	4.8	15.9	-	1.5	4.3	-	0.5	0.9	-	32.8	27.3	39.9	100.0
P2	1.6	5.1	-	36.3	1.9	-	1.2	0.2	-	0.2	0.0	46.5	49.9	3.6	100.0
R2	-	12.7	1.7	-	11.5	15.2	-	1.3	0.3	-	0.2	43.0	45.1	11.9	100.0
O2	0.1	-	0.6	1.7	-	0.6	3.9	-	0.2	0.0	-	7.2	77.9	14.9	100.0
P3	0.0	2.1	-	0.8	1.0	-	11.2	0.3	-	0.6	0.0	16.0	81.0	3.0	100.0
R3	-	2.8	0.2	-	3.1	1.0	-	2.3	4.4	-	0.3	14.1	78.5	7.4	100.0
O3	0.0	-	0.0	0.0	-	0.0	0.6	-	0.1	0.9	-	1.6	95.2	3.2	100.0
P4	0.0	0.4	-	0.1	0.4	-	0.3	0.1	-	2.8	0.0	4.1	93.2	2.7	100.0
R4	-	0.6	0.0	-	0.5	0.1	-	0.5	1.2	-	0.5	3.5	94.4	2.1	100.0
O4	0.0	-	0.0	0.0	-	0.0	0.0	-	0.0	0.2	-	0.2	98.9	0.9	100.0
Total	94.9	72.7	50.1	54.9	22.1	19.0	21.5	4.8	6.8	5.6	1.1	353.6			

Source: Authors' tabulations of NLSY weighted data. The sample consists of white, African-American, and Hispanic Individuals.

P1 = first stay with parents (the initial living arrangement for everyone).

P2, P3, P4 = second through fourth stays with parents or others.

R1, R2, R3, R4 = first through fourth spells as a renter.

O1, O2, O3, O4 = first through fourth spells as a homeowner.

The data elements are the percentage of the cohort who change from the living arrangement listed in the left hand column to the living arrangement listed as a column heading. For example, 88.4 percent of the sample moved, sometime during the 21-year period, from a first stay with parents to a first rental experience.

Exhibit 15

The Percentage of White Individuals Experiencing a Particular Living Arrangement during a 21 Year Period

Moved From:	Moved to:											Total Changes to Other Living Arrangements	Never Entered this Living Arrangement	Remained Through the Final Period	Grand Total
	R1	O1	P2	R2	O2	P3	R3	O3	P4	R4	O4				
P1	87.9	12.1		0.0	0.0		0.0	0.0		0.0	0.0	100.0	0.0	0.0	100.0
R1		38.7	42.2		4.0	0.7		0.0	0.0		0.0	85.6	5.4	8.9	100.0
O1	4.9		4.9	16.5		1.5	4.4		0.5	1.0		33.8	24.7	41.5	100.0
P2	1.7	5.1		36.1	2.0		1.2	0.2		0.2	0.0	46.5	50.1	3.3	100.0
R2		13.4	1.8		12.2	14.8		1.4	0.3		0.2	44.0	44.7	11.3	100.0
O2	0.1		0.7	1.8		0.6	4.1		0.3	0.0		7.5	76.7	15.8	100.0
P3	0.0	2.1		0.8	1.0		11.0	0.3		0.6	0.0	15.8	81.2	3.0	100.0
R3		2.7	0.2		3.2	1.0		2.5	4.5		0.4	14.4	78.4	7.2	100.0
O3	0.0		0.0	0.0		0.0	0.7		0.0	0.9		1.7	95.0	3.4	100.0
P4	0.0	0.4		0.0	0.4		0.2	0.1		2.7	0.0	4.0	93.3	2.7	100.0
R4		0.7	0.0		0.5	0.1		0.5	1.2		0.5	3.6	94.4	2.0	100.0
O4	0.0		0.0	0.0		0.0	0.0		0.0	0.2		0.2	98.9	0.9	100.0
Total	94.6	75.3	49.9	55.3	23.3	18.8	21.6	5.0	6.7	5.6	1.1	357.1			

Source: Authors' tabulations of NLSY weighted data. The sample consists of white, African-American, and Hispanic Individuals.

Exhibit 16
The Percentage of Black Individuals Experiencing a Particular Living Arrangement during a 21 Year Period

Moved From:	Moved to:											Total Changes to Other Living Arrangements	Never Entered this Living Arrangement	Remained Through the Final Period	Grand Total
	R1	O1	P2	R2	O2	P3	R3	O3	P4	R4	O4				
P1	90.2	9.8		0.0	0.0		0.0	0.0		0.0	0.0	100.0	0.0	0.0	100.0
R1		32.3	45.2		3.0	0.8		0.2	0.1		0.0	81.5	3.7	14.8	100.0
O1	4.3		4.1	14.0		1.4	4.0		1.0	0.7		29.4	37.1	33.5	100.0
P2	1.3	4.8		37.8	1.6		1.5	0.1		0.3	0.0	47.3	48.4	4.3	100.0
R2		10.1	1.7		8.7	17.0		1.0	0.7		0.3	39.4	45.3	15.2	100.0
O2	0.2		0.2	1.5		0.6	3.4		0.2	0.1		6.4	82.6	11.0	100.0
P3	0.2	1.9		1.0	0.8		12.4	0.2		1.0	0.0	17.6	79.0	3.4	100.0
R3		3.4	0.3		2.5	1.2		1.8	4.0		0.2	13.3	77.8	8.8	100.0
O3	0.0		0.1	0.2		0.0	0.3		0.1	0.8		1.6	96.0	2.4	100.0
P4	0.0	0.3		0.2	0.3		0.5	0.1		2.9	0.0	4.3	92.9	2.8	100.0
R4		0.4	0.0		0.4	0.1		0.5	1.1		0.5	3.1	94.0	2.9	100.0
O4	0.0		0.0	0.0		0.0	0.1		0.0	0.2		0.4	98.9	0.7	100.0
Total	96.3	62.9	51.6	54.7	17.4	21.0	22.2	4.0	7.1	6.0	1.1	344.2			

Source: Authors' tabulations of NLSY weighted data. The sample consists of white, African-American, and Hispanic Individuals.

Exhibit 17
The Percentage of Hispanic Individuals Experiencing a Particular Living Arrangement during a 21 Year Period

Moved From:	Moved to:											Total Changes to Other Living Arrangements	Never Entered this Living Arrangement	Remained Through the Final Period	Grand Total
	R1	O1	P2	R2	O2	P3	R3	O3	P4	R4	O4				
P1	91.0	9.0		0.0	0.0		0.0	0.0		0.0	0.0	100.0	0.0	0.0	100.0
R1		33.0	42.4		2.4	0.3		0.3	0.0		0.0	78.4	3.6	18.0	100.0
O1	4.1		4.7	13.1		1.1	3.4		0.7	0.5		27.7	37.5	34.9	100.0
P2	0.9	4.7		35.3	1.7		0.7	0.0		0.0	0.0	43.3	51.3	5.3	100.0
R2		10.4	1.4		9.8	14.7		0.9	0.4		0.1	37.6	49.7	12.7	100.0
O2	0.3		0.1	1.3		0.2	2.9		0.1	0.0		5.0	82.2	12.7	100.0
P3	0.0	2.3		0.5	0.6		10.9	0.1		0.5	0.0	14.8	83.0	2.1	100.0
R3		2.0	0.1		2.4	0.6		1.3	5.3		0.2	11.9	81.3	6.9	100.0
O3	0.0		0.0	0.0		0.0	0.3		0.2	0.5		1.0	96.6	2.4	100.0
P4	0.0	0.5		0.0	0.2		0.5	0.0		3.9	0.0	5.1	92.2	2.7	100.0
R4		0.9	0.0		0.7	0.0		0.7	1.1		0.3	3.7	94.5	1.7	100.0
O4	0.0		0.0	0.0		0.0	0.0		0.0	0.1		0.1	99.4	0.6	100.0
Total	96.4	62.5	48.7	50.3	17.8	17.0	18.7	3.4	7.8	5.5	0.6	328.7			

Source: Authors' tabulations of NLSY weighted data. The sample consists of white, African-American, and Hispanic Individuals.

Because individuals can undertake multiple transitions, the column sum of percentages in the "Total" column is much greater than 100. The average number of recorded transitions per individual is 3.5 during this 21-year period.[18] The "Total Changes to Other Living Arrangements" column of the P1 row sums to 100 because we excluded both the group of 1979 homeowners and the very small number of individuals who never exited from their parents/others home, and because of our assumption that all individuals began their residence history in P1. The other rows' Total Changes column do not sum to 100 because some individuals never enter the category in the first column (the column labeled "Never Entered this Living Arrangement"), and because some of those who begin a particular spell never exit from it (the column labeled "Remained Through the Final Period"). For example, 32.8 percent of the cohort transitioned out of first-time owning to some other tenure status during the period, 27.3 percent never became first-time homeowners, and 39.9 percent of the sample became first-time owners and stayed owners through 2000.

A variety of interesting observations are facilitated by these data. The predominant destination of youths leaving their parental home is to rental units. Once in the first spell of renting, a young adult is approximately equally likely to return to parents/others as to become a first-time homeowner.

Keeping in mind that the results are for a specific age cohort for a 21-year period, we find that most individuals move from renting to one of the spells of homeownership. Overall, 74 percent of first-time homeowners' prior residence was a rented dwelling unit (the rest moved from parents/others), 85 percent of second-time owners moved from a rental unit, 87 percent of third-time owners moved from a rental, and the entire small sample of fourth-time owners moved from a rental. Even though these percentages are large, a nontrivial number of new homeowners came from living with a parent or others. This atypical transition could occur because couples lived with parents (or with others) to conserve expenses and save for a down payment before moving to ownership, couples married and then moved into first-time ownership, an individual married and moved in with a current homeowner, or a person moved from military or dormitory housing directly into homeownership.

Departures from ownership to either renting or living with parents are nontrivial in number. Almost one-third of the sample ended their first spell of ownership by transitioning into renting (25.9 percent, which equals the sum of 4.8 + 15.9 + 4.3 + 0.9) or living with parents/others (6.8 percent). Overall, 40.1 percent of individuals in the cohort ended a spell of ownership by transitioning into some other living arrangement sometime during the 21-year period.[19] There are many potential causes of these terminations of ownership including financial problems that result in mortgage default or delinquency (e.g. loss of income due to unemployment or poor financial planning), inability to maintain a home, divorce/widowhood/separation, or job mobility followed by a temporary rental. Jones (1995) restated a commonly heard cliché: "once an owner, always an owner" as "once becoming homeowners,

---

[18]   The recorded number of transitions underreports the total number of transitions because some occurred between survey dates. For example, assuming a May survey date, if an individual rented in May 1980, moved in with parents in December 1980, and then changed to renting in May 1981, then a transition would not be recorded. While attrition from the sample is a concern, the data are reweighted annually thus making the transition data representative.

[19]   These data differ from Exhibit 12 because Exhibit 14 reports percentages of all whites, blacks, and Hispanics who terminate a spell of ownership anytime during the entire survey period, while Exhibit 12 reports the percentage of all homeowners terminating a spell of ownership in a particular year.

households typically remain owners for most, if not all, of the remainder of their life cycle." However, this statement is clearly not true for the young and middle-aged individuals in this cohort.[20]

Exhibits 15 through 17 describe the changes in living arrangements and tenure for white, African-Americans, and Hispanics. Although there are differences in the total rates in which whites and minorities attain and terminate spells of ownership, there are similarities in the distribution of paths among alternative routes. For example, of those individuals that transition into first-time homeownership, the distributions between those coming from rental units and parents are nearly identical by race (the percentages for white, African-American and Hispanic individuals are 73.6, 73.5, and 73.9). Going the other direction, the percentages of white, African-American, and Hispanic owners who terminated their spell and transition to renting rather than parents/others also are very similar: 65.1, 63.1, and 61.7.

There are racial differences in the percentage of the cohort who attained a particular ownership status. More whites than African-Americans or Hispanics became first-time owners (75.3 versus 62.9 and 62.5). But these differences are much less than the total racial gaps in homeownership reported above. Racial differences persist in second, third, and fourth spells of ownership, contributing to the explanation of the ownership rate gap, but the differences are relatively small.

Of substantial interest are the rates of termination of spells of ownership by race. Exhibit 15 shows that 33.8 percent of whites terminated a spell of first-time ownership, this percentage being greater than that for African-Americans (29.4) or Hispanics (27.7). A better comparison is of the percent terminating first-time ownership divided by the percent becoming first-time owners; this being a form of the termination rate for the full period. The calculated values are 44.9 percent for whites, 46.7 percent for African-Americans, and 44.3 percent for Hispanics; that is, they are essentially identical.

These observations create a puzzle. How can there be such a large racial gap in ownership rates when the percentage of ownership spells terminated are similar across race and ethnic groups? One contributor is the lower rate at which minorities become first-time homeowners. A second contributor is a shorter stay by minorities in owned homes and/or longer stay by minorities as renters after a spell of ownership is terminated. Thus, analyses of the duration of these spells are critical to understanding gaps in ownership rates. We next describe the overall percentage of time spent in homeownership, controlling for a number of socio-economic characteristics of the cohort. The analysis then continues in the next section with a formal estimation of the duration of time spent in first, second, and third time ownership, and first and second time spells out of ownership subsequent to a spell of owning.

---

[20]   A related descriptive statistic is the duration of time spent in each spell. We do not report these data because many spells are truncated and the average duration spent in a spell would be a misleading statistic. In the estimation of time spent in a spell, this right censoring is accounted for.

3.6   Percentage of Time Spent Owning a House

How much of a person's life is spent as a homeowner? The answer provides insights about the total effect of the activities discussed above: when is homeownership first achieved, how long does the first and subsequent spells of owning last, and how long do post-ownership spells of renting last. The NLSY sample provides information about this question for approximately the first 20 years of a person's life as an independent individual. This section provides an answer to the question and relates the answer to various characteristics of a household. For example, we relate the percentage of time spent as a homeowner to an individual's race, ethnicity, gender, education, ability level, and location.

Because we analyze a cohort consisting of eight age groups (14 to 21 in 1979), the analysis must separate these groups. We report the percentage of time spent as an owner (P-OWN) during 1979 to 2000 for each specific age group. These data should show the percentage is lower for the group of youths age 14 in 1979 compared with those age 21 in 1979 because the 14 year-olds will have spent a longer time in their parents' household.

We also created another measure (P21-OWN) that measures the percentage of time that a particular age group spent as a homeowner between the year they turned 21 and the end of the sample in 2000. Those age 14 in 1979 turned 21 in 1986, thus P21-OWN reflects their ownership experiences during the period 1986-2000. In contrast, those age 21 in 1979 have the entire 1979-2000 period included in the calculation. The comparison of the various age groups' values of P21-OWN thus reveals the impact of both different starting years and of the fact that those age 21 in 1979 have more years included in the analysis when they are relatively old (ages 36-42) compared to those age 14 in 1979. Thus, we expect P21-OWN to be the highest for the group of respondents age 21 in 1979.

Our final descriptive measure, P2135-OWN, is the percentage of time that an individual spends as a homeowner during the 1979-2000 period as they age from 21 to 35. This period is obviously early in a person's life, but ownership outcomes during this period likely have long-term implications. For example, Masnick (2001a, 2001b) found that cohort effects in homeownership persist over multiple decades. P2135-OWN compares ownership outcomes during 1986-2000 for respondents age 14 in 1979 to those during 1979-1993 for those age 21 in 1979. Thus, the comparisons of P2135-OWN among age groups reflect year specific effects, examples including the strength of the labor market and the level of mortgage interest rates during the period.

Exhibit 18 reports the values for the above three measures for each age group. The left hand column reports the age of the respondent in 1979. The results are as expected; that is, both P-OWN and P21-OWN rise with age. The best comparison between years uses the P2135-OWN data, which reveals that respondents were homeowners about 37 percent of the time between ages 21 and 35 (inclusive). There is some variation among the age cohorts, with the percentages tending to be greater for the three oldest groups. The time period covered for P2135-OWN for those ages 19 to 21 in 1979 is 1979 to 1995. Thus, finding that their ownership rates are somewhat higher than subsequent age groups is somewhat surprising given the relatively high interest rates during the early years of this period. However, data from the Housing Vacancy Survey (Office of Policy Development and Research 2003) confirms that for adults up to age 35, the trough in homeownership rates was in 1993-94. Thus,

youths age 14 in 1979 experienced economic conditions that resulted in 15 years of falling ownership rates; this experience is consistent with their lower percentage of time spent as an owner.

Exhibit 18
The Percentage of Time Spent as a Homeowner

Age in 1979	P-OWN	P21-OWN	P2135-OWN
14	24.9	35.7	35.7
15	28.3	38.2	36.5
16	31.3	39.7	36.5
17	35.4	42.4	37.5
18	36.8	41.7	35.8
19	42.4	45.9	39.0
20	44.1	45.8	37.6
21	49.0	49.0	39.2

Source: Authors' tabulations of NLSY weighted data.

Of interest are the variations in the above statistics when comparing groups with similar characteristics. Because we are following individuals over time, the cleanest separation is by variables that are time invariant such as race. We use P2135-OWN as the single summary measure of the time spent as a homeowner. Its values, by race and ethnicity, are listed in Exhibit 19.

Exhibit 19
Percentage of Time Spent as a Homeowner between Ages 21 and 35: by Race

Age in 1979	Total Sample	White	African-American	Hispanic
14	35.7	40.4	17.8	27.4
15	36.5	40.5	19.5	27.0
16	36.5	40.6	15.1	29.8
17	37.5	41.9	18.6	23.6
18	35.8	40.7	14.1	26.1
19	39.0	42.7	15.5	31.3
20	37.6	42.3	16.3	28.5
21	39.2	43.7	20.0	23.3
Average	37.5	41.7	17.1	27.0

Source: Authors' tabulations of NLSY weighted data.

There is a dramatic difference in time spent as an owner comparing white with African-American respondents. The ratio of the average value for whites to African-Americans is about 2.5 based on a comparison of the 41.7 percent of the period that young white individuals spent as an owner compared with 17.1 percent for African-Americans. The white-Hispanic ratio is 1.55.[21]

Next, we report the variations in values of P2135-OWN by education level and a measure of the individual's score on an achievement test. These measures of ability are of direct interest, but also they are of interest because these they are proxies for an individual's permanent income. Actual income varies over time due to lifecycle effects and transitory components, making descriptive analysis difficult.

Education is measured by the highest grade completed (HGC) by the respondent and the ability measure is a score (AFQT) on an achievement test. We present only the average value of all age groups to clarify the impact of these variables.

The data in Exhibit 20 show that the percentage of time spent as a homeowner rises with the respondent's ability and education, with one minor exception. In the sample of whites, individuals pursuing some form of graduate or professional degree (greater than 16 years of education completed) are owners for a modestly smaller percentage of time, likely due to the additional time spent as a student. There are substantial differences in ownership time comparing the lowest one-third of the AFQT distribution with others, but the marginal positive impact of AFQT falls as AFQT rises. Similarly, those individuals with less than a high school education spend relatively little time in homeownership compared with all other education levels, but among whites there are few differences once twelfth grade is completed.

The percent of time spent as an owner rises monotonically with AFQT and education for African-Americans and Hispanics. The decreased marginal impact of AFQT found for whites is not apparent in the African-American and Hispanic samples, nor is there any reduction in the impact of additional education. Of substantial interest is the observation that the gap in ownership comparing white and African-American individuals is present even when achievement test score and education are controlled. The white-African-American ratio of time spent as an owner varies by HGC and AFQT, but averages approximately 2. A similar finding holds for the white-Hispanic comparison where the percentage of time spent as an owner is about 40 percent higher for whites. The exhibit shows that the minority-white gap shrinks as education increases, thus suggesting that additional education is particularly helpful to minorities in the pursuit of achieving homeownership.

---

[21] It is interesting to note that these ratios are very similar to those for the departure rates from ownership. The average P2135-OWN white-Asian ratio is 1.40. Because of the relatively small number of Asians in the sample, the values for individual age groups are quite volatile.

Exhibit 20
Percentage of Time Spent as a Homeowner between Ages 21 and 35: by Ability and Education

	P2135-OWN Full Sample	P2135-OWN White	P2135-OWN African-American	P2135-OWN Hispanic
AFQT 1-22	25.3	32.4	14.5	23.4
AFQT 23-54	38.8	42.1	20.8	29.2
AFQT 55-99	43.4	44.6	26.0	35.1
HGC < 12	24.6	29.2	8.4	21.3
HGC = 12	38.3	43.8	15.6	26.7
12 < HGC < 16	38.0	43.2	17.8	28.6
HGC = 16	41.3	43.0	27.8	33.9
HGC > 16	37.9	38.6	30.6	33.7

Source: Authors' tabulations of NLSY weighted data. The sample consists of white, African-American, and Hispanic Individuals.

Note: Using the unweighted data, 34 percent of the respondents have an AFQT score less than or equal to 22, 32 percent have a score between 23 and 54 (inclusive), and 32 percent have a score above 54.

Marriage and homeownership are often found to be related. However, marriage is a time varying variable, and its impact is best found in an econometric model that allows for time varying variables. We created two rough indicator variables to gain a sense of their relationship with the time spent as a homeowner: EVERMARRIED and EVERDIVORCED. The first is a dummy variable that indicates if the respondent was ever married during the survey period, and the second indicates if the respondent reported being divorced in any survey year during the sampled period. These are obviously gross measures because EVERMARRIED equals 1 both when a respondent is married throughout the sample and when a respondent marries in the final survey year. A full analysis of the impact of marriage and divorce on the duration of ownership is presented in econometric analysis.

As shown in Exhibit 21 there are very large differences in the percentage of time spent homeowning if a respondent reported being married sometime in the period 1979-2000 compared with a respondent who was always single. In contrast, the percentage of time as an owner is very similar if a divorce is reported compared with individuals who have never been involved in the breakup of a marriage. Perhaps the explanation is that to be divorced, one must first be married, tending to increase the time spent as an owner. Also, while a divorce modestly reduces the time spent as an owner, a subsequent remarriage would again increase the likelihood of homeownership. These general patterns are repeated for each racial group and the impacts are generally similar. Again, we find that the percent of time spent as an owner is much lower for African-American individuals and somewhat lower for Hispanics, even when controlling for marital events.

Exhibit 21
Percentage of Time Spent as a Homeowner between Ages 21 and 35: by Marital Status

	P2135-OWN Full Sample	P2135-OWN White	P2135-OWN African-American	P2135-OWN Hispanic
EVERMARRIED=1	42.5	45.9	23.3	30.7
EVERMARRIED=0	11.2	13.8	5.8	9.4
EVERDIVORCED=1	34.7	37.8	18.6	23.9
EVERDIVORCED=0	38.4	43.3	16.8	28.0

Source: Authors' tabulations of NLSY weighted data.

Next, we review the relationship between the time spent as a homeowner and geographic location. Location varies over time, but for this analysis, we created a set of time invariant measures. For region of the U.S., we established a set of indicator variables defined as always living in the Northeast region (that is, for the full 21-year period), always living in the North Central region, always in the South region, or always in the West region (Census definitions are used for regions). The residual category is Change Region, this capturing all respondents who moved among regions during the survey period. The data in Exhibit 22 reveal that the greatest percentage of time spent as an owner occurs in the North Central and South regions. A likely explanation is the lower relative cost of housing in these areas and the smaller amount of funds required for a down payment.

We also report the percentage of time spent as an owner for those respondents who always lived in a rural area, in an urban area, in a central city, and those who changed areas. Exhibit 22 shows that the largest amount of time spent as an owner occurs for individuals who always lived in a rural area, and the smallest is for those who always lived in a central city.[22] None of these results are particularly surprising.

These locational differences in the full sample are not precisely repeated in the samples of minorities. While whites have the highest percent of time spent owning in the North Central and South regions, the greatest percentage for African-Americans is in the South, that for Hispanics is in the North Central, and that for Asians is in the West. Rural ownership rates are greatest for whites and African-Americans. Worthy of note is the particularly low percent of time spent as an owner by African-Americans who always resided in central cities (11 percent), compared with 33 percent for whites.

---

[22] A respondent could move from one central city to another and would remain classified as always living in a central city.

Exhibit 22
Percentage of Time Spent as a Homeowner between Ages 21 and 35: by Region, Urban/Rural, and Central City/Suburb

	P2135-OWN Full Sample	P2135-OWN White	P2135-OWN African-American	P2135-OWN Hispanic
NORTHEAST	36.8	42.0	10.1	14.3
NORTH CENTRAL	45.3	49.1	13.4	38.5
SOUTH	40.9	48.5	21.1	32.6
WEST	32.9	35.6	12.0	28.3
CHANGE REGIONS	30.5	33.0	16.4	23.5
RURAL	52.8	55.9	31.9	22.8
URBAN	31.3	37.2	14.2	25.1
CENTRAL CITY	23.0	33.5	11.1	20.5
CHANGE AREAS	41.0	43.4	21.2	32.1

Source: Authors' tabulations of NLSY weighted data

Section 4   Multivariate Analysis

This section describes multivariate analyses of the sustainability of homeownership and the periods spent out of ownership following a spell of owning. The econometric basis for our analysis is the set of parametric duration models. In this approach, the natural log of the length of a spell is regressed on a set of explanatory variables. The results indicate which factors tend to end a spell and which ones tend to extend it. The impact of these variables is compared across individuals' first three spells of ownership and first two spells of renting (or living with parents) that follow a spell of ownership.

The key application of these models will be to understand which household characteristics contribute to observed racial differences in the durations of ownership and renting. The descriptive analysis suggests that contributing factors include the level of education, knowledge (achievement test score), location, income, and marital status.

We perform two sets of analysis of ownership spells. First, we model the duration of ownership based on the values of explanatory variables at the time of purchase. This method allows us to predict the duration of ownership using data that is observable to policy makers at the time of sale. We perform a similar analysis for spells of renting/live with parents that follow a terminated spell of owning.

Our second approach extends the above model by including time-varying explanatory variables in the analysis. The key research question addressed by these models is how does the size of the impact of time-varying variables compare with household characteristics known at the time of purchase. That is, do spells of owning terminate primarily because of unforeseen events or are they predictable based on known characteristics. The econometric assumptions of the model are described in the Appendix.

4.1   Sample

The sample analyzed includes all respondents who were renters or lived with parents or others in 1979. Our analysis of spells of first-time and subsequent homeownership thus includes no instances of "left" censorship; that is, cases where a respondent was homeowner in 1979. Because respondents begin first-time ownership in different years, the years covered by a spell of owning differ from respondent to respondent.

4.2   Dependent Variables

The length of time a respondent is an owner is one of the two primary dependent variables, the other being the length of time a respondent rents or lives with parents (or others) following a spell of ownership. Duration is measured in increments defined by the survey years. The mean observed lengths of first, second, and third time ownership are 5.8, 4.8, and 4.3 years; however these means are misleading because they include both truncated spells (sample attrition) and spells that continued to the year 2000 (final survey year). The estimation method accounts for these types of censoring. The

mean observed lengths of first and second spells out of ownership following a spell of ownership are 3.9 and 3.4 years. Again, censoring makes these means very misleading.

The mean observed durations of first, second, and third time ownership for white, African-American, and Hispanic households are listed in Exhibit 23 (again, censoring may cause these means to be misleading). Also reported are the mean durations of the spells that follow first and second-time homeownership. Substantial differences in means are noted in the exhibit. The longer stays of whites compared with minorities in spells of ownership and the shorter stays of whites in renting in subsequent spells both increase the white-minority homeownership gap. These duration differences are attributable to differences in the economic, social, and demographic characteristics of the respondents. The duration analysis disentangles these effects.

Exhibit 23
Observed Durations of Homeownership and Renting/Other Living Arrangement (Years)

Duration	White	African-American	Hispanic
First time ownership	6.48	4.44	5.42
Second time ownership	5.16	3.94	4.38
Third time ownership	4.74	3.95	3.80
Renting/other: following first time ownership	3.54	4.70	4.11
Renting/other: following second time ownership	2.99	3.87	3.75

Source: Authors' tabulations of NLSY unweighted data.

4.3   Explanatory Variables

Some characteristics of individuals do not vary over time. Included in this group are race/ethnicity (white, African-American, Hispanic, Asian, other race), gender, the AFQT score, and whether the respondent is part of a first- or second-generation family in the U.S. First Generation indicates whether the respondent was born outside of the U.S. and Second Generation indicates whether both of the respondent's parents were born outside of the U.S. Other explanatory variables vary over time. Our analysis includes the respondent's age, family size, highest grade completed through the survey year, MSA location (central city, suburban), region (Northeast, South, West, North Central), marital status (married, divorced/widowed/separated, single/never married), poor health, the respondent's number of weeks worked in the past calendar year, and the respondent's number of weeks unemployed. We include two economy-wide time varying measures: the national unemployment rate and the mortgage interest rate on 30-year, fixed-rate loans. Because the rate of missing values for household income, home equity, and wealth is greater than for other variables, we report results that include these variables in separate estimations.

We test for various types of lock-in effects. Mortgage lock-in occurs if interest rates rise and a homeowner has a fixed rate loan. We do not have information about the type of mortgage loan; thus, we can only measure the difference between the interest rate in year t of a spell of ownership and the

interest rate in the year of purchase of a home. A positive value indicates that interest rates have risen and lock-in to the dwelling is a possibility, extending the duration of owning. This variable equals zero whenever interest rates are equal to or lower than when the home was purchased. Untested in the literature is whether mortgage lock-in extends spells of ownership, although it is clear that it extends the stay in a particular dwelling. We also measure the amount of decline in the mortgage interest rate in a separate variable (it equals zero if rates have risen). If a household refinances its mortgage then it eases the monthly payment-to-income constraint, suggesting that the duration of ownership will be extended. Alternatively, a lower interest rate makes relocation easier. While the expectation is that spells of ownership will continue, temporary spells of renting after relocation are possible. The combination of these two effects suggests that the duration of spells of ownership may be shortest if the mortgage interest rate does not change compared to the rate at the time of the start of the spell.

The amount of equity in a home may have offsetting effects. Greater equity equals greater wealth, providing a cushion against negative income shocks, thus tending to extend the period of ownership (a positive coefficient sign). However, equity lock-in may also occur when a homeowner's mortgage debt is high relative to the current price of the house. These households should find it difficult to relocate to another home, thus low equity could extend the duration of stay (a negative coefficient sign). The NLSY reports the owner's estimate of house price and mortgage debt at each survey date allowing for a measure of equity lock-in. While negative equity has been found to extend the stay in a particular dwelling, there have been no tests of whether it increases the duration of homeowning.

While our analysis contains a reasonably complete set of explanatory variables, there certainly are unobserved factors that affect the length of stay as an owner or renter/other. For example, some individuals may have a "taste for stability" or "a taste for moving." It is possible that the duration of a prior spell predicts that of a later spell, this being an implication of the effect of time invariant unobservable factors. We include in the analysis of second and third spells of ownership the duration of the first spell of owning to test for this effect.

Similarly, if any of the race and ethnicity coefficients are significant, the implication is that there are unobservable variables, correlated with race, that influence the duration of stay.[23] Examples of omitted variables include the level of knowledge of homeowners about home maintenance and refinancing.[24] Some of the differences in knowledge may be picked up by the education variables included in the analysis, but the ownership status of parents is not known and it is likely an important source of information about home repair and finance. Individuals who do not have a source of information in the family regarding mortgage financing may be more susceptible to high cost offers to refinance and consolidate debt. Another unobserved variable could be discrimination, manifested in the treatment of minorities by mortgage servicers or in the labor market. For example, if a household falls behind in its mortgage payments, do the workout opportunities afford equal opportunity for

---

[23] Finding these indicator variables to be insignificant simply implies that the model has explained observed racial differences in the duration of stay.

[24] Deng and Gabriel (2002) find that African-Americans are less likely to refinance than whites, ceteris paribus.

whites and minorities to remain an owner?[25] Discrimination in the labor market could cause minorities' incomes to be more volatile than whites, increasing the risk of terminating a spell of ownership. Finding a negative coefficient for one of the minority indicator variables suggests further study is needed to determine the underlying cause of this difference in termination rates.

The means for the set of explanatory variables in first-time ownership spells are listed in Exhibit 24, by race and ethnicity. Some variables' values change over time (e.g. age) and the table reports the mean value at the beginning of the spell of homeowning. Variables' means for other spells (e.g. second time homeownership) are not reported but are generally similar except for age (which is greater) and variables related to age such as family size.

The means for the full sample (first data column) of first-time homeowners are affected by multiple conditions including the NLSY oversampling African-Americans and Hispanics, by the relative youth of the sample, and by the limitation of the sample to households who are beginning first-time homeownership. Substantial differences in means are noted for the AFQT score (higher for whites), residence in a central city (lower for whites), marriage (lower for African-Americans), residence in the West (higher for Hispanics), and residence in the South (higher for African-Americans). Differences in means also are present for being divorced/separated/widowed (higher for African-Americans), living in a suburban area (lower for African-Americans), education (highest for whites), weeks unemployed (higher for African-Americans), and age (lowest for whites). The differences in age at the time of first homeownership reflect the relatively slower movement into ownership for minorities. Differences in wealth and income are present, but are much smaller than in the total population represented by the NLSY cohort. The reason is that all first-time homeowners must qualify for a mortgage, eliminating low wealth and income households from this estimation sample.

---

[25] Loss mitigation strategies in the mortgage industry are reviewed by Capone (1996). Strategies employed by HUD, Fannie Mae, and Freddie Mac are evaluated by Herbert, Gruenstein, and Burnett (2000).

Exhibit 24
Explanatory Variables' Means for First-Time Homeowners

	Full Sample First-time Owner	White First-Time Owner	African-American First-Time Owner	Hispanic First-Time Owner
African-American	0.23	0.00	1.00	0.00
White	0.58	1.00	0.00	0.00
Hispanic	0.14	0.00	0.00	1.00
Asian	0.01	0.00	0.00	0.00
Other Race	0.03	0.00	0.00	0.00
Male	0.48	0.48	0.46	0.49
First Generation	0.05	0.01	0.01	0.24
Second Generation	0.03	0.01	0.00	0.14
AFQT Score*	0.44	0.53	0.25	0.31
HGC*	0.13	0.13	0.13	0.12
Age*	0.28	0.27	0.29	0.28
Family Size	2.79	2.54	3.08	3.39
Central City	0.41	0.35	0.52	0.53
Suburban	0.36	0.39	0.28	0.35
Northeast	0.14	0.16	0.10	0.12
South	0.43	0.36	0.68	0.33
West	0.19	0.16	0.06	0.48
Married	0.68	0.73	0.53	0.70
Divorced/Widowed/Separated	0.07	0.06	0.10	0.06
Poor Health	0.04	0.04	0.05	0.03
Weeks Worked*	0.42	0.42	0.41	0.42
Weeks Unemployed*	0.02	0.02	0.04	0.02
Liquid Wealth*	0.17	0.18	0.11	0.13
Income*	0.45	0.45	0.43	0.42
Home Equity*	0.16	0.16	0.15	0.16
Number of Individuals	5355	3244	1239	737

Source: Authors' computations using NLSY unweighted data.

*The sample sizes are smaller for estimations that include wealth, income, and the loan-to-value ratio. The following variables have been scaled by dividing by 100: AFQT, AGE, HGC, Weeks Worked, and Weeks Unemployed. Their coefficients reflect these scaled values. The following variables have been scaled by dividing by 100,000: wealth, income, home equity.

4.4   Factors Affecting the Duration of Homeownership

Results for durations of first, second, and third-time homeownership are presented in Exhibit 25. The dependent variable is the duration of the spell of ownership measured in years. Explanatory variables are limited to those observable at the time the spell of homeownership started. That is, future marriages, divorces, changes in income, unemployment, and family size are not included in this

estimation. Only the purchase year data is included for variables that vary over time; for example, the individual's marital status at the time of purchase.

One research question is whether these time invariant characteristics predict the duration of owning. Assuming they do, another question is whether the significant predictors of ownership differ comparing first, second, and third-time homeownership. A third question is whether racial and ethnic differences in duration are explained fully by individuals' economic and social endowments, or is there a residual effect captured by the dummy variables for race and ethnicity.

Exhibit 25
Factors Affecting the Duration of Spells of Homeownership

	First-Time Owner		Second-Time Owner		Third-Time Owner	
	Coeff.	Std. Err.	Coeff.	Std. Err.	Coeff.	Std. Err.
Constant	-3.76***	0.68	-2.97*	1.62	0.11	4.03
African-American	-0.20***	0.07	-0.18	0.11	-0.39*	0.21
Hispanic	0.04	0.08	0.03	0.13	-0.40	0.30
Asian	-0.21	0.22	-0.88***	0.36	-1.08**	0.54
Other Race	0.01	0.13	0.34	0.25	-0.31	0.54
Male	-0.13***	0.05	-0.35***	0.08	-0.10	0.17
First Generation	0.03	0.12	-0.13	0.18	0.12	0.35
Second Generation	0.12	0.16	-0.27	0.23	0.36	0.49
AFQT Score	0.59***	0.11	0.36*	0.19	0.48	0.40
HGC	3.76***	1.34	4.95**	2.17	-4.78	3.97
Age	30.23***	5.05	24.73**	11.01	15.65	25.86
Age-squared	-40.20***	9.07	-31.62*	18.45	-20.57	40.73
Family Size	-0.11***	0.02	-0.06**	0.03	-0.10*	0.06
Married	0.90***	0.59	0.52***	0.12	0.38	0.26
Divorced/Widowed/Separated	0.08	0.10	-0.13	0.14	-0.14	0.28
Weeks Worked	0.93***	0.15	0.89***	0.27	-0.36	0.51
Weeks Unemployed	-0.63**	0.33	-0.70	0.64	0.22	0.18
Poor Health	-0.05	0.12	-0.10	0.18	-0.24	0.43
Central City	-0.04	0.06	-0.14	0.10	0.10	0.22
Suburban	0.14**	0.06	-0.13	0.10	-0.29	0.21
Northeast	-0.33***	0.08	-0.27*	0.16	0.16	0.31
South	-0.35***	0.06	-0.44***	0.13	0.23	0.21
West	-0.41***	0.08	-0.44***	0.13	0.02	0.24
First Spell Duration	--	--	0.07***	0.02	0.09	0.07
Sigma	1.09***	0.03	0.98***	0.05	0.84***	0.09
Total Observed Years	31351		7889		1569	
Total Individuals	5355		1655		365	

Source: Authors' computations using NLSY unweighted data.

Note: significance at the 1 percent, 5 percent, and 10 percent levels are indicated by ***, **, and *.

Of all households beginning spells of first-time owning, we estimate that 75 percent will complete 3.1 years of owning, 50 percent (median) will complete 8.1 years, and 25 percent will complete 17.3 years. Duration for the "typical" respondent is estimated to be 13.8 years, longer than the median because the distribution is skewed to the right. For second spells of owning, the survival distribution is similar: 75 percent complete 3.4 years, 50 percent complete 8.1 years, and 25 percent complete 15.9 years. Thirds spells of ownership differ only a little: 75 percent complete 3.5 years, 50 percent complete 7.3 years, and 25 percent complete 13.1 years. It is important to recall that these predictions are limited to adults age 42 or less.

The estimated underlying hazard rate in a year is the probability of terminating a spell of ownership, independent of the characteristics of the individual. It can be derived from the estimation as well. In general, the hazard rate rises, is stable, and falls over time when the estimated value of sigma is less than, equal to, or greater than 1. For first-time ownership, sigma is greater than one and thus the hazard rate falls as the spell gets longer. The hazard rate is estimated to equal 0.105 at the start of the spell, 0.082 at year 4, 0.078 at year 8, and 0.076 at year 12. The comparable values for second-time homeownership are 0.081, 0.086, 0.087, and 0.088; that is, the baseline probability of terminating a spell of ownership is approximately flat. For third-time ownership, the hazard rate rises from 0.055 at the start, to 0.100 at 4 years, to 0.115 at 8 years, and 0.125 at 12 years. The sample size for third-time ownership is by far the smallest; hence its results are not as reliable.

Regarding the first question listed above, it is clear that the duration of owning is predictable using only characteristics observable at the beginning of a spell. The implication is that some households are more likely than others to quickly terminate a spell of homeownership and these households can be identified at the time of purchase. This finding is important because it suggests that policy interventions can be targeted.

Regarding the second question about whether the predictors of spell length differ across first, second, and third spells, we find very high consistency of coefficients' signs and magnitudes comparing first and second spells of ownership. The small sample size of third-time owners estimation makes it difficult to precisely determine the impact of individual's characteristics due to higher standard errors, thus we do not focus on those results.

The third question is whether the model fully explains racial and ethnic differences in length of stay in homeownership. The negative coefficient of African-American in Exhibit 25 reveals that the length of stay in owned housing is shorter for African-Americans than whites even when they have the same observed socio-economic characteristics. This shortfall is present for first, second, and third stays in ownership, although it misses being statistically significant at the 5% level in the second-time ownership equation. Hispanic is not significant in any equation, indicating that white-Hispanic differences in duration are explained by differences in observed social and economic characteristics. Asian is negative in all cases, and large and statistically significant in second and third spells of owning.

Most of the other variables are statistically significant in the first-time ownership and many are significant in the second-time ownership estimations. As expected, the duration of stay in owned homes is longer for individuals scoring well on the achievement test and having more education. It is substantially greater for married couples, but divorced/separated/widowed individuals' duration of

owning is no different than that of singles. More weeks worked lengthens the duration of stay while more weeks unemployed during the year of purchase shortens it.[26] Note that these are respondent characteristics at the time of purchase, not in subsequent years. Respondent age has the expected positive effect, diminishing as age rises. Male respondents and those with larger families at the time of purchase have shorter stays (the latter finding is consistent with the literature on length of stay in a dwelling). No effect was found for being first or second generation, health, or living in a central city. Individuals in the North Central region (the omitted region) have notably longer durations of stay in ownership, while those in other regions are very similar. Only in the first-time ownership estimation does living in a suburb lengthen the stay in owning.

A form of decomposition of the African-American-white and Hispanic-white durations of ownership gap can be performed, the goal being to determine the contribution of each of the explanatory variables to explaining the gap. Multiplying the estimated coefficient of a variable by the African-American-white difference in the variable's means yields a measure of its contribution to the total racial gap in duration. We report the results for only first-time spells of ownership. The average length of stay for typical whites, African-Americans, and Hispanics in first-time ownership is estimated to be: 16.1, 9.5, and 12.5 years. The most important contributors to creating the almost seven year African-American-white gap are (in order of importance): the African-American dummy variable (unobserved factors), and the following characteristics of the sample of African-Americans: a lower marriage rate, lower achievement test scores, more live in the South, larger family sizes, fewer reside in the suburbs, fewer weeks worked, more weeks unemployed, and fewer years of formal education. The most important contributors to decreasing the African-American-white gap are: African-Americans' greater age at the time of first home purchase and fewer African-Americans live in the West (a high housing price region).

The Hispanic-white gap in average length of stay in the first home is just over three years. The most important characteristics of Hispanics that contribute to creating the gap are: more live in the West (where durations are lower), lower achievement test scores, larger family sizes, fewer years of formal education, a lower marriage rate, fewer weeks employed, and a lower rate of living in the suburbs. Factors tending to offset the gap are Hispanics' greater age at the time of purchase and fewer live in the Northeast (a high housing price region).

If income and wealth are included in the estimation, the sample size decreases substantially (by about two-thirds) because of missing values. Many of the characteristics of a person that explain income are already in the equation such as education, AFQT, race, and gender. Thus the income variable can be interpreted as picking up other factors that affect income such as job tenure and work effort, and the transitory components of income (e.g. winning the lottery). Wealth is a measure of net wealth. We separate it into two measures: wealth excluding equity in the home (liquid wealth) and home equity.[27] We also included in this estimation the observed mortgage interest rate (30 year-fixed) and the nation's unemployment rate at the time of home purchase.

---

[26] The respondent could be unemployed, but the spouse employed during the year of purchase of a home.

[27] The wealth variables are, at times, top coded in the NLSY; that is, precise information is not revealed about the wealth of very wealthy individuals. To achieve a more consistent set of wealth measures over the 21-year period, we trimmed the data. If the reported value of income, house value or debt, or liquid wealth

We find that neither income nor liquid wealth are statistically significant, though wealth has a positive coefficient and significance level of 0.15. The home equity measure has a negative coefficient and is highly significant ("t-statistic" of 5.5). Thus, low equity households tend to remain owners longer. This finding could be an outcome of the Stein hypothesis discussed above where low equity owners suffer from a type of lock-in. All other variables significant in this estimation have the same sign as reported in Exhibit 25; however, four variables lose their significance when the financial variables are included: Age, African-American, HGC, and Weeks Unemployed. This change likely occurs because of the smaller sample and the correlation of income and wealth with these variables.[28] Both the mortgage interest rate and the unemployment rate at the time of purchase are highly significant (t-statistics of 17.2 and 9.8 respectively) and have negative coefficients implying a shorter duration of the homeownership spell. A high interest rate suggests the first-time owner is more likely to be constrained by the monthly payment-to-income constraint and thus the household is susceptible to shocks. A high unemployment rate suggests that it is difficult to change jobs in case a respondent's current employment is terminated.

4.5   Factors Affecting the Duration of Post-Homeownership Spells of Renting and Living with Others

African-Americans and Hispanics spend more time as a renter or living with others following a spell of homeownership, ceteris paribus. We analyze the durations of 2,453 spells that followed first-time homeownership and 611 spells that followed second-time ownership. The results are in Exhibit 26.

We find that spells as a renter or living with parents following first-time homeownership are greater for African-Americans and Hispanics (unobserved factors), and households with large families. Marriage shortens the length of time out of ownership, as do being older at the beginning of the spell, living in the Northeast, having a higher AFQT score, and being male. The number of individuals with spells out of ownership following second-time owning is relatively small and the equation is not estimated precisely. The only significant coefficients are HGC, central city, and African-American; all have their expected signs.

---

exceeded $500,000 we dropped the spell from the data. One justification is that the goal of this paper is not to understand the choices of very high income and wealth household.

[28]   Note that the lack of significance of the African American variable does not imply that African Americans' durations of stay are the same as whites. Rather, the differences are "explained" by the other variables in the estimation.

Exhibit 26
The Duration of Spells of Renting and Living with Others Following a Spell of Homeownership

	Post First-Time Ownership		Post Second-Time Ownership	
	Coeff.	Std. Err.	Coeff.	Std. Err.
Constant	5.03***	1.49	6.02	6.81
African-American	0.59***	0.14	0.68**	0.34
Hispanic	0.61***	0.19	0.38	0.38
Asian	0.43	0.38	-0.46	0.69
Other Race	-0.09	0.26	0.78	0.92
Male	-0.17	0.10	-0.27	0.26
First Generation	-0.33	0.23	-0.26	0.45
Second Generation	-0.11	0.34	0.29	1.08
AFQT Score	-0.37*	0.23	0.48	0.55
HGC	-1.17	2.69	-9.19*	5.23
Age	-18.18*	10.91	-19.03	45.59
Age-squared	42.37**	19.32	40.34	75.02
Family Size	0.10***	0.36	0.15	0.10
Central City	0.19	0.13	0.52*	0.30
Suburban	0.01	0.13	0.02	0.28
Northeast	-0.42***	0.17	-0.79	0.63
South	-0.15	0.13	-0.49	0.58
West	0.04	0.15	-0.65	0.60
Married	-0.61***	0.13	-0.49	0.42
Divorced/Widowed/Separated	-0.13	0.14	-0.13	0.40
Weeks Worked	-0.02	0.31	-0.02	0.83
Weeks Unemployed	0.13	0.62	1.73	2.40
Poor Health	0.18	0.26	0.02	0.64
Sigma	0.92***	0.06	0.77***	0.12
Total Individuals	2453		611	
Total Observed Years	9657		2054	

Source: Authors' computations using NLSY unweighted data.

Note: significance at the 1 percent, 5 percent, and 10 percent levels are indicated by ***, **, and

Often, a characteristic that lengthens the duration of a spell of homeownership tends to shorten the spell of renting or living with parents following ownership and vice versa. Variables that are significant and have the opposite signs in the duration equations for first-time owning and the first spell of post ownership renting/living with parents are: African-American, AFQT, Age, Family Size, and Married. Variables significant only in the duration of ownership equation are: HGC, Weeks Worked, Weeks Unemployed, Suburban residence, and living in the South and West regions. Only Hispanic is significant in the rental duration equation and not in the ownership estimation. Two variables have conflicting effects: being male and living in the Northeast. Both reduce the duration of owning and renting.

A decomposition of effects indicates that African-Americans remain out of ownership longer for the following reasons (in order of importance): the African-American dummy variable (unobserved factors), lower achievement test scores, a lower rate of marriage, a higher percentage live in the central city, and family sizes are larger. There are no factors that work in the opposite direction. A decomposition of the Hispanic effects shows that, by far, the biggest effect is derived from the Hispanic dummy variable (a longer stay in renting/living with parents). That is, while the included variables help explain the duration of stay in rental units or with parents, the largest explanator of the Hispanic-white gap in duration of stay is composed of unobserved Hispanic characteristics.

Inclusion of income and wealth in the regression reduces the sample size by more than half. The coefficient of liquid wealth is negative, as expected, but it is not significant. In contrast, family income's coefficient is negative and significant at the 5 percent level. Thus, as expected, high income reduces the time spent out of ownership. The coefficients of the African-American and Hispanic dummy variables remain positive and significant. Perhaps due to the smaller sample size or the correlation of the variables with income, age, age-squared, family size, and married are no longer significant. The variable, First Generation, is negative and significant. Both the national unemployment rate and the mortgage interest rate are significant and negative, implying a shorter duration is spent renting when these two beginning-of-the-spell measures are high.[29]

In this estimation that includes the financial variables, the predicted distribution of durations of time spent renting/living with parents after first-time ownership is 5.3 years (75 percent of those beginning the spell), 8.9 years (median time spent in the spell), and 13.5 years (25 percent of those beginning the spell). The predicted racial differences in length of stay are substantial: 10.7 years for whites, 14.4 years for African-Americans, and 14.3 years for Hispanics. These differences contribute to the racial gap in homeownership rates.

4.6   The Impact of Time-Varying Variables on the Duration of Homeownership

We have found that the duration of ownership is predictable using the set of characteristics of a person that are observable at the time of home purchase. This finding is important because if a person has characteristics that suggest sustaining ownership is risky, then policy interventions can be targeted toward that household type (e.g. ownership education programs).

Another question is whether changing household level socio-economic characteristics or macroeconomic characteristics affect the duration of owning. We add to the list of explanatory variables a set of measures that change compared with the value at the time of purchase. For

---

[29]   A possible explanation for this outcome is that individuals who begin a spell of post-ownership renting when the national unemployment rate is high are ones who are particularly susceptible to the negative effects of a recession. A possible example is the 2001-2002 downturn where job security in information technology jobs worsened substantially. But, it seems likely that these individuals will quickly regain employment and return to homeownership. The result would be a negative correlation of the national unemployment rate, measured at the beginning of the rental spell, and the duration of the spell.

example, the anticipated effect of a rising mortgage interest rate was discussed above (mortgage lock-in) as was the effect of falling home equity (equity lock-in). Increased nonhousing wealth should extend duration because of the greater cushion against an unexpected decrease in income or costly home repairs that could cause the loss of a home. Increasing income should allow for greater leeway in meeting monthly payments.[30]

Changes in demographic factors likely affect the duration of owning. A divorce could lead to one of the partners moving to a rental unit or back to his or her parents' household. A marriage of a single homeowner could lead to geographic relocation and the possibility of renting or it might lead to greater stability in family resources, extending the stay in ownership. Geographic relocation of a homeowner could lead to the termination of a spell of owning. Increasing unemployment could cause the termination of a spell of owning as could a decreased number of weeks worked.

The results of the estimation for first and second-time ownership are presented in Exhibit 27. This estimation is based on the larger sample, omitting income and wealth. Its companion is Exhibit 25, a regression with the same dependent variable but without the time varying variables.

Exhibit 27
The Duration of Spells of Homeownership – Time Varying Explanatory Variables

	First-Time Owner		Second-Time Owner	
	Coeff.	Std. Err.	Coeff.	Std. Err.
Constant	-1.62**	0.43	-3.52***	1.06
African-American	-0.11***	0.03	-0.10*	0.06
Hispanic	0.00	0.04	-0.02	0.07
Asian	-0.24**	0.11	-0.40**	0.19
Other Race	-0.06	0.06	0.18	0.13
Male	-0.09***	0.02	-0.20***	0.19
First Generation	0.04	0.06	-0.13	0.09
Second Generation	0.08	0.08	-0.15	0.11
AFQT Score	0.32***	0.06	0.18*	0.10
HGC	0.58	0.65	1.59	1.10
Change HGC	0.12***	3.08	0.15**	0.07
Age	17.46***	2.39	29.58***	5.70
Age-squared	-18.01***	8.62	-38.92***	8.62
Family Size	-0.03***	0.01	-0.02	0.02
Change Family Size	0.05***	0.01	0.06**	0.03
Married	0.48***	0.03	0.28***	0.06
Change Married	0.45***	0.06	0.38*	0.21
Divorced/Widowed/Separated	-0.07	0.05	-0.13*	0.07

---

[30] This positive effect might not occur if a household with rising income or wealth traded-up in house value, recreating binding down payment and/or monthly payment constraints. In this case, the risk of terminating a spell of ownership might not fall noticeably.

Exhibit 27 *(Cont.)*
The Duration of Spells of Homeownership – Time Varying Explanatory Variables

	First-Time Owner		Second-Time Owner	
	Coeff.	**Std. Err.**	**Coeff.**	**Std. Err.**
Change D/W/S	0.09	0.08	0.17	0.22
Weeks Worked	0.57***	0.08	0.57***	0.15
Change Weeks Worked	0.34***	0.10	0.49***	0.19
Weeks Unemployed	-0.32**	0.17	-0.03	0.40
Change Weeks Unemployed	-0.25	0.19	0.19	0.42
Poor Health	-0.06	0.16	0.00	0.10
Change Poor Health	-0.13*	0.07	0.03	0.11
Central City	-0.04	0.03	-0.07	0.05
Change Central City	0.04	0.06	0.12	0.12
Suburban	0.04	0.03	-0.05	0.05
Change Suburban	-0.13**	0.06	0.28***	0.11
Northeast	-0.16***	0.04	-0.14*	0.08
Change Northeast	-0.05	0.23	-0.68*	0.38
South	-0.17***	0.03	-0.18***	0.06
Change South	-0.09	0.15	0.53	0.35
West	-0.21***	0.04	-0.22***	0.06
Change West	-0.17	0.20	0.04	0.38
National Unemployment Rate	-6.20***	1.30	-7.54***	2.48
Change Unemployment Rate	-8.53***	1.13	-16.59***	2.48
Mortgage Interest Rate	-3.01***	0.90	-3.30	2.15
Mortgage Interest Rate Up	20.31***	3.36	55.62***	14.71
Mortgage Interest Rate Down	-24.15***	1.12	-40.27***	3.30
First Spell Duration	--	--	0.01	0.01
Sigma	0.54***	0.01	0.49***	0.02
Total Observed Years	31351		7889	
Total Individuals	5355		1655	

Source: Authors' computations using NLSY unweighted data.

Note: Significance at the 1 percent, 5 percent, and 10 percent levels are indicated by ***, **, and *.
Unemployment and Mortgage Interest Rate are measured in percent, e.g. 6.00.

The results in Exhibit 27 support those reported in Exhibit 25 and they provide strong evidence that post-purchase changes affect the duration of spells of homeownership. For most variables, their post-purchase changes reinforce the initial effect of the variable on duration. For example, the greater number of weeks worked at the time of purchase, the longer the duration of owning. Further, the more Weeks Worked increases following the start of the ownership spell, the greater is the duration of owning. A similar effect is found for the national unemployment rate, where a high rate at the time of purchase reduces the expected duration of owning and an increasing unemployment rate further decrease expected duration. We find that the greater is the initial mortgage interest rate, the shorter is expected duration. If the interest rate rises further, duration is extended, an example of mortgage

lock-in. Interestingly, if the interest rate falls (a negative number), then duration also is extended. This may occur because of mortgage refinancing, which relaxes the monthly payment-to-income constraint, providing a buffer against income shocks. Locational changes following the time of purchase tend not to affect duration.[31] Increases in education positively affect duration while worsening health following the purchase of a home decreases duration of first-time ownership. A larger family size at the time of purchase tends to decrease duration, but subsequent increases in size lengthen duration. Finally, if a single or divorced homeowner marries, duration is substantially extended.

The estimate of the parameter, sigma, that determines the shape of the baseline hazard function is now substantially less than one, implying a strongly upwards sloping hazard rate. It rises sharply from near zero in year 1 (no one leaves ownership unless one of the time varying variables changes in a way that raises the probability of termination such as Weeks Worked falls). In year 3 the hazard is 0.08, by year 6 it is 0.18, by year 10 it is about 0.30.

The final estimation of the duration of homeownership adds the financial variables to the model, which, as before, results in a much smaller sample.

Exhibit 28
The Duration of Spells of Homeownership – Time Varying Explanatory Variables including Financial Measures

	First-time Owner		Second-time Owner	
	Coeff.	Std. Err.	Coeff.	Std. Err.
Constant	-4.46***	0.81	-4.11***	1.35
African-American	-0.10*	0.05	-0.16**	0.07
Hispanic	0.07	0.06	0.10	0.09
Asian	-0.16	0.17	-0.13	0.24
Other Race	-0.03	0.09	0.41	0.15
Male	-0.05	0.03	-0.18***	0.05
First Generation	0.06	0.09	-0.12	0.12
Second Generation	0.11	0.11	-0.29*	0.16
AFQT Score	0.19**	0.08	0.17	0.12
HGC	1.06	0.96	2.22	1.44
Change HGC	13.61***	4.66	3.76	7.69
Age	34.74***	4.41	30.25***	7.02
Age-squared	-45.88***	7.07	-39.24***	10.69
Family Size	-0.02	0.02	-2.28	1.79
Change Family Size	0.05**	0.02	0.10***	0.03
Married	0.28***	0.05	0.21***	0.08
Change Married	0.31***	0.10	0.17	0.27

---

[31]   Because the focal variable is the length of spell in a particular tenure, there can be moves in the middle of a spell with no change in tenure.

Exhibit 28 *(Cont.)*
The Duration of Spells of Homeownership – Time Varying Explanatory Variables including Financial Measures

	First-time Owner		Second-time Owner	
	Coeff.	Std. Err.	Coeff.	Std. Err.
Divorced/Widowed/Separated	-0.10	0.07	-0.15*	0.09
Change D/W/S	0.14	0.12	0.14	0.28
Weeks Worked	0.82***	0.13	0.74***	0.19
Change Weeks Worked	0.36**	0.17	0.32	0.26
Weeks Unemployed	0.28	0.32	0.20	0.51
Change Weeks Unemployed	-0.23	0.35	0.19	0.54
Poor Health	-0.10	0.10	-0.03	0.14
Change Poor Health	-0.06	0.14	-0.11	0.08
Central City	-0.02	0.04	-0.07	0.06
Change Central City	0.09	0.11	0.17	0.14
Suburban	0.12***	0.05	0.02	0.06
Change Suburban	0.20*	0.11	0.47***	0.15
Northeast	-0.13**	0.06	-0.19**	0.09
Change Northeast	0.00	0.33	-0.35*	0.41
South	-0.19***	0.04	-0.22***	0.06
Change South	-0.16	0.21	0.42	0.40
West	-0.24***	0.05	-0.31***	0.08
Change West	-0.54*	0.31	-0.24	0.40
National Unemployment Rate	-10.29***	2.38	-7.54***	3.26
Change Unemployment Rate	-22.66***	2.07	-24.26***	3.11
Mortgage Interest Rate	-0.10	2.15	-3.30	3.26
Mortgage Interest Rate Up	39.53***	14.63	52.25***	17.25
Mortgage Interest Rate Down	-40.05***	2.58	-46.68***	4.32
First Spell Duration	--	--	0.01	0.01
Income	0.00	0.10	-0.15	0.11
Change Income	-0.01	0.03	0.03	0.12
Liquid Wealth	0.07	0.09	0.03	0.06
Change Liquid Wealth	0.13***	0.05	0.07	0.08
Home Equity	-0.18***	0.08	-0.12**	0.05
Change Home Equity	0.07	0.05	-0.06	0.10
Sigma	0.49***	0.02	0.42***	0.03
Total Observed Years	10742		3604	
Total Individuals	2196		925	

Source: Authors' computations using NLSY unweighted data.

Note: significance at the 1 percent, 5 percent, and 10 percent levels are indicated by ***, **, and *.

Neither income nor the increase in income is significant. Perhaps the number of weeks worked and its change captures the income effect, as both of those are significant. The initial level of liquid wealth is not significant but increasing liquid wealth extends the duration of stay in homeownership. The initial level of home equity again has a negative effect on duration. The change in home equity has a positive sign, implying that increasing equity increases duration, but the coefficient is not statistically significant.

How important are the post-purchase changes? On average, discounting the change in age and national variables (unemployment and mortgage interest rates), changes in household characteristics are not important; they only increase the duration of stay by about one year. But, on average, many of the household level changes tend to offset; for example, some individuals marry while others divorce. Specific changes have larger effects. For example, the expected length of a spell of ownership falls by two years for an individual who reduces weeks worked by 30 in a year, increases weeks unemployed by the same amount, loses half of the family's income and wealth. Expected spell length falls by 2.5 years for a married individual who divorces and family income and liquid wealth fall by half. In a third example, a divorced homeowning individual marries, doubles family income and wealth, and moves from the central city to the suburb. The result is that the expected length of homeowning spell rises substantially by 4.8 years.

Our final estimation was for the post-ownership spell of renting or living with parents. None of the changes in household characteristics are significant (thus the results are not shown). However, both a falling unemployment rate and reductions in the mortgage interest rate significantly reduce the length of time spent out of homeownership. Thus, a healthy macroeconomic climate helps to induce past homeowners back into homeownership.

Section 5 Conclusions and Policy Implication

The nation's homeownership rate is affected by both the length of time that households stay in spells of owning rather than renting and the length of time that households spend in spells of renting or living with parents following spells of owning. Thus, differences in ownership rates between African Americans, whites, and Hispanics could be due, in part, to differences in their durations of owning, renting, and living with parents.

5.1 Results

This study used a national data set (the National Longitudinal Survey of Youth-NLSY) that reports the results of 18 surveys over a 21-year period. The surveys describe respondents' residence histories and the time spent in each type of housing tenure. This data set also provides extensive information about the socio-demographic characteristics of individuals. The respondents are relatively young, the oldest reaching age 42 by the year 2000.

We distinguish between the length of stay in a particular dwelling and the duration of stay in a spell of homeownership. All existing published studies focus on the length of stay in a particular dwelling (either owner or rented), or on the time to mortgage default. While these studies are of interest for particular questions, they do not provide the needed information to determine whether different lengths of continuous spells of owning or renting contribute to racial gaps in homeownership rates.

Data describing ownership and rental spells yield a number of insights about homeownership rates and durations of stay in owned and rented dwellings. In our cohort, African-Americans' ownership rate lags that of whites by 34 percentage points in the year 2000 when respondents were on average 38 years old. The Hispanic-white gap is 25 percentage points. We find that over the survey's 21-year span, African Americans trailed whites in ever attaining first-time homeownership by 24 percentage points and Hispanics lagged by 12 percentage points. However, these differences are smaller than the differences in homeownership rate, suggesting that factors other than achieving first-time homeownership are influential. We find that whites are homeowners 250 percent more often during ages 21 to 34 than are African-Americans and 155 percent more than Hispanics. The minority-white gaps are smallest for both the attainment of first-time homeownership and the percentage of time spent as an owner when respondents' level of education is high—at least some college education has been completed. This finding suggests that additional education could be an effective policy tool to address racial gaps in ownership.

We find strong evidence that the cliché "once an owner, always an owner" is false. Terminations of first-time homeownership are substantial and there are significant racial differences. Overall, the termination rate of homeownership spells by African-Americans is 240 percent of the rate for whites while the rate for Hispanics is 168 percent of whites. These greater annual rates of terminating spells of homeownership indicate that the duration of stay in homeownership is shorter for African-Americans and Hispanics than whites.

In our formal analysis, we find that, on average, all spells of ownership are longer for whites than Hispanics or African-Americans. The average length of completed stay by a typical first-time white, African-American, and Hispanic homeowner is estimated to be: 16.1, 9.5, and 12.5 years. This difference in duration is substantial and clearly will cause differences in homeownership rates. Similar patterns are observed for subsequent spells. Most of the differences in predicted lengths of stay are due to differences in the socio-economic endowments of individuals, but some are due to unobserved variables.

In the spells of renting or living with parents after terminating homeownership, we again find that the average spell length is over ten years and minorities' average duration is greater than that of whites by 3.5 to 4 years. Thus, it is difficult to return to ownership once a spell has been terminated suggesting that policy makers ought to focus on sustaining first-time spells of ownership.

We conclude the econometric analysis by expanding the set of explanatory variables to include time varying attributes of households and the economy. We find that post-purchase changes in a household's or the economy's characteristics are important explanators of the duration of homeownership. In particular, terminations are more likely when a household's weeks worked falls, when it suffers a loss of wealth, and when the national unemployment rate rises. They are less likely when a household moves to the suburbs or if mortgage interest rates change compared to the rate at the time of purchase. The only time varying variables we found to be important in the post-ownership rental spell length estimation were the unemployment rate and mortgage interest rate. Reductions in either shorten this spell's expected length.

A question that remains unanswered is the relative contribution to the total white-minority homeownership rate gap of differences in rates of attaining first-time homeownership, differences in the length of ownership spells, and differences in the length of post-ownership rental spells. Solving this problem requires that a Markov type model (Rosenthal 1988) be applied to the estimated transition rates, and simulations conducted to determine the effect on ownership rates.

5.2   Policy Implications

As a result of the national concern about a decreasing homeownership rate throughout the 1980s and into the 1990s and concern about substantial differences in ownership rates between whites and minorities, substantial effort has been devoted to increasing ownership rates. Many of these policies (see Haurin, Rosenthal, Herbert, and Duda (2004) for a summary) have focused on increasing the accessibility of first-time homeowning. The analysis conducted in this study supports continuing these policies. There are still substantial gaps between whites and minorities in the rate that first-time homeownership is achieved.

However, policies that promote only temporary spells of homeownership will have little impact on the national homeownership rate. To have a lasting impact on overall homeownership rates, policies must promote new ownership spells that are sustainable. Furthermore, policies that lengthen existing ownership spells also will raise the national ownership rate, even if the rate of attaining first-time or a subsequent spell of ownership is not affected.

Our study provides strong evidence that there are substantial differences in the duration of all spells of ownership between white, African-American, and Hispanic households. These differences, combined with longer stays in rental units or living with parents by minorities result in substantially less time spent as a homeowner. Several recent studies have noted the benefits of homeownership for children, and these benefits are permanently lost if young minority adults rent for a substantial part of the time when they are raising their child (Haurin, Parcel, and Haurin 2002; Green and White 1997).

An implication of our analysis is that, just as there is public concern about the gap in homeownership rates between whites and minorities, there should be concern about the gap in the duration of stay in owned homes between whites and minorities. This concern justifies consideration of new policies, specifically ones that address the racial differences in the duration of homeownership. A number of personal attribute measured at the beginning of a spell of homeownership signal that a household is at risk of a quick termination: low education, low levels of knowledge, relative youth, being single, divorced or separated, living in a central city or rural area, and living in a region other than the North Central. Quick terminations also are more likely when the national economy is characterized by high unemployment and high mortgage interest rates at the time of home purchase. Besides these attributes measured at the time of home purchase, other signals of quick terminations include a loss of household wealth, falling weeks worked, a worsening national economic climate, and divorce or separation.

What general policies are called for? Factors shown to be important in both the descriptive and formal analysis are education and knowledge. A simple policy is to target those households at risk of quick termination of homeownership and provide education that raises their level of knowledge about the risks that lead to terminations of homeownership. Obviously, counseling programs fit this description. The needed programs should focus on sustaining the first spell of homeownership. They should also be continuing, not just provided at the time of home purchase. Our study shows that post-purchase events affect the length of stay in ownership, thus educational and counseling resources should continue to be available to households who are at risk.[32]

Finally, good national measures of the duration of ownership spells should be developed. Data are available quarterly that describe the homeownership rate in substantial detail (by age, by race, by location). There also have been efforts to count the number of first-time homebuyers, in part, to measure the success of policy interventions. What is now needed is a continuing national data set that describes the length of stay of individuals in owned and rented units. Carefully worded retrospective questions can be used to gather this important information about the duration of spells of ownership and renting.

---

[32]   A general review of policies that help to sustain homeownership is in Belsky and Herbert (forthcoming).

Bibliography

Belsky, Eric and Christopher Herbert. Forthcoming. "The Homeownership Experience of Low-Income Households: A Review of the Literature," U.S. Department of Housing and Urban Development.

Boehm, Thomas P. 1981. "Tenure Choice and Expected Mobility: A Synthesis," *Journal of Urban Economics* 10: 375-389.

Boehm, Thomas P. and A. Schlottmann. 2004. "The Dynamics of Race, Income and Homeownership," *Journal of Urban Economics* 55:113-130.

Capone, Charles A. Jr. 1996. "Providing Alternatives to Mortgage Foreclosure: A Report to Congress," U.S. Department of Housing and Urban Development, Office of Policy Development and Research.

Center for Human Resource Research. 1999. *NLSY79 User's Guide*. Columbus OH.

Chan, Sewin W. 2001. "Spatial Lock-In: Do Falling House Prices Constrain Residential Mobility?" *Journal of Urban Economics* 49: 567-586.

Deng, Yongheng and Stuart A. Gabriel. 2002. "Enhancing Mortgage Credit Availability among Underserved and Higher Credit-Risk Populations: An Assessment of Default and Prepayment Option Exercise among FHA-Insured Borrowers," FBE Working Paper 1491.

Deng, Yongheng, Stuart A. Gabriel, and Frank E. Nothaft. 2003. "Duration of Residence in the Rental Housing Market," *Journal of Real Estate Finance and Economics* 26: 267-285.

Engelhardt, Gary V. 2003. "Nominal Loss Aversion, Housing Equity Constraints, and Household Mobility," *Journal of Urban Economics* 53: 171-195.

Genesove, David, C. J. Mayer. 2001. "Loss Aversion and Seller Behavior: Evidence from the Housing Market," *Quarterly Journal of Economics* 116: 1233-1260.

Green, Richard and Michelle White. 1997. "Measuring the Benefits of Homeowning: Effects on Children," *Journal of Urban Economics* 41: 441-461.

Greene, William H. 1995. *Limdep Version 7.0 User's Manual*. Econometric Software Inc.: Bellport NY.

Gronberg, Timothy J. and W. Robert Reed. 1992. "Estimation of Duration Models Using the Annual Housing Survey," *Journal of Urban Economics* 31: 311-324.

Haurin, Donald R. and K. B. Lee. 1989. "A Structural Model of the Demand for Owner-Occupied Housing", *Journal of Urban Economics*, 26, 348-360.

Haurin, Donald R., Toby Parcel and R. Jean Haurin. 2002. "Does Home Ownership Affect Child Outcomes," *Real Estate Economics*, 30, 635-666.

Haurin, Donald R., Stuart Rosenthal, Christopher Herbert, and Mark Duda. 2004. "Homeownership Gaps Among Low-Income and Minority Borrowers and Neighborhoods," Abt Associates: Cambridge MA.

Hendershott, Patric H. and S. C. Hu. 1982. "Accelerating Inflation, Nonassumable Fixed Rate Mortgages, and Consumer Choice and Welfare," *Public Finance Quarterly* 10: 158-184.

Henderson, J. Vernon and Y. M. Ioannides. 1989. "Dynamic Aspects of Consumer Decisions in Housing Markets," *Journal of Urban Economics,* 26, 212-230.

Henley, A. 1998. "Residential Mobility, Housing Equity, and the Labour Market," *Economic Journal* 108: 414-427.

Herbert, Christopher, Debbie Gruenstein, and Kimberly Burnett. 2000. "An Assessment of FHA's Single-Family Mortgage Insurance Loss Mitigation Program," Cambridge, MA: Abt Associates, Inc.

Kalbfleisch, John D. and Ross L. Prentice. 1980. *The Statistical Analysis of Failure Time Data*. Wiley: New York.

Masnick, George S. 2001a. "Home Ownership Trends and Racial Inequality in the United States in the 20th Century," Working paper W01-4, Joint Center for Housing Studies: Harvard University.

Masnick, George S. 2001b. "The New Demographics of Housing," Working Paper W01-11, Joint Center for Housing Studies: Harvard University.

Office of Policy Development and Research. 2003. *U.S. Housing Market Conditions, Historical Data*, Department of Housing and Urban Development, Washington D.C. 2003.

Quigley, John M. 1987. "Interest Rate Variations, Mortgage Prepayments and Household Mobility," *Review of Economics and Statistics* 49: 636-643.

Rosenthal, Stuart S. 1988. "A Residence Time Model of Housing Markets," *Journal of Public Economics* 36: 87-109.

Stein, Jeremy C. 1995. "Prices and Trading Volume in the Housing Market: A Model with Downpayment Effects," *Quarterly Journal of Economics* 110: 379-406.

Zorn, Peter M. 1988. "An Analysis Of Household Mobility and Tenure Choice: An Empirical Study of Korea," *Journal of Urban Economics* 24: 113-128.

Zuehlke, Thomas W. 1987. "Duration Dependence in the Housing Market," *Review of Economics and Statistics* 69: 701-704.

Appendix
Econometric Assumptions of the Duration Model

There are various approaches to estimating the impact that variables have on the duration of an event. These duration models are known by multiple terms: survival models, failure time models, hazard rate models. The relationship between the likelihood of a "failure" (the termination of a spell) and survival is mathematically determined depending on the assumptions of the model. The survival function S(t) describes the probability, at time t, of observing an activity that began at time 0. The hazard function h(t) describes the probability that a spell will end at time t, conditional on having survived up to that time. Hazard functions are a useful way of describing the likelihood of observing a termination of a spell, such as homeownership.

There are different classes of duration models. We chose to use parametric models because of their relatively straightforward interpretation. The most restrictive is the exponential form of the survival function, where the implied hazard rate is constant. This assumption is overly restrictive for homeownership because we expect the hazard rate to vary over time. An alternative is the Weibull assumption. Here, the hazard rate is either always falling, always rising, or constant. This assumption is more general than the exponential form, but is still restrictive compared with more complicated models.

Kalbfleisch and Prentice (1980) note that the hazard function under the Weibull distribution assumption is $\lambda p(\lambda t)^{p-1} \exp(x\beta)$ where $p = 1/\sigma$ (σ is listed as "sigma" in the tables of results). If $p = 1$, then the hazard simplifies to be: $h(t) = \lambda \exp(x\beta)$. That is, the hazard is a constant, shifted multiplicatively by the covariates. If $p > 1$ (sigma < 1), then the hazard rate rises over time and it falls if $p < 1$ (sigma > 1), assuming the covariates are time invariant. In terms of the survival time, the model is linear: $\log S(t) = \alpha + x\beta + \sigma w$ where $\alpha = - \log \lambda$ and w has an extreme value distribution. The estimation method is maximum likelihood (Greene 1995). The estimation method with time varying covariates is discussed on pages 736-737.