Cohort Estimation of Homeownership Attainment among Native-Born and Immigrant Populations

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Abstract

This article proposes a cohort method for modeling longitudinal changes in homeownership attainment. Theory underlying the method draws on two research traditions: labor economists' research on the economic mobility of immigrants and housing economists' research on homeownership over the life cycle.

The modeling technique was applied to native-born, non-Hispanic whites, native-born Mexican Americans, and Mexican immigrants and was used to estimate trajectories of homeownership attainment by birth cohort and arrival cohort from 1980 to 1990. The results show that temporal factors such as cohort membership, aging, and duration of U.S. residence are strong predictors of homeownership attainment. The results also show that the adjusted homeownership trajectories of younger native-born, non-Hispanic whites and Mexican Americans lag behind those of older cohorts.

Keywords: homeownership; immigrants; cohorts

Introduction

In the field of housing economics, the correct modeling of the longitudinal progress of native-born groups in the housing market has been a controversial subject, at least in part because of the different ways that the impact of age on housing demand has been treated in the literature. Statistical analysis of immigrants' rate of progress into homeownership poses an even greater challenge to housing researchers because immigrant housing demand unfolds in a more complex temporal context. Like that of native-born residents, the housing demand of immigrants is set in historical time, involves differences among birth cohorts, and evolves over the life cycle. Immigrant demand is also shaped, however, by differences among immigration cohorts and by duration of U.S. residence.

Housing progress can be adequately observed only over a long period of time, but in that time many changes take place. Housing market conditions vary from decade to decade, and as time passes, successive waves of immigrants enter the market and successive generations of young adults reach maturity. At the same time, all the existing residents grow older, and

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immigrants grow progressively more settled as their time in the United States lengthens. Separating these distinct temporal effects presents serious analytical challenges. The cohort methodology used in this article goes far toward meeting those challenges.

We accomplish three specific objectives in the article. First, we present a cohort approach to longitudinal modeling of homeownership attainment. Second, we use the cohort methodology to analyze homeownership attainment between 1980 and 1990 for two native-born groups: non-Hispanic white males and Mexican-American males. The cohort applications for these native-born groups involve only birth cohorts. Third, we use a double cohort model, incorporating both birth and immigration cohorts, to compare the homeownership attainment of Mexican immigrants with that of the two native-born groups.[1] We conclude with an assessment of the usefulness of cohort modeling of homeownership among both native-born residents and immigrants in general.

The study reported in this article is part of the Fannie Mae Foundation Immigration Research Project, a multiyear study of the impact of immigration on housing consumption in the United States. It presents a statistical analysis of the progress that several populations have made toward achieving homeownership. Immigrant trajectories into homeownership are compared with the trajectories of native-born groups, with consideration given to the effects of aging and time spent in the United States. These cohort trajectories are modeled in relation to income, education, and marital status of the population, and they take into account the local prices of both renting and owning.

Modeling of Economic Progress and Homeownership

The recent resurgence of large-scale immigration to the United States has kindled many debates. One of the central questions regarding immigration is the rate at which new immigrants are incorporated into the mainstream of American society and the economy. The long-standing term for this process is *assimilation*. Homeownership is one of the most important milestones in the assimilation process. A home of one's own is the most visible reward for hard work and is in itself a means of further economic advancement. In these senses, it is closely tied to economic assimilation. But homeownership has great symbolic meaning; it is more than an outcome of economic advancement.

The rate at which immigrants become homeowners is thus an important question, made complex by a combination of temporal effects. Drawing on research on both homeownership and the economic mobility of immigrants can help separate these temporal effects. Both homeownership and immigrant economic mobility have been extensively analyzed using census data that measure changes in behavior or status between decades. Periodic surveys such as the Current Population Survey and the American Housing Survey provide more frequent data coverage, but no source matches the census for its large sample size, which makes possible detailed analyses of specific groups in specific metropolitan areas. Economic mobility and homeownership research both rely on census data, but they have been per-

[1] We study Mexican immigrants because they are the largest single country-of-origin group in the United States and are projected to account for one-quarter of the growth in the foreign-born population in the next 20 years (Pitkin and Simmons 1996). Understanding the housing market progress of Mexican immigrants also has special importance because their economic status and ownership attainment are currently among the lowest in the United States.

formed by entirely different groups—labor economists on the one hand and housing economists on the other. Nevertheless, the shared source of data and the similarity of temporal issues hold the potential for exchanges of analytical lessons between the two areas.

Economic Mobility of Immigrants

Labor economists have proposed a number of models for measuring immigrants' economic advancement over time. The earliest research on immigrant assimilation using census data is that of Chiswick (1978). Taking advantage of a question on year of arrival that was introduced in the 1970 census, Chiswick estimated a standard labor force model that predicted earnings based on years of experience (embedding age), educational endowment, and years since migration (YSM). The coefficient on YSM was interpreted as the growth in earnings that corresponded to the lengthening duration of U.S. residence. Of course, this variable did not actually represent the longitudinal experience of immigrants but rather the difference between groups with longer or shorter durations of U.S. residence as observed in 1970. Those differences combined both real gains attributed to duration and permanent differences between earlier, more successful arrivals and later, less successful arrivals, thus exaggerating the apparent effect of duration. Nevertheless, Chiswick concluded from his cross-sectional model that immigrant workers would surpass the earnings of otherwise similar native-born residents in less than 15 years. This finding attracted much attention, especially from those who favored higher immigration because of a perceived stronger work ethic.

The Chiswick method and finding were both overturned in a widely referenced article by Borjas (1985) that exploited new data from the 1980 census together with those from the 1970 census. The results of Borjas's model, which traced immigrant cohorts from 1970 to 1980, suggested that immigrants were faring less well than native-born residents, the opposite of Chiswick's conclusion. Borjas attributed the divergent findings to the lower quality of recent immigrants, who were tracking on permanently lower earnings trajectories. This intercohort difference exaggerated the immigration duration effect when more established immigrants were compared with newcomers.

Despite this major insight, the Borjas model failed in another respect. Age in the Borjas model was not observed as the longitudinal aging of cohorts but as a simple cross-sectional difference. This "age cohort fallacy" (Pitkin and Myers 1994) makes the same conceptual error regarding age that Borjas accused Chiswick of making regarding duration.[2] Younger cohorts are entering the economy on lower trajectories than their parents (Levy and Michel

[2] The "age cohort fallacy" erroneously assumes that an age profile of housing consumption rates observed at one point in time defines the future path of a cohort as it ages. In fact, the opposite is true: The age profile is derived from a cross section comprising a series of different cohorts that have reached respectively older ages at the time of observation. These cohorts have unique histories of housing consumption as reflected in their respective trajectory levels of demand as they pass across age groups. The cross section is a "snapshot" at a single moment in time that cuts across these successive cohorts. The differences in demand observed among successive cohorts are due in part to differences in aging and in part to differences in their trajectory levels. The assumption that any cohort would follow the cross section observed across cohorts is sustainable only if the cohorts are tracking on the same levels and with the same aging patterns. The danger of this assumption is that it implies, for example, that the per capita housing demand of 60-year-olds in 1990 is the same as that of 60-year-olds in 1950 (which we know to be vastly different) or that the per capita housing demand of 30-year-olds in 1990 will elevate to the superior level of currently observed 60-year-olds once they reach that age in 2020 (an unlikely event).

1991); when the achievements of old and young are compared, this fact creates the cross-sectional illusion of economic advancement because of aging alone.

The underlying problem that needs to be addressed is temporal identification. Temporal variables are synchronic and collinear: As time passes from one period to the next, new cohorts enter the labor or housing markets, and existing cohorts grow older and their duration of U.S. residence increases. Controlling for one or two of these variables also controls for other temporal factors through their mutual identification. Demographers recognize the potential for temporal misspecification as the classic age-period-cohort identification problem (Mason and Fienberg 1985). A method for addressing this identification problem is given below.

Homeownership over the Life Cycle

The analysis of homeownership using census data parallels that of economic mobility but has a shorter tradition of analyzing immigrants. Early analysts constructed life-cycle models of housing demand that used age—as observed in a single cross section of data—as a proxy for the dynamic behavior that accompanies aging (Campbell 1966; Maisel 1966). Most studies in recent years have continued to rely on cross-sectional formulations of how age affects housing demand (e.g., Green 1996; Green and Hendershott 1996; Gyourko and Linneman 1997; Hendershott 1988, and Mankiw and Weil 1989). Such studies assume that the consumption decisions of a cohort in one decade are independent of those in previous decades and do not take into account the fact that the same people occupy successive age groups in successive decades.

The assumption of continuity across time has been found valid in many instances but is especially relevant in the case of homeownership.[3] Homeownership is a quasi-cumulative status attainment: The majority of owners reside in the same units from one decade to the next and accumulate home equity over time, rarely trading down until extreme old age (Megbolugbe, Sa-Aadu, and Shilling 1997; Myers and Pitkin 1995). As is well known, the extreme inertia in the housing market makes housing far different from other goods and services where consumption decisions are made more frequently. The cohort approach is well suited to such a context.

The difference between the two approaches—cross-sectional and cohort—became more acute when researchers in the two traditions reached opposite conclusions about likely homeownership trends in the 1990s. In 1980, the peak per capita rates of housing demand were found at about age 45, with lower rates for older groups. On the basis of this cross-sectional pattern, Mankiw and Weil (1989) foresaw decreasing housing prices as the demand of the baby boom generation slid down the cross-sectional slope. Mankiw and Weil were soundly criticized by housing economists on several grounds, but few observed the age cohort fallacy in their argument.

[3] Research conducted at the MIT–Harvard Joint Center for Urban Studies during the 1970s and 1980s applied a demographic formulation to better forecast housing consumption, leading to a new tradition that emphasizes trajectories of cohorts over time (Myers 1982; Pitkin and Masnick 1980).

With the leading edge of the baby boom generation turning 45 in 1990, it was important to learn whether or not households would indeed spend less on housing as they grew older. Pitkin and Myers (1994) directly attacked the temporal structure of Mankiw and Weil's age cohort fallacy, while others began to test the effect of different endowments of different age groups. Green and Hendershott (1996) created partial derivatives with respect to age that remove important disadvantages of older cohorts—particularly their low education—and appear to yield homeownership rates adjusted by age that are purged of these permanent intergenerational differences in endowments. A key factor is that education levels have risen monotonically throughout the 20th century for each successive cohort of 25-year-olds until the most recent (Spain and Bianchi 1996, table 3.1); hence, the education trend covaries with recency of cohort. As a result, the Green and Hendershott results potentially confound the pure endowment effects of education with an indirect measure of cohort membership, as discussed more fully below.

Clear identification of cohort continuities over time is important because cohort momentum is an important factor that enables forecasts of future consumption (Pitkin and Masnick 1980). One apparent paradox revealed by the 1990 census was that ownership rates of the elderly rose by several percentage points at the same time those for young adults dropped several percentage points (Myers et al. 1992). Rather than assume that people over 60 were buying more homes, the only reasonable explanation for rising ownership was the aging of late-middle-aged persons into elderly age groups. Most of these older homeowners had owned the same homes for more than 20 years (Myers and Pitkin 1995), but now cohort momentum was carrying them and their high homeownership rates into the elderly age bracket. Indeed, one study of a sample of metropolitan areas revealed that the strongest predictor of elderly homeownership rates was not income, or the relative costs of owning and renting, but the lagged effect of homeownership attainment when the cohort members were a decade younger (Pitkin 1990).

Linking Homeownership and Immigrants

The literatures on immigrant economic mobility and homeownership face a common methodological challenge. Data limitations severely restrict longitudinal analysis, forcing analysts to rely on census data collected once a decade. Panel data would be preferred, but available data sets have fairly small sample sizes, do not trace individuals throughout their lives, and suffer from panel attrition that renders the sample less representative. Moreover, panel data do not provide enough historical depth to allow comparison of different cohorts. A few panel studies have focused on homeownership over limited age ranges, with especially useful studies by Don Haurin and his associates (Haurin, Hendershott, and Wachter 1996), but the limitations of panel data sets are especially severe with regard to immigrants (Edmonston 1996).

Initial research on the housing consumption of immigrants has largely been conducted from a cross-sectional perspective, using a single census year and estimating differences across age groups or duration groups (Alba and Logan 1992; Krivo 1995). A pioneering economic study of immigrant homeownership in Australia by Bourassa (1994) found a strong propensity on the part of immigrants to become homeowners, concluding, "With respect to the great Australian dream of homeownership, immigrant groups are at least as and sometimes more 'Australian' than the Australian-born population" (Bourassa 1994, 135). The lower home-

ownership rates observed in some country-of-origin groups were attributed to differences in initial endowments; once adjusted, all groups approached the average for nonimmigrant Australians, while three groups exceeded that average. Bourassa also estimated a duration effect on ownership rates of 1.7 percentage points for one additional year of residence in Australia. However, this model, too, was constrained by its use of a single cross section of data. Not only were intercohort differences interpreted as the result of increasing duration, but age effects were commingled with duration and cohort effects.

Cohort studies have begun to emerge that address these shortcomings. McArdle and Masnick (1995) analyzed the homeownership trends of the immigrants focusing on selected birth cohorts within the 1970s immigrant cohort. Myers and Lee (1998) prepared a statistical analysis of homeownership that fully nested birth cohorts within the array of arrival cohorts, following the double cohort model proposed as a correction to the single cohort design of Borjas (1985, 1995). Pitkin et al. (1997) follow that nested, double cohort design to prepare forecasts of future housing consumption by extending the temporal trajectories estimated for different cohorts in the 1980 to 1990 period.

Two conclusions can be drawn from comparing the modeling evolution in the immigrant economic mobility and homeownership fields. One is that older methods will not necessarily be dropped in favor of newer, more complex methods. The other is that we can no longer afford to ignore the cohort solution—for both age and duration—which avoids the cross-sectional fallacy. The question of immigrant residential assimilation highlights the need for longitudinal representation, but the strong intergenerational differences among native-born residents also require modeling that avoids cross-sectional fallacies if meaningful comparisons with immigrant cohorts are to be drawn. The following analysis develops an appropriate cohort estimation of homeownership attainment by both immigrants and native-born residents.

Method and Data

Temporal Specification of the Cohort Model

As discussed above, the analysis of immigrant homeowners is characterized by the classical age-period-cohort identification problems in two different forms: (1) period of observation-birth cohort-age and (2) period of observation-arrival cohort-duration in the United States. Myers and Lee (1996) provide a formal discussion of this dual identification problem and how it can be resolved in immigration research. The essence of the newly proposed "double cohort" procedure is to nest birth cohorts within immigration cohorts (or within native-born status). Given observations at two separate points in time that identify duration (or year of immigration) and age (or birth year), such as data from two census years, the method permits cohort estimation on both the immigration duration and aging dimensions.

Advancement over time for each cohort is measured by the interaction of observation year with cohort, comparing the end-of-interval status with the status at the beginning. The relative advancement or assimilation of immigrants is then estimated through higher-level interaction effects that contrast immigrant advancement with native-born advancement in

the same birth cohort. The method yields specific effects for each cohort, not a generalized estimate, and the expected values for each dually defined cohort can be generated for comparison with the raw data or with the results from other models.

This system of estimation expresses effects relative to a reference cohort. Native-born residents comprise the reference for the immigrant arrival cohorts, while one birth cohort serves as the reference for all the other birth cohorts. In the present analysis, the cohort aged 45 to 54 in 1980 and 55 to 64 in 1990 serves as the reference, defining a group in their peak earning years and near the peak of their housing careers. As will be shown, this cohort has achieved the highest homeownership levels of any cohort in this century. Moreover, the reference cohort is aging well past 45, the age at which housing consumption is expected to decline in the cross-sectional model. More than an arbitrary statistical reference, this cohort precedes others in time and may serve as a role model for younger cohorts.

The cohort model can be described in two variations: one representation for native-born residents and a second that contrasts immigrants and native-born residents. These variations may be expressed as

$$\mathrm{L\,(H)} = \beta_1\mathbf{X} + \beta_2 Year + \beta_{3i} BC_i + \beta_{4i}(Year \cdot BC_i) \tag{1}$$

and

$$\begin{aligned}\mathrm{L\,(H)} = {} & \beta_1\mathbf{X} + \beta_2 Year + \beta_{3i} BC_i + \beta_{4i}(Year \cdot BC_i) + \beta_{5j} MC_j + \beta_{6j}(Year \cdot MC_j) \\ & + \beta_{7ij}(BC_i \cdot MC_j) + \beta_{8ij}(Year \cdot BC_i \cdot MC_j),\end{aligned} \tag{2}$$

where L (H) are log odds of homeownership; *Year* is census year (1980 = 0 and 1990 = 1); BC_i is age, or birth cohort, coded in 1980 as 15–24, 25–34, 35–44, 45–54, 55–64, or 65–74, and with each cohort 10 years older in 1990 (the reference group is 45–54 in 1980 and 55–64 in 1990); MC_j is immigration duration or year of arrival, coded as 1970s arrivals, 1960s arrivals, or pre-1960 arrivals (reference group is native born); $\mathbf{X}$ is a vector of covariates (marital status, education, income, relative housing prices, or other); β are logistic regression (logit) coefficients to be estimated; and the terms enclosed in parentheses are interactions.

Equation (1) estimates native-born homeownership attainment by birth cohort (BC_i), by year of observation (*Year*), and by the aging of each specific birth cohort ($Year \cdot BC_i$). *Year* indicates the gain of the reference cohort as it aged over the decade, and $Year \cdot BC_i$ represents the gain of each cohort relative to the reference cohort's gain. Adjustment for covariate effects may or may not alter the underlying temporal parameters.

Against this native-born model, immigrant progress can be estimated as in equation (2) by adding identification of migration cohort (MC_j) and the growing duration in the United States of each immigration cohort ($Year \cdot MC_j$). In addition, a joint effect of birth cohort and migration cohort ($BC_i \cdot MC_j$) is defined, which may be interpreted as an age-at-arrival effect. Finally, a high-level interaction joins all three temporal variables in a saturated model, but detailed analysis shows that the highest interaction is not needed to adequately model immigrant homeownership. (Myers and Lee 1998).

The major advantage of this cohort formulation is that it separates the effect of cohort "levels" from rates of change observed over a decade. In the models shown above, levels are represented by BC_i or MC_j, while the rates of change are given by *Year,* which pertains to the reference cohort of native-born residents aged 45 to 54 in 1980 and 55 to 64 in 1990, and by $Year \cdot BC_i$ or $Year \cdot MC_j$, which measures the differential rates of change for specific cohorts. A divergence between inferences based on levels and those based on rates of change is found whenever the change estimated for a cohort over a decade fails to close the difference found at the beginning of the decade between one cohort and its predecessor. In such an instance we may say that the trailing cohort is tracking above or below its predecessor.

The traditional, and simpler, cross-sectional models draw inferences solely from differences between BC_i or MC_j. Estimating homeownership in separate models for each observation year, or with dummy variable shifters to represent observation year in pooled samples, yields potentially biased results. The observed housing status at a given age is the level obtained by each cohort in a given year, but differences among age groups do not represent changes that can be inferred from aging alone. Instead, those differences reflect both changes with aging ($Year \cdot BC_i$) and relatively permanent differences among birth cohorts (BC_i) that are tracking on different levels. If the trailing cohort is tracking on a lower trajectory, then the cross-sectional coefficients will be upwardly biased. Among immigrants, a comparable bias occurs with MC_j, and it may be compounded with the biases associated with cross-sectional analysis of BC_i.

Data and Sample Selection

Models of homeownership attainment were estimated for males living in the 101 largest consolidated metropolitan statistical areas (CMSAs) or metropolitan statistical areas (MSAs) in the United States. These areas have been geographically recoded to a comparable basis in 1980 and 1990.[4] Approximately two-thirds of the nation's population is included in these geographic areas. We used the Public Use Microdata Sample (PUMS-A), 5 percent file, issued from the censuses of 1980 and 1990. We selected males because we wished to avoid assigning household headship/ownership to husbands or wives (Myers 1992). Following Chevan (1989), we assigned all of the headship/ownership shared by married couples to the male partner. Chevan finds that similar results are obtained in the case of females under equivalent procedures, because men and women share their housing status. A focus on males is also more compatible with the immigration research of labor economists upon which we draw. We drew samples for two groups of native-born residents (non-Hispanic white and Mexican American) and also for Mexican immigrants.[5]

Migration between 1980 and 1990 has a potentially confounding influence on the analysis of changes because of its effects on the sample composition. Over time individuals may move in or out of each of our defined metropolitan areas. Worse, Mexican immigrants are prone

[4] Coding for creation of equivalent metropolitan regions on the Public Use Microdata Sample (PUMS-A) files was kindly provided by Professor Mark Ellis of the Department of Geography at the University of California at Los Angeles.

[5] We used varying sample fractions because of the dramatically different size of the population universes in each group. Those sample fractions are white, non-Hispanic (0.15 percent), Mexican American (5.0 percent), and Mexican immigrant (5.0 percent).

to repeated migration between the United States and Mexico, especially in their early years of U.S. residence (Massey et al. 1987). This situation creates potential error in the measurement of year of immigration (Ellis and Wright 1998). The openness of the sample to these migration effects also potentially biases the cohort measurement of change if outmigrants have substantially different characteristics than inmigrants. Any difference is mitigated, however, to the extent that measures of attributes (such as education and income) can be introduced to control for shifting composition in the cohort. A less manageable problem pointed out by one reviewer is that our dependent variable—homeownership—may itself bear a systematic relationship to migration. Because homeowners are less mobile, those who remain in place from earlier cohorts would be more likely to be homeowners. This potential bias must be borne in mind in interpreting our findings.

Our dependent variable is the log odds that males are householders of owner-occupied single-family homes. This *per capita* measure of homeownership differs from the more common *per household* measure in that it subsumes household formation or headship within its definition. Studies that analyze only ownership rates of households fail to take into account the significant variation in household formation that exists between younger and older persons or between immigrants and native-born residents.[6] We have specified single-family ownership to control for shifts over time and for intergroup differences in the fraction of owners concentrated in mobile homes or multifamily units.

Other variables are defined in table 1. In addition to the temporal variables, a number of covariates are included. Hendershott (1988) and Green (1996) emphasize the importance of marital status in explaining homeownership trends over time, and we include dummy variables indicating whether the person is never married or formerly married (the reference is currently married). Previously married men are separately identified because they may retain some portion of the homeownership advantage acquired by married men. Also included is educational level, with dummy variables indicating persons with less than a high school degree or with four or more years of college (the reference is high school graduates and those with some college).[7] Education is expected to proxy both permanent income of the individual and socioeconomic status at time of upbringing, with more educated men more likely to be homeowners, all else equal. Green and Hendershott (1996) find that adjusting for education explains much of the lower homeownership rates observed in older persons in 1980.

Personal income is included to capture the ability to pay for housing. The alternative, household income, was considered but rejected because it is endogenous to the decision to share living quarters with other earners.[8] Personal income is the preferred measure of economic

[6] Analysis of household formation operates on a population base, using householder (headship) rates to divide persons into householders or nonhouseholders, whereas analysis of homeownership typically operates on a household base, using ownership rates to divide householders into owners or renters. The per capita homeownership rates in the present analysis are based on persons instead of households and measure the likelihood that an individual is the householder of an owner-occupied single-family unit. Because only one person in the unit is granted credit for the unit's consumption, other occupants of the same unit would be considered nonhouseholders and nonhomeowners. The greater the amount of sharing of residential units, the lower the per capita homeownership and the smaller the number of owned homes occupied by a population group of a given size.

[7] Changes in the census questionnaire between 1980 and 1990 force us to combine the "high school" and "some college" categories to maintain comparability between 1980 and 1990 (Myers and Lee 1996).

[8] Immigrants often double up in housing units and pool incomes to rent or buy housing. Whereas a larger number of wage earners may increase the household income, it also has the offsetting effect of reducing the individual-level headship and ownership of the occupants (since by definition they are sharing one unit).

Table 1. **Definition of Variables**

Dependent	
Single-family owner (head or spouse of head in owner-occupied, single-family detached or attached unit)	1 = yes
Independent	
Year (census year of observation, 1980 or 1990)	1 = 1990
BC (birth cohort, defined by age in 1980—15–24, 25–34, 35–44, 45–54, 55–64, 65–74—and 10 years older in 1990)	Five dichotomous variables (reference = 45–54 in 1980, 55–64 in 1990)
MC (immigration cohort, defined by year of arrival—1970–79, 1960–69, or pre-1960)	Three dichotomous variables (reference = native born)
Marital status (never married or formerly married)	Two dichotomous variables (reference = currently married)
Education (No_HS, less than high school completion; BA, four or more years of college)	Two dichotomous variables (reference = high school but less than four years of college)
Permanent personal income (Perm_Income, 1989 dollars in 1,000s)	Continuous
Transitory personal income (Tran_Income, 1989 dollars in 1,000s)	Continuous
Market owner-to-renter price ratio (measures the relative price of housing for comparison across metropolitan areas)	Continuous
Unit value-to-rent ratio (measures investment versus consumption components of the individual housing unit)	Continuous

Note: Universe for analysis consists of men living inside 101 largest CMSAs or MSAs. Separate samples are drawn for two groups of native-born men and one group of immigrants.

capacity in this analysis because it is consistent with the per capita basis for our housing demand estimation. Our model specification, which relates personal income to per capita homeownership, avoids potential biases stemming from immigrants' practice of doubling up in larger households and pooling incomes. A household-level analysis would overestimate immigrant males' individual probability of becoming homeowners, and an asymmetric design that combines per capita homeownership with household income would lead to other biases.

Permanent and transitory components were calculated using the standard procedure (Goodman and Kawai 1982).[9] Permanent income is derived as a predicted value from the coefficients estimated by a model in which observed personal income is regressed on a set of

[9] Results of these estimating models are available from the authors upon request.

independent variables, such as age, race, education, occupation, and disability status, that capture the individual's human capital. Nine census regions are also included to capture the factors that may not be identified in the individual human capital factors. Transitory income is calculated as the residual of observed personal income and predicted income. All 1979 incomes are adjusted to 1989 dollars using the national consumer price index.

Housing prices are modeled using an estimation procedure suggested by Goodman (1988). Goodman developed a technique that separates housing as consumption and investment goods through the formulation of market-specific owner-renter price ratios (PR_RATIO) and unit-specific value-to-rent ratios (VAL_RENT). The former is the relative price of owning compared with renting in each MSA, which controls for differences in the quality of houses across markets by pricing the owner bundle of characteristics y^* in each market and compares it with the renter bundle of characteristics y^* in the same market. A decreased ratio of owner to renter prices implies a greater incentive for owning.

The value-to-rent ratio prices the owner unit-specific bundle y and compares it with a similar renter bundle of characteristics y. Through a well-specified hedonic function, one can reconstruct any rental (owned) unit as if it were owned (rented). A set of high quasi-rents for a specific bundle suggests a market-indicated expectation for a capital gain. Low quasi-rents (i.e., negative) may suggest that units of a given type are no longer being built because of their lack of investment potential. Holding the relative prices of standardized amounts of housing constant, the value-to-rent ratio thus compares one unit with another for investment potential (Goodman 1988).[10]

Following Goodman (1988) and Wachter and Megbolugbe (1992), this study adopts a Box-Cox parameter of 0.3 for housing value regression and 0.6 for rent regression.[11]

Results

Native-Born Residents' Trajectories into Homeownership

Model Estimations. Estimations were carried out separately for two native-born groups: non-Hispanic whites and Mexican Americans. For each of these groups, four alternative models were estimated:

Model 1—the gross, unadjusted estimation that includes only birth cohort and year of observation;

[10] Alternative user cost measures relate the flow of services to the asset value with a term related to the real after-tax interest rate, expected capital gain, property tax rate, maintenance, management, and depreciation. Although theoretically elegant, derived user costs present several potential problems: (1) They can be quite volatile and may sometimes be negative (if expected capital gains are high), leading to problems in interpretation; (2) they do not typically provide a user-specific expected capital gain; and (3) the income tax rate is generally imputed rather than taken from tax returns. The approach used in this article addresses issues (1) and (2), although variations in marginal income tax are not addressed. Comparing the two methods would be a useful exercise but is beyond the scope of this article.

[11] The results of these hedonic regressions are available from the authors upon request.

Model 2—adds to Model 1 covariate adjustment: marital status, education, income, and relative housing prices;

Model 3—adds to Model 2 a set of interactions of educational attainment with birth cohort; and

Model 4—adds to Model 2 a set of interactions of income with birth cohort.[12]

The results of the estimation are reported in tables 2 and 3 for whites and Mexican Americans, respectively. Results are fairly similar for both groups, except for the higher overall level of homeownership among whites, so the discussion will concentrate on results in table 2.

The models are estimated relative to a reference cohort aged 45 to 54 in 1980 and 55 to 64 in 1990. As shown in Model 1, all cohorts have lower ownership attainment than this peak cohort (*BC* effects are negative), but the younger cohorts achieve steeper gains in ownership over time than does the reference cohort (*Year* · *BC* effects are positive).

Model 2 then introduces controls for covariates. All variables have their expected effects. Higher income increases the likelihood of homeownership, but at a decreasing rate. Permanent income has greater effect than does the transitory component. Never-married men have far lower odds of homeownership than married men, and that difference is somewhat less for men who were formerly married. Failure to complete a high school education lowers the likelihood of homeownership, but those who earn a college degree are only moderately more likely to be homeowners than high school graduates. Housing price terms have the expected effects: A relatively higher ratio of owner to renter prices in the local market reduces the probability of homeownership. Holding that ratio constant, higher expected appreciation (higher value-to-rent ratio) increases the probability of homeownership.

Green and Hendershott (1996) found educational attainment important for explaining differences in homeownership achievement by different cohorts. Presumably, less educated men have lower earnings over their lifetimes and possess less wealth, and so an earlier generation (now older) that achieved less education would also achieve lower rates of homeownership. However, a college education was likely much less of a determinant of homeownership in earlier decades, when today's older cohorts were passing through their prime home-buying years. To test this supposition, Model 3 includes the effect of both birth cohort membership and educational attainment (as does Model 2) but further specifies a series of interactions that represent the differential effect for each birth cohort of, alternatively, not completing high school or completing four or more years of college. The results clearly show that the effect of educational achievement on homeownership varies by birth cohort.[13] The effect of four years of college on achieving homeownership is not as beneficial for older non-Hispanic whites as it is for the middle-aged reference group or for younger cohorts. Conversely, the effect of not completing high school is not as deleterious for these older cohorts

[12] An additional model not reported here tested the interaction of housing price variables with birth cohort, but this proved generally insignificant as it increased the overall model chi-square only marginally.

[13] Comparison of model fit statistics in tables 2 and 3 shows that adding the education–birth cohort interactions increases model chi-square by 292 for non-Hispanic whites and 99 for Mexican Americans, both with 10 degrees of freedom.

Table 2. **Logistic Regression of Single-Family Homeownership Attainment of Native-Born, Non-Hispanic White Males, 1980 to 1990**

	Model 1		Model 2		Model 3		Model 4	
	Coefficient	Standard Error	Coefficient	Standard Error	Coefficient	Standard Error	Coefficient	Standard Error
Intercept	1.028	0.026***	1.189	0.105***	1.214	0.107***	1.389	0.122***
Year (1 = 1990, 0 = 1980)	0.075	0.038*	0.784	0.050***	0.768	0.050***	0.720	0.057***
Birth cohort in 1980 (BC, reference = 45–54)								
15–24	−3.864	0.050***	−2.248	0.062***	−2.177	0.067***	−2.820	0.098***
25–34	−1.184	0.031***	−0.731	0.039***	−0.755	0.046***	−1.470	0.094***
35–44	−0.171	0.035***	−0.174	0.041***	−0.135	0.050**	−0.542	0.103***
55–64	−0.115	0.036**	0.119	0.042**	0.030	0.053	0.659	0.115***
65–74	−0.485	0.040***	0.223	0.050***	0.067	0.066	0.924	0.118***
Aging effect with time (Year · BC, reference = year effect)								
15–24 to 25–34	2.240	0.059***	0.708	0.076***	0.661	0.077***	0.571	0.082***
25–34 to 35–44	0.673	0.045***	−0.105	0.059	−0.083	0.059	−0.100	0.065
35–44 to 45–54	0.049	0.050	−0.384	0.062***	−0.368	0.062***	−0.282	0.067***
55–64 to 65–74	−0.067	0.054	0.443	0.068***	0.454	0.068***	−0.056	0.102
65–74 to 75–84	−0.160	0.064*	0.134	0.076	0.174	0.076*	−0.511	0.107***

Table 2. **Logistic Regression of Single-Family Homeownership Attainment of Native-Born, Non-Hispanic White Males, 1980 to 1990** *(continued)*

	Model 1		Model 2		Model 3		Model 4	
	Coefficient	Standard Error	Coefficient	Standard Error	Coefficient	Standard Error	Coefficient	Standard Error
Income components (dollars in 1,000s)								
Permanent income	—	—	0.051	0.003***	0.051	0.003***	0.055	0.004***
Permanent income squared	—	—	−0.000	0.000***	−0.000	0.000***	−0.001	0.000***
Transitory income	—	—	0.029	0.001***	0.029	0.001***	0.021	0.001***
Transitory income squared	—	—	−0.000	0.000***	−0.000	0.000***	−0.000	0.000***
Marital status (reference = currently married)								
Never married	—	—	−2.307	0.030***	−2.333	0.031***	−2.287	0.031***
Divorced or widowed	—	—	−1.729	0.025***	−1.736	0.025***	−1.728	0.025***
Educational attainment (reference = high school graduate but less than four or more years of college)								
Did not complete high school	—	—	−0.364	0.025***	−0.338	0.052***	−0.438	0.025***
Four or more years of college	—	—	0.115	0.024***	0.050	0.058	0.103	0.024***
Housing price measures								
Unit value-to-rent ratio	—	—	2.891	0.051***	2.936	0.051***	2.944	0.051***
Market owner-to-renter price ratio	—	—	−4.043	0.091***	−4.077	0.092***	−4.153	0.092***
Interactions with education								
No_HS · 15–24	—	—	—	—	−0.574	0.086***	—	—
No_HS · 25–34	—	—	—	—	−0.441	0.076***	—	—
No_HS · 35–44	—	—	—	—	−0.144	0.075	—	—
No_HS · 55–64	—	—	—	—	0.219	0.070**	—	—
No_HS · 65–74	—	—	—	—	0.301	0.079***	—	—
BA · 15–24	—	—	—	—	0.142	0.071*	—	—
BA · 25–34	—	—	—	—	0.207	0.065**	—	—
BA · 35–44	—	—	—	—	−0.026	0.073	—	—
BA · 55–64	—	—	—	—	−0.091	0.085***	—	—
BA · 65–74	—	—	—	—	−0.287	0.105**	—	—

Table 2. **Logistic Regression of Single-Family Homeownership Attainment of Native-Born, Non-Hispanic White Males, 1980 to 1990** *(continued)*

	Model 1		Model 2		Model 3		Model 4	
	Coefficient	Standard Error	Coefficient	Standard Error	Coefficient	Standard Error	Coefficient	Standard Error
Interactions with income								
Perm_Income · 15–24	—	—	—	—	—	—	0.025	0.003***
Perm_Income · 25–34	—	—	—	—	—	—	0.025	0.003***
Perm_Income · 35–44	—	—	—	—	—	—	0.011	0.003***
Perm_Income · 55–64	—	—	—	—	—	—	−0.021	0.004***
Perm_Income · 65–74	—	—	—	—	—	—	−0.045	0.005***
Tran_Income · 15–24	—	—	—	—	—	—	0.026	0.001***
Tran_Income · 25–34	—	—	—	—	—	—	0.017	0.001***
Tran_Income · 35–44	—	—	—	—	—	—	0.003	0.001*
Tran_Income · 55–64	—	—	—	—	—	—	−0.000	0.001
Tran_Income · 65–74	—	—	—	—	—	—	−0.005	0.002**
Number of cases	101,568		101,568		101,568		101,568	
Degrees of freedom	11		21		31		31	
Log likelihood χ^2	20,956		49,475		49,767		50,344	

Note: See Table 1 for definitions of variables used in this table. Sample is drawn from 101 MSA/CMSAs that can be geographically matched in the 1980 and 1990 PUMS-A files. The sample universe includes 59 percent of all native-born white, non-Hispanic males in the United States in 1990.
*$p < 0.05$. **$p < 0.01$. ***$p < 0.001$.

Table 3. **Logistic Regression of Single-Family Homeownership Attainment of Native-Born Males of Mexican Origin, 1980 to 1990**

	Model 1		Model 2		Model 3		Model 4	
	Coefficient	Standard Error	Coefficient	Standard Error	Coefficient	Standard Error	Coefficient	Standard Error
Intercept	0.592	0.025***	2.051	0.101***	2.002	0.105***	2.373	0.122***
Year (1 = 1990, 0 = 1980)	0.210	0.037***	1.010	0.053***	0.995	0.052***	0.914	0.065***
Birth cohort in 1980 (BC, reference = 45–54)								
15–24	−3.676	0.046***	−2.569	0.057***	−2.461	0.066***	−3.033	0.098***
25–34	−1.160	0.031***	−1.109	0.037***	−0.978	0.050***	−1.674	0.094***
35–44	−0.211	0.034***	−0.363	0.039***	−0.276	0.055***	−0.584	0.104***
55–64	−0.014	0.042	0.261	0.049***	0.167	0.079*	0.671	0.139***
65–74	−0.288	0.059***	0.468	0.070***	0.126	0.143	0.687	0.178***
Aging effect with time (Year · BC, reference = year effect)								
15–24 to 25–34	1.747	0.056***	0.301	0.072***	0.302	0.072***	0.342	0.081***
25–34 to 35–44	0.381	0.044***	−0.332	0.058***	−0.325	0.058***	−0.251	0.069***
35–44 to 45–54	−0.057	0.049	−0.418	0.061***	−0.405	0.061***	−0.305	0.073***
55–64 to 65–74	−0.067	0.063	0.311	0.076***	0.293	0.076***	−0.174	0.133
65–74 to 75–84	−0.071	0.096	0.115	0.110	0.108	0.110	−0.205	0.177

Table 3. **Logistic Regression of Single-Family Homeownership Attainment of Native-Born Males of Mexican Origin, 1980 to 1990** *(continued)*

	Model 1		Model 2		Model 3		Model 4	
	Coefficient	Standard Error	Coefficient	Standard Error	Coefficient	Standard Error	Coefficient	Standard Error
Income components (dollars in 1,000s)								
Permanent income	—	—	0.055	0.004***	0.050	0.004***	0.047	0.005***
Permanent income squared	—	—	−0.000	0.000*	−0.000	0.000	−0.000	0.000***
Transitory income	—	—	0.048	0.001***	0.048	0.001***	0.034	0.001***
Transitory income squared	—	—	−0.000	0.000***	−0.000	0.000***	−0.000	0.000***
Marital status (reference = currently married)								
Never married	—	—	−2.211	0.033***	−2.227	0.033***	−2.194	0.034***
Divorced or widowed	—	—	−1.845	0.027***	−1.844	0.027***	−1.837	0.027***
Educational attainment (reference = high school graduate but less than four or more years of college)								
Did not complete high school	—	—	−0.405	0.022***	−0.251	0.048***	−0.407	0.022***
Four or more years of college	—	—	0.115	0.035**	−0.121	0.107	0.088	0.036*
Housing price measures								
Unit value-to-rent ratio	—	—	2.245	0.061***	2.253	0.062***	2.269	0.062***
Market owner-to-renter price ratio	—	—	−4.107	0.102***	−4.107	0.102***	−4.204	0.103***
Interactions with education								
No_HS · 15–24	—	—	—	—	−0.250	0.063***	—	—
No_HS · 25–34	—	—	—	—	−0.320	0.057***	—	—
No_HS · 35–44	—	—	—	—	−0.111	0.061	—	—
No_HS · 55–64	—	—	—	—	0.091	0.083	—	—
No_HS · 65–74	—	—	—	—	0.326	0.147*	—	—
BA · 15–24	—	—	—	—	0.335	0.119**	—	—
BA · 25–34	—	—	—	—	0.266	0.114*	—	—
BA · 35–44	—	—	—	—	0.052	0.125	—	—
BA · 55–64	—	—	—	—	0.058	0.206	—	—
BA · 65–74	—	—	—	—	0.738	0.456	—	—

Table 3. **Logistic Regression of Single-Family Homeownership Attainment of Native-Born Males of Mexican Origin, 1980 to 1990** *(continued)*

	Model 1		Model 2		Model 3		Model 4	
	Coefficient	Standard Error	Coefficient	Standard Error	Coefficient	Standard Error	Coefficient	Standard Error
Interactions with income								
Perm_Income · 15–24	—	—	—	—	—	—	0.022	0.004***
Perm_Income · 25–34	—	—	—	—	—	—	0.026	0.004***
Perm_Income · 35–44	—	—	—	—	—	—	0.010	0.004*
Perm_Income · 55–64	—	—	—	—	—	—	−0.024	0.006***
Perm_Income · 65–74	—	—	—	—	—	—	−0.033	0.014*
Tran_Income · 15–24	—	—	—	—	—	—	0.027	0.002***
Tran_Income · 25–34	—	—	—	—	—	—	0.022	0.002***
Tran_Income · 35–44	—	—	—	—	—	—	0.005	0.002**
Tran_Income · 55–64	—	—	—	—	—	—	0.001	0.003
Tran_Income · 65–74	—	—	—	—	—	—	0.008	0.006
Number of cases	102,144		102,144		102,144		102,144	
Degrees of freedom	11		21		31		31	
Log likelihood χ^2	23,244		49,478		49,577		49,911	

Note: See table 1 for definitions of variables used in this table. Sample is drawn from 101 MSA/CMSAs that can be geographically matched in the 1980 and 1990 PUMS-A files.

*$p < 0.05$. **$p < 0.01$. ***$p < 0.001$.

as it is for the youngest cohorts. Among Mexican Americans, differences in education effect among birth cohorts are somewhat muted but still important. Overall, these results suggest that it may be unwise to use educational attainment as an endowment factor without first identifying cohort membership.

Annual income might also affect homeownership attainment differently across birth cohorts. The series of interactions with income in Model 4 are a more effective model improvement than the education interactions, raising the model chi-square substantially.[14] Individual coefficients in the interaction terms reveal a decreasing effect of both permanent and transitory income across successively older birth cohorts, reflecting the fact that younger adults have had less time to save for a down payment or accumulate equity and thus are more reliant on current income. Moreover, older persons likely used their earnings to purchase homes when they were younger, so their current income has less direct effect on current housing.

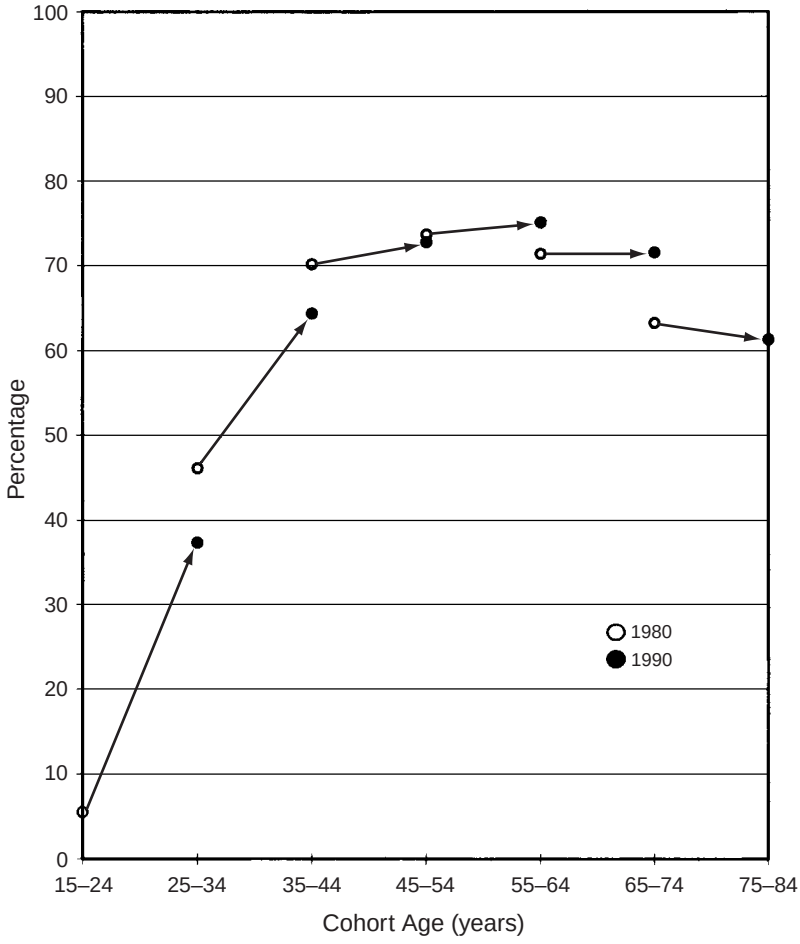
Visualizing the Cohort Trajectories. One useful way of viewing the overall pattern of results for cohorts is the expected value plots shown in figures 1 and 2. They display the gross pattern of homeownership attainment among native-born residents without controlling for other factors (Model 1). Two noteworthy observations, which come from examining the vertical gaps between data points in a given age category, are the lagging homeownership trajectories among the young cohorts and the overarching trajectories among elderly cohorts. These observations are evidence of a growing generation gap in homeownership that was first reported in Myers et al. (1992). We note also that the lagging achievements of young cohorts appear somewhat more extreme among Mexican Americans than among whites.[15]

Cohort Differences Adjusted for Endowments. How are the gross cohort effects on homeownership attainment affected by adjustments for major covariates? Green and Hendershott (1996) observe correctly that the gross age differences carry along a great many other characteristics that are associated with age. Green (1996) points in particular to the lower marriage rates among young cohorts to explain their lagging homeownership rates. The best way of viewing the model results once adjustment has been made for these and other factors is to compute the gaps between successive cohorts reaching a given age (e.g., the cohort in the 25–34 age group in 1980 and the next-younger cohort that occupies the same age group in 1990). Once adjustments have been made, we would expect the gaps in the gross plots of figures 1 and 2 to be reduced, because covariate adjustments control for differences in composition between successive cohorts and raise or lower the homeownership rates in different age groups. Controlling for education removes older cohorts' disadvantage of lower educational attainment, while controlling for marital status reduces the disadvantage of the youngest cohort. Controlling for income should greatly elevate the ownership odds among the elderly, because income normally is much lower in that age range.

[14] As indicated by comparison of model fit statistics in tables 2 and 3, the increase in model chi-square from adding the earnings-birth cohort interactions is more than triple that of the education–birth cohort interactions (868 for non-Hispanic whites and 432 for Mexican Americans, both with 10 degrees of freedom).

[15] Continued upward increases in homeownership during elderly years for Mexican Americans is most likely explained by differential mortality among owners, renters, and nonhouseholders. Although no firm data are available to test this assumption, circumstantial evidence discussed in Myers and Pitkin (1995) suggests that the greater attrition of renters and nonheads from the elderly population causes a higher ownership rate among the surviving population.

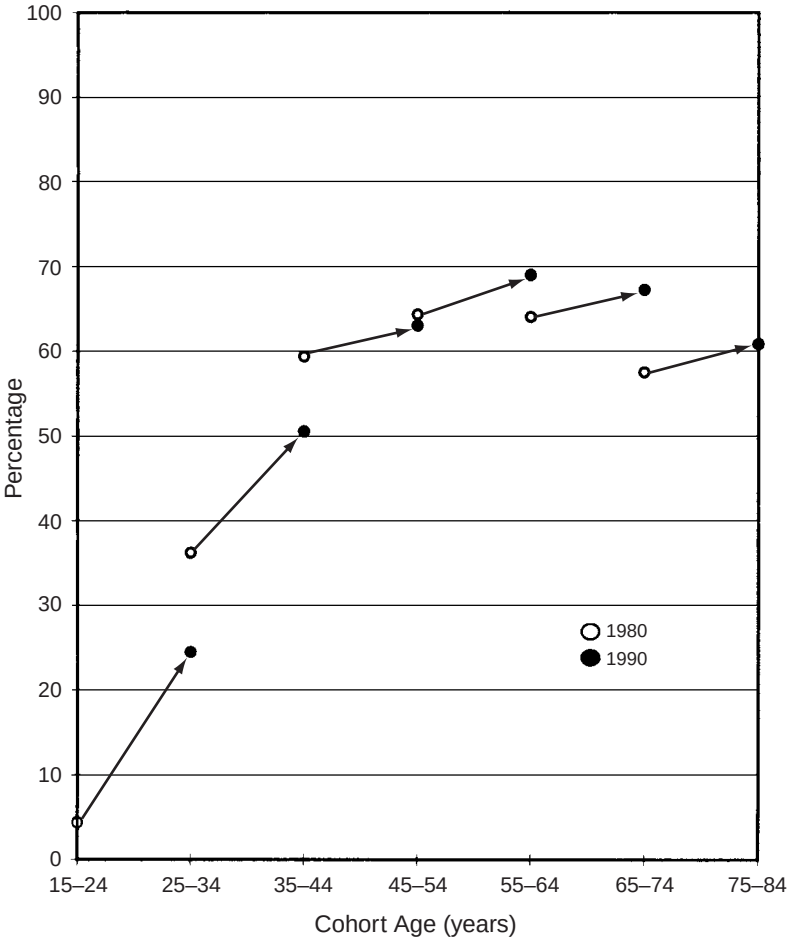
Figure 1. **Cohort Trajectories of Native-Born Non-Hispanic White Males Who Are Single-Family Homeowners, 1980 to 1990**



The intercohort gaps estimated by each model for each of the two native-born groups are reported in table 4. The gaps found under Model 1 directly match those shown in figures 1 and 2. Under Model 2, after adjustment for all covariates,[16] the intercohort gaps are reduced among the younger cohorts but increased among the two older cohorts. Similar results obtain under Models 3 and 4. Nevertheless, in all the models for both groups, the lagging homeownership trajectories of cohorts reaching age 25–34 fail to be erased. Under Model 4, the best-fitting overall model in both groups, the gaps between successive young cohorts are reduced the most, but only by half their unadjusted magnitude.

[16] The income and relative house price terms were set to the mean for each sample group, while the dummy coded variables were left at their reference values: currently married, high school graduates with less than four years of college.

Figure 2. **Cohort Trajectories of Native-Born Mexican-American Males Who Are Single-Family Homeowners, 1980 to 1990**



Overall, these results seem very clear. Income and price matter, as do personal demographics, but cohort differences remain, and younger cohorts are tracking across successive age groups with persistently lower homeownership rates. The drop in homeownership at ages 35 to 44 in 1990 is clearly driven by the lower homeownership rates carried into that age bracket by cohorts who were aged 25 to 34 in 1980. Those differences are sustained even after adjusting for marital status, education, income, and relative house prices.

Immigrant Trajectories into Homeownership. We now turn to an evaluation of housing consumption by Mexican immigrants. These men are compared with native-born men who are otherwise similar, including membership in the same birth cohort, but adding immigration cohort identification as specified in equation (2). Two alternative estimations were carried out—the gross temporal model (Model 1) and the model with all covariates added (Model

Table 4. **Differential in Single-Family Homeownership Rates between 1980 and 1990 for Successive Native-Born Cohorts at Comparable Ages**

	Model 1			Model 2			Model 3			Model 4		
	1980	1990	Gap	1980	1990	Gap	1980	1990	Gap	1980	1990	Gap
White, non-Hispanic males												
25–34	46.1	37.3	−8.8	62.3	57.0	−5.3	62.2	57.6	−4.5	61.9	57.5	−4.5
35–44	70.2	64.4	−5.8	74.2	72.8	−1.4	75.3	72.8	−2.5	73.7	71.3	−2.4
45–54	73.7	72.7	−0.9	77.4	78.0	0.5	77.7	78.9	1.2	78.5	77.3	−1.2
55–64	71.4	75.1	3.7	79.4	86.1	6.6	78.3	86.1	7.8	80.8	85.5	4.6
65–74	63.3	71.5	8.3	81.1	91.6	10.5	78.9	90.9	12.1	75.2	86.6	11.4
Mexican-American males												
25–34	36.2	24.5	−11.7	46.5	39.3	−7.2	47.8	39.7	−8.1	45.2	38.4	−6.9
35–44	59.4	50.6	−8.9	64.7	59.7	−5.0	64.8	60.7	−4.1	64.7	58.1	−6.6
45–54	64.4	63.0	−1.3	72.5	74.1	1.6	70.9	74.2	3.4	73.3	73.7	0.4
55–64	64.1	69.0	5.0	77.4	86.2	8.8	74.2	85.1	10.9	78.3	85.0	6.7
65–74	57.6	67.3	9.7	80.8	91.7	10.9	73.4	90.0	16.6	76.3	86.3	10.0

Note: Model 1 is the gross, unadjusted estimation that includes only birth cohort and year of observation. Model 2 adds to Model 1 covariate adjustment: marital status, education, income, and housing prices. Model 3 adds to Model 2 a set of interactions of educational attainment with birth cohort. Model 4 adds to Model 2 a set of interactions of income with birth cohort. The single-family homeownership rate is the percentage of males who own a single-family attached or detached unit, excluding mobile homes.

2).[17] In this analysis, we compare the Mexican immigrants with two alternative native-born reference groups, either Mexican Americans or non-Hispanic whites. The Mexican Americans are the native-born reference group that is most similar to the Mexican immigrants, sharing a racial, linguistic, and cultural heritage. The non-Hispanic white reference group is used to proxy the majority culture in the United States.

Model Estimations. Results are presented in table 5. Few substantive differences were found between models using the two alternative reference groups, aside from the relatively lower rates of homeownership of Mexican immigrants when compared with whites rather than Mexican Americans. Accordingly, the discussion focuses on the comparison of Mexican immigrants with Mexican Americans.

Birth cohort and aging effects are similar to those estimated above in the simpler native-born models. What has been added are the effects of immigration cohort (*MC*) and increased duration in the United States (*Year* · *MC*). In Models 1 and 2, we see that recent arrivals have far lower odds of homeownership than native-born residents and that this gap is progressively reduced across immigration cohorts as duration in the United States increases. Equally important, we observe that the rate of increase in homeownership attainment between 1980 and 1990 is greater for more recent immigrants than for the longer-settled immigrants and greater for the longer-settled immigrants than for native-born residents.[18]

The models also reveal substantial age-at-arrival effects (*BC* · *MC*). In particular, immigrants who were younger when they arrived demonstrate a greater likelihood of attaining homeownership than do immigrants who were older when they arrived. The likely explanation is that the older immigrants have not had the accumulated advantage of lifetime housing and economic careers in the United States. Hence, their achievement levels are not as high. Myers and Lee (1998) explore the pattern of age-at-arrival effects for homeownership attainment in more detail among Asians and Hispanics who live in Southern California.

Overall, what is most striking about the estimation results is how little difference there is between Model 1 and Model 2 with regard to the cohort variables. Adding covariates for cohort endowments—marital status, education, income, and housing prices—does not alter the fundamental differences between immigrants and natives or between different arrival cohorts and birth cohorts of immigrants. When endowments are controlled, the magnitude of the cohort differentials is somewhat reduced. Young cohorts are less disadvantaged after adjustment, and the aging effect with time is substantially reduced. However, the disadvan-

[17] Additional interaction terms between birth cohort and education or income are not included because of the greater complexity of the models adding immigration cohort identification. In any event, as suggested by the summary of results in table 4, Model 2 is a reasonable representation of intercohort changes.

[18] As previously noted, the disproportionate increase in homeownership by Mexican immigrants over time could reflect the differential emigration or circular migration of renters. This hypothesis is certainly plausible, and one would expect the selective migration effect to be strongest in the initial few years of U.S. residence (Ellis and Wright 1998; Massey et al. 1987). However, the estimations reported in table 5 show enhanced immigrant movement into homeownership even among those who had resided in the United States for 20 to 29 years as of 1990. A separate analysis by Myers and Lee (1998) found a similar pattern of sustained homeownership progress by Mexican immigrants in southern California. Countering the argument of selective migration effects, even more rapid progress was found among recent Asian immigrants in that region, a group much less prone to emigration and, presumably, the selective effects of rising homeownership. Accordingly, the present evidence of Mexican immigrants' progress toward homeownership lies well within the bounds of reason despite the presumed risk of selective migration effects.

Table 5. **Logistic Regression Contrasting Single-Family Homeownership Attainment of Mexican Immigrants and Native-Born Males, 1980 to 1990**

	Comparison with Mexican Americans				Comparison with Non-Hispanic Whites			
	Model 1		Model 2		Model 1		Model 2	
	Coefficient	Standard Error	Coefficient	Standard Error	Coefficient	Standard Error	Coefficient	Standard Error
Intercept	0.608	0.024***	2.218	0.080***	1.021	0.024***	1.609	0.081***
Year (1 = 1990, 0 = 1980)	0.175	0.032***	0.883	0.043***	0.091	0.032**	0.777	0.042***
Birth cohort in 1980 (BC, reference = 45–54)								
15–24	−3.679	0.042***	−2.633	0.050***	−3.775	0.044***	−2.257	0.053***
25–34	−1.180	0.028***	−1.151	0.034***	−1.162	0.029***	−0.755	0.035***
35–44	−0.243	0.031***	−0.412	0.036***	−0.196	0.031***	−0.235	0.037***
55–64	−0.017	0.038	0.247	0.044***	−0.111	0.034***	0.131	0.039***
65–74	−0.305	0.053***	0.400	0.063***	−0.497	0.038***	0.192	0.046***
Aging effect with time (Year · BC, reference = year effect)								
15–24 to 25–34	1.766	0.047***	0.471	0.060***	2.129	0.049***	0.732	0.062***
25–34 to 35–44	0.423	0.036***	−0.170	0.047***	0.626	0.037***	−0.042	0.047
35–44 to 45–54	0.011	0.039	−0.267	0.047***	0.100	0.040*	−0.257	0.048***
55–64 to 65–74	−0.063	0.050	0.275	0.060***	−0.074	0.045	0.373	0.055***
65–74 to 75–84	−0.034	0.070	0.152	0.079	−0.122	0.054*	0.143	0.062*
Immigration cohort in 1980 (MC, reference = native-born)								
1970s immigrants	−2.244	0.066***	−2.053	0.072***	−2.556	0.065***	−1.783	0.072***
1960s immigrants	−1.020	0.053***	−0.925	0.059***	−1.364	0.053***	−0.666	0.060***
Pre-1960 immigrants	−0.342	0.045***	−0.364	0.050***	−0.734	0.044***	−0.106	0.051*

Table 5. **Logistic Regression Contrasting Single-Family Homeownership Attainment of Mexican Immigrants and Native-Born Males, 1980 to 1990** *(continued)*

	Comparison with Mexican Americans				Comparison with Non-Hispanic Whites			
	Model 1		Model 2		Model 3		Model 4	
	Coefficient	Standard Error	Coefficient	Standard Error	Coefficient	Standard Error	Coefficient	Standard Error
Duration effect with time (Year · MC, reference = year effect)								
1970s immigrants	0.590	0.035***	0.498	0.038***	0.499	0.035***	0.427	0.038***
1960s immigrants	0.190	0.037***	0.166	0.041***	0.142	0.038***	0.121	0.041**
Pre-1960 immigrants	0.036	0.041	0.033	0.046	0.080	0.039*	0.008	0.044
Age-at-arrival effects (MC · BC, reference = MC effect)								
For 1970s immigrants								
15–24	1.446	0.069***	1.521	0.075***	1.265	0.069***	1.005	0.075***
25–34	0.889	0.067***	1.110	0.073***	0.751	0.067***	0.674	0.072***
35–44	0.443	0.072***	0.697	0.078***	0.348	0.072***	0.513	0.078***
55–64	−0.207	0.128	−0.372	0.138**	−0.113	0.127	−0.327	0.135*
65–74	−0.217	0.227	−0.502	0.241*	0.019	0.223	−0.321	0.235
For 1960s immigrants								
15–24	0.990	0.070***	0.953	0.078***	0.812	0.070***	0.481	0.078***
25–34	0.809	0.058***	0.880	0.064***	0.683	0.058***	0.467	0.064***
35–44	0.336	0.060***	0.485	0.066***	0.243	0.060***	0.310	0.066***
55–64	−0.159	0.099	−0.211	0.107*	−0.070	0.097	−0.182	0.105
65–74	−0.313	0.165	−0.418	0.178*	−0.106	0.161	−0.283	0.173
For pre-1960 immigrants								
15–24	0.977	0.122***	0.672	0.140***	0.801	0.124***	0.221	0.139
25–34	0.439	0.061***	0.428	0.070***	0.315	0.061***	0.049	0.069
35–44	0.214	0.059***	0.333	0.067***	0.123	0.059*	0.180	0.066**
55–64	−0.023	0.061	−0.087	0.068	0.072	0.059	−0.050	0.065
65–74	0.213	0.073**	0.232	0.082**	0.433	0.065***	0.365	0.072***

Table 5. **Logistic Regression Contrasting Single-Family Homeownership Attainment of Meixan Immigrants and Native-Born Males, 1980 to 1990** *(continued)*

	Comparison with Mexican Americans				Comparison with Non-Hispanic Whites			
	Model 1		Model 2		Model 1		Model 2	
	Coefficient	Standard Error	Coefficient	Standard Error	Coefficient	Standard Error	Coefficient	Standard Error
Income components (dollars in 1,000s)								
Permanent income	—	—	0.050	0.003***	—	—	0.044	0.003***
Permanent income squared	—	—	0.000	0.000	—	—	−0.000	0.000***
Transitory income	—	—	0.046	0.001***	—	—	0.035	0.000***
Transitory income squared	—	—	−0.000	0.000***	—	—	−0.000	0.000***
Marital status (reference = currently married)								
Never married	—	—	−2.228	0.029***	—	—	−2.310	0.027***
Divorced or widowed	—	—	−1.784	0.023***	—	—	−1.710	0.022***
Educational attainment (reference = high school graduate but less than four or more years of college)								
Did not complete high school	—	—	−0.356	0.017***	—	—	−0.342	0.018***
Four or more years of college	—	—	0.051	0.031	—	—	0.090	0.022***
Housing price measures								
United value-to-rent ratio	—	—	2.548	0.047***	—	—	2.889	0.042***
Market owner-to-renter price ratio	—	—	−4.467	0.080***	—	—	−4.374	0.074***
Number of cases	173,719		173,719		173,143		173,143	
Degrees of freedom	32		42		32		42	
Log likelihood χ^2	37,395		75,361		44,421		84,283	

*$p < 0.05$. **$p < 0.01$. ***$p < 0.001$.

tages of Mexican immigrant cohorts compared with native-born residents are only moderately reduced by covariate controls, and the effect of increasing duration of residence on Mexican immigrants' homeownership attainment is not substantially altered.

Visualizing the Cohort Trajectories. A useful view of the model estimations is provided by the double cohort plots in figures 3 and 4, which display the expected values yielded by Model 1 in table 5. Ownership levels are much lower among 1970s arrivals than among longer-settled immigrants, but recent immigrants double their ownership rates between 1980 and 1990. Also noteworthy is the strength of the movement into homeownership among immigrants in the age 25–34 cohort in 1980 compared with the same birth cohort among native-born residents. Finally, among both 1970s and 1960s arrivals, the birth cohorts arriving at each age group in 1990 achieve higher homeownership rates than the previous cohort occupying that age group in 1980. This is the opposite of the pattern observed among young native-born residents.

Cohort Differences Adjusted for Endowments. Cohort endowments likely differ between immigrants and native-born residents, principally in terms of education and income, and there also may be substantial changes between 1980 and 1990. These differentials could translate

Figure 3. **Double Cohort Trajectories of Mexican-Heritage Males Who Are Single-Family Homeowners, 1980 to 1990 (1970s and 1960s Arrivals)**

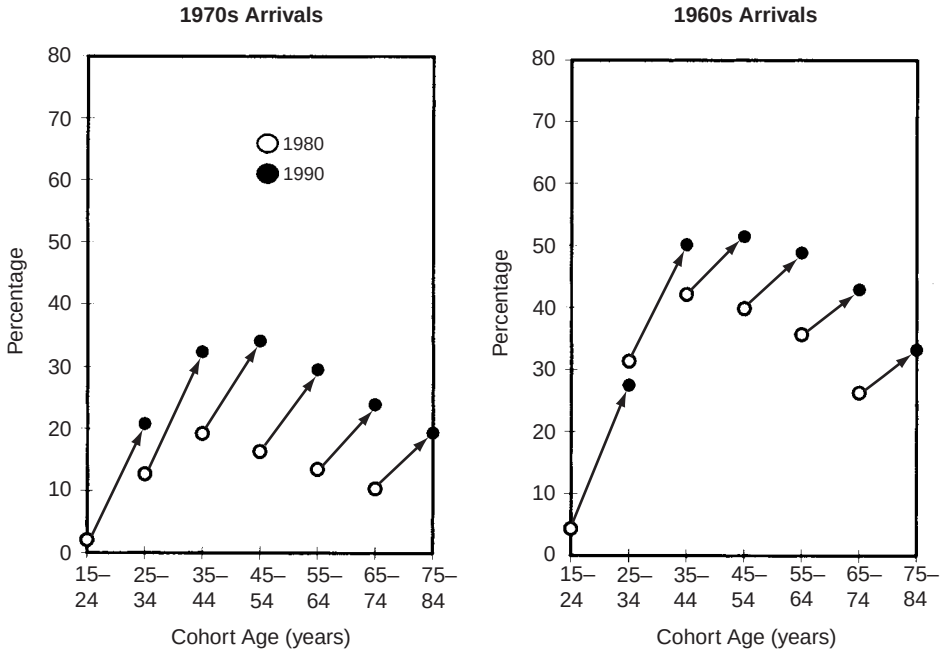
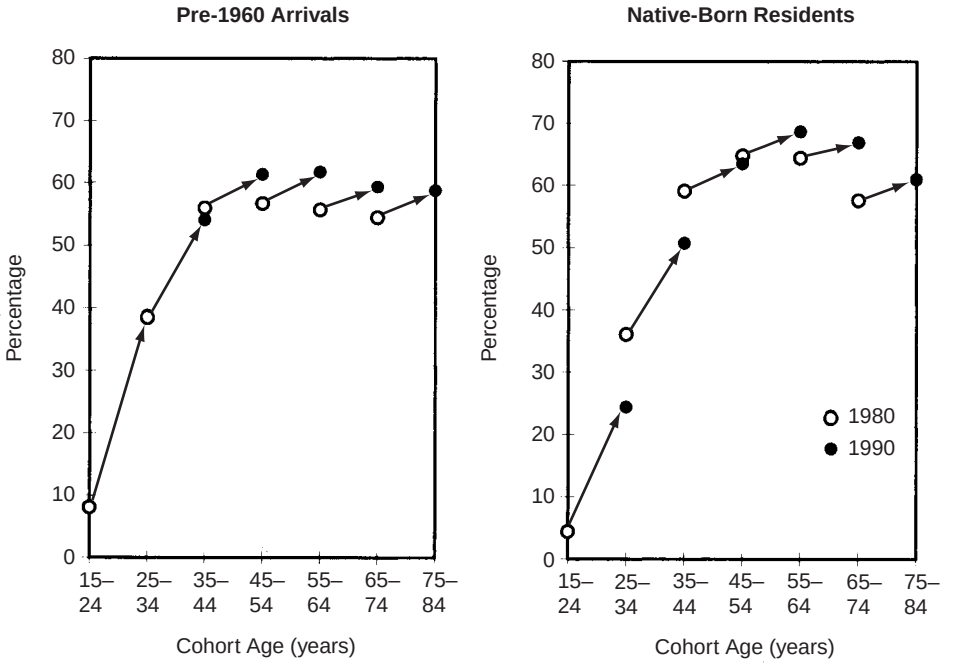


Figure 4. **Double Cohort Trajectories of Mexican-Heritage Males Who Are Single-Family Homeowners, 1980 to 1990 (Pre-1960 Arrivals and Native-Born Residents)**



at least partially into the observed differences in cohorts' attainment of homeownership. To explore this matter, table 6 computes the single-family homeownership rates at each age that would be expected if covariate values in Model 2 of table 5 were controlled to a standard set of values. The top panel of table 6 gives the unadjusted values that reflect the pattern of cohort succession displayed in figures 3 and 4. For example, at ages 25 to 34 among native-born residents, the 1990 cohort has an ownership rate that is 11.7 percentage points lower than that of the cohort occupying that age group in 1980. Conversely, among 1970s arrivals, the 1990 cohort at ages 25 to 34 has an ownership rate that is 8.1 percentage points higher than that of the cohort occupying that age group in 1980.

The lower panel displays the expected ownership rates after adjusting for covariate values. The pattern of lagging ownership rates among native-born residents is substantially mitigated by this adjustment, as demonstrated in the 25–34 age group, where the gap has decreased from 11.7 to 3.1 percentage points. Among the immigration arrival cohorts, the advantages of cohorts occupying an age group in 1990 are accentuated even further. However, it should be noted that among immigrants, not only are birth cohorts replacing their predecessors in an age group because of the aging process, but at the same time immigration arrival cohorts are replacing their predecessors in the same duration of residence interval

Table 6. **Differential in Single-Family Homeownership Rates between 1980 and 1990 for Successive Cohorts of Mexican-Heritage Males at Comparable Ages, by Native-Born Status or Immigration Arrival Cohort**

	Native Born			1970s Arrivals			1960s Arrivals			Pre-1960 Arrivals		
	1980	1990	Gap	1980	1990	Gap	1980	1990	Gap	1980	1990	Gap
Unadjusted[a]												
25–34	36.1	24.4	−11.7	12.7	20.8	8.1	31.4	27.5	−3.9	38.3	38.7	0.4
35–44	59.0	50.7	−8.4	19.2	32.3	13.1	42.1	50.1	8.0	55.9	54.0	−1.9
45–54	64.8	63.4	−1.3	16.3	34.1	17.8	39.8	51.4	11.6	56.6	61.3	4.7
55–64	64.4	68.6	4.3	13.5	29.5	16.0	35.7	48.8	13.1	55.6	61.7	6.1
65–74	57.5	66.9	9.4	10.4	23.9	13.6	26.3	42.9	16.6	54.3	59.3	4.9
Adjusted[b]												
25–34	43.7	40.6	−3.1	23.3	39.8	16.5	42.6	45.3	2.7	45.3	49.0	3.7
35–44	61.9	61.3	−0.6	29.5	50.4	20.9	51.2	64.1	13.0	61.2	63.6	2.4
45–54	71.1	75.1	4.0	24.0	56.1	32.1	49.3	69.6	20.3	63.1	75.1	12.0
55–64	75.9	85.6	9.7	21.8	55.7	33.9	50.2	73.5	23.3	66.7	81.0	14.3
65–74	78.6	90.9	12.3	22.2	59.3	37.1	48.9	79.1	30.3	76.3	86.8	10.6

Note: The single-family homeownership rate is the percentage of males who own a single-family attached or detached unit, excluding mobile homes.

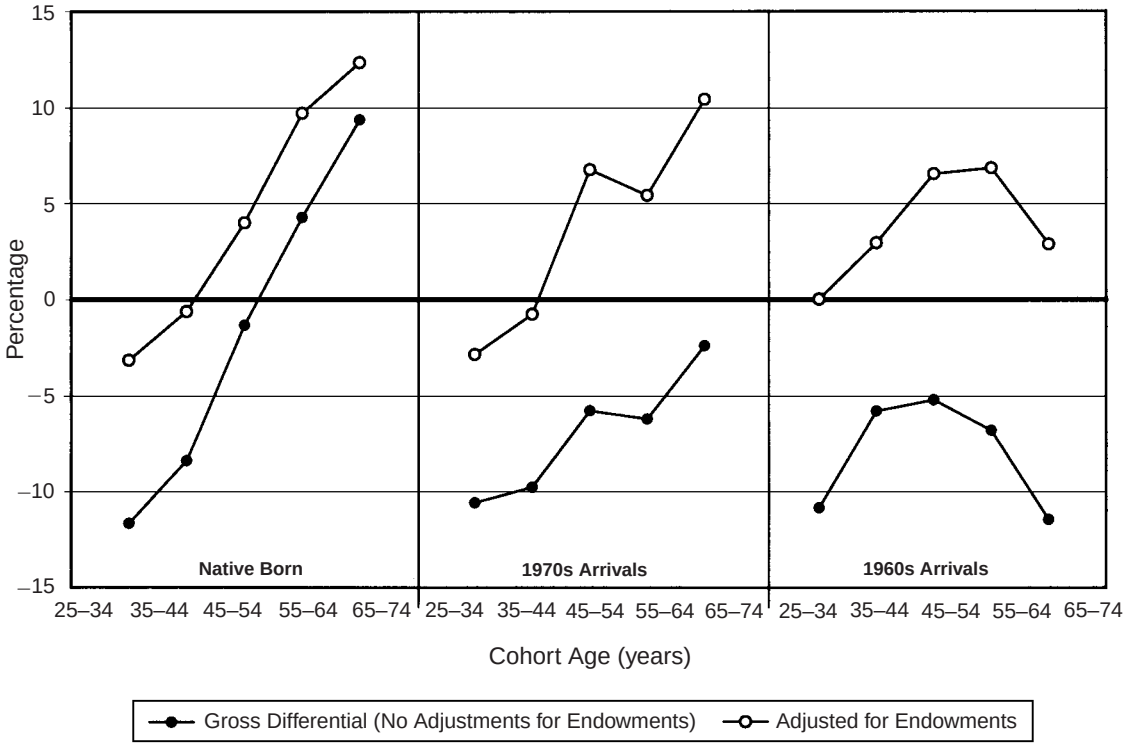
[a]The adjusted rates are derived from Model 1 (Mexican Americans) of table 5.

[b]The rates adjusted for endowments are derived from Model 2 (Mexican Americans) of table 5. Income and housing prices are set to 1990 native-born mean, marital status is set to married, and education is set to high school completion or some college.

as length of U.S. residence increases. Thus, the duration experience of 1970s arrivals in 1990 equals that of 1960s arrivals in 1980. Accordingly, for immigrants we should trace cohort succession on dual dimensions, further manipulating the ownership rates in table 6 to compare, for example, those of 1970s immigrants in the 25–34 age group in 1990 with those of 1960s immigrants in the 25–34 age group in 1980.

The results of calculating ownership differentials for a succession of cohorts at both comparable ages and durations of U.S. residence are displayed in figure 5. Among native-born residents, the gross differential is negative for the three most recent birth cohorts, but adjusting for endowments substantially eliminates that differential. Among 1970s and 1960s arrivals, the gross differential is negative for all birth cohorts. Unlike the positive differential shown in table 6, which is calculated solely on the basis of birth cohort succession and ignores the greater duration of U.S. residence of the 1990 cohort, figure 5 takes account of arrival cohort succession. We find that the 1990 ownership attainment falls below the 1980 attainment of the previous arrival cohort in the same age group. After adjusting for endowments, however, this negative differential is substantially eliminated. This fact indicates that much of the observed homeownership disadvantage among recent Mexican immigrants

Figure 5. **Differential in Single-Family Homeownership Rates between 1980 and 1990 for Successive Cohorts of Comparable Age and Duration of U.S. Residence**



is due to their lower endowments, including education, marital status, income, and the relative housing prices they face.[19]

Conclusion

Homeownership attainment is not a consumer decision of the moment but is part of a lifetime consumer career. The cumulative nature of homeownership attainment introduces substantial lags into the consumption decision; thus, the observed homeownership levels of today are often the product of previous decades' experience. Current comparisons among generations embody differences across cohorts in career lengths as well as in the effects of economic and housing market conditions that may have prevailed for older cohorts in previous decades. Recognizing this temporal context, cohort models of homeownership emphasize the continuity between past achievements and current homeownership levels. These models also separate aging effects from differences among birth cohorts in levels of achievement.

Immigrants pose even greater temporal complexity for estimation of homeownership attainment. Immigrants' homeownership increases markedly over time for two reasons. Like native-born residents, immigrants' likelihood of homeownership grows over the life course and may differ among birth cohorts. In addition, however, homeownership among immigrants also grows as their residence in the United States increases. The latter constitutes an assimilation effect and is separated from the aging effect by means of the double cohort estimation used in this study. Our model also separates the assimilation effect from the levels of achievement observed for successive waves of immigrants, just as aging effects are separated from relatively permanent differences between the homeownership trajectories of birth cohorts.

Cohort models hold strong potential as the basis for forecasting the housing consumption of immigrants. Even with adjustments for income or other covariates, the temporal structure of homeownership remains firmly in place, providing a strong basis for modeling longitudinal changes. In addition, birth cohort and immigration cohort both imply a set of income and other endowments common to different life stages. If those endowments are left uncontrolled, their status is carried along implicitly by the temporal variables. The longitudinal momentum implicit in the temporal structure provides an opportunity to construct useful forecasts of homeownership attainment. Further research is needed to explore the implications of the presently observable cohort structure for future homeownership attainment.

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[19] The large positive differentials for older cohorts are possibly misleading, because older immigrant men are especially unlikely to achieve the high income levels of native-born men that are used for this adjustment. Nor are the older men as likely to face current housing prices as are young men. Accordingly, the adjustment process yields the most meaningful results for the two or three youngest cohorts.

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